

Energy Tidbits

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Supplemental Documents

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Short-Term Energy Outlook (STEO)

Forecast highlights

Global liquid fuels

- Brent crude oil spot prices averaged \$71 per barrel (b) in May, largely unchanged from April 2019 and almost \$6/b lower than the price in May of last year. However, Brent prices fell sharply in recent weeks, reaching \$62/b on June 5. EIA forecasts Brent spot prices will average \$67/b in 2019, \$3/b lower than the forecast in last month's STEO, and remain at \$67/b in 2020. EIA's lower 2019 Brent price path reflects rising uncertainty about global oil demand growth.
- EIA forecasts global oil inventories will decline by 0.3 million barrels per day (b/d) in 2019 and then increase by 0.3 million b/d in 2020. Although global liquid fuels demand outpaces supply in 2019 in EIA's forecast, global liquid fuels supply is forecast to rise by 2.0 million b/d in 2020, with 1.4 million of that growth coming from the United States. Global oil demand rises by 1.4 million b/d in 2020 in the forecast, up from expected growth of 1.2 million b/d in 2019.
- Annual U.S. crude oil production reached a [record 11.0 million b/d in 2018](#). EIA forecasts that U.S. production will increase by 1.4 million b/d in 2019 and by 0.9 million b/d in 2020, with 2020 production averaging 13.3 million b/d. Despite EIA's expectation for slowing growth, the 2019 forecast would be the second-largest annual growth on record (following 1.6 million b/d in 2018), and the 2020 forecast would be the fifth-largest growth on record.
- For the 2019 summer driving season, which runs from April through September, EIA forecasts that U.S. regular gasoline retail prices will average \$2.76 per gallon (gal), down from an average of \$2.85/gal last summer. The lower forecast gasoline prices primarily reflect EIA's expectation of lower crude oil prices this summer.

Natural gas

- The Henry Hub natural gas spot price averaged \$2.64/million British thermal units (MMBtu) in May, almost unchanged from April. EIA expects strong growth in U.S. natural gas production to put downward pressure on prices in 2019. EIA expects Henry Hub natural gas spot prices will average \$2.77/MMBtu in 2019, down 38 cents/MMBtu from 2018. EIA expects natural gas prices in 2020 will again average \$2.77/MMBtu.

- EIA forecasts that U.S. dry natural gas production will average 90.6 billion cubic feet per day (Bcf/d) in 2019, up 7.2 Bcf/d from 2018. EIA expects natural gas production will continue to grow in 2020, albeit at a slower rate, averaging 91.8 Bcf/d next year.
- U.S. natural gas exports averaged 9.9 Bcf/d in 2018, and EIA forecasts that they will rise by 2.5 Bcf/d in 2019 and by 2.9 Bcf/d in 2020. Rising exports reflect increases in liquefied natural gas exports as new facilities come online. Rising natural gas exports are also the result of an expected increase in pipeline exports to Mexico.
- EIA estimates that natural gas inventories ended March at 1.2 trillion cubic feet (Tcf), 15% lower than levels from a year earlier and 28% lower than the five-year (2014–18) average. EIA forecasts that natural gas storage injections will outpace the previous five-year average during the 2019 April-through-October injection season and that inventories will reach almost 3.8 Tcf at the end of October, which would be 17% higher than October 2018 levels and about equal to the five-year average.

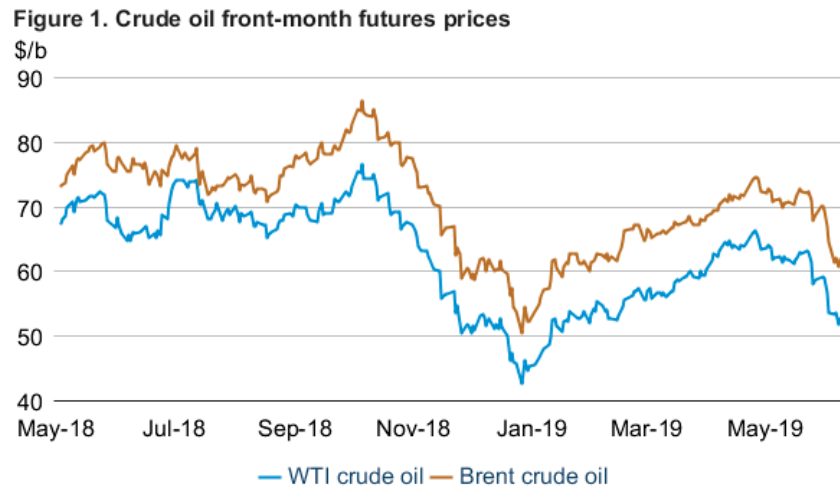
Electricity, coal, renewables, and emissions

- EIA expects the share of U.S. total utility-scale electricity generation from natural gas-fired power plants to rise from 35% in 2018 to 37% in 2019 and to 38% in 2020. EIA forecasts that the share of generation from coal will average 24% in 2019 and 23% in 2020, down from 27% in 2018. The forecast nuclear share of generation falls from 20% in 2019 to 19% in 2020, reflecting the retirement of some nuclear reactors. Hydropower averages a 7% share of total generation in the forecast for 2019 and 2020, similar to 2018. Wind, solar, and other nonhydropower renewables together provided 10% of U.S. generation in 2018. EIA expects they will provide 11% in 2019 and 13% in 2020.
- EIA forecasts that renewable fuels, including wind, solar, and hydropower, will collectively produce 18% of U.S. electricity in 2019 and almost 20% in 2020. EIA expects that annual generation from wind will surpass hydropower generation for the first time in 2019 to become the leading source of renewable electricity generation and maintain that position in 2020.
- EIA forecasts that U.S. coal consumption, which reached a 39-year low of 687 million metric tons (MMst) in 2018, will fall to 602 MMst in 2019 and to 567 MMst in 2020. The falling consumption reflects lower demand for coal in the electric power sector.
- After rising by 2.7% in 2018, EIA forecasts that U.S. energy-related carbon dioxide (CO₂) emissions will decline by 2.0% in 2019 and by 0.9% in 2020. EIA expects U.S. CO₂ emissions will fall in 2019 and in 2020 because its forecast assumes that temperatures will return to near normal, and because the forecast share of electricity generated from natural gas and renewables increases while the forecast share generated from coal, which produces more CO₂ emissions, decreases. Energy-related CO₂ emissions are sensitive to weather, economic growth, energy prices, and fuel mix.

Petroleum and natural gas markets review

Crude oil

Prices: The front-month futures price for Brent crude oil settled at \$61.67 per barrel (b) on June 6, 2019, a decrease of \$10.51/b from May 1. The front-month futures price for West Texas Intermediate (WTI) crude oil for delivery at Cushing, Oklahoma, decreased by \$11.01/b during the same period, settling at \$52.59/b on June 6 (**Figure 1**).



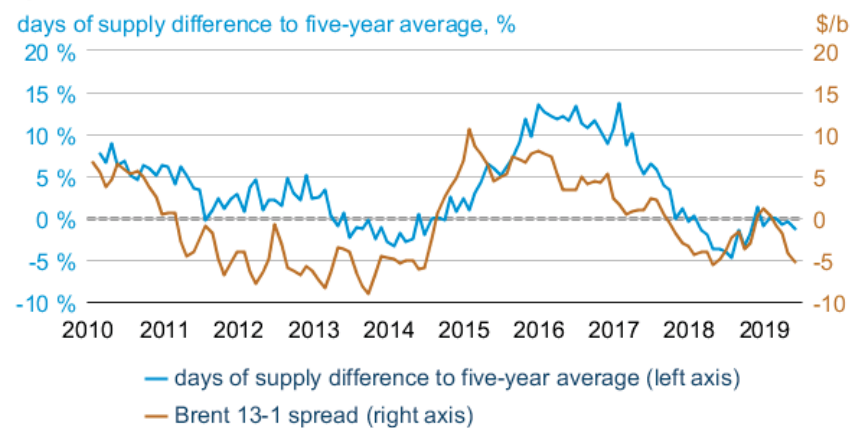
 CME Group and Intercontinental Exchange, as compiled by Bloomberg L.P.

Crude oil price volatility increased in May after declining for four consecutive months and stayed at elevated levels into the first week of June. Demand-side concerns became the most salient issue during the past month and contributed to volatility and price declines for risk assets such as commodities and equities. Both China and the United States issued tariffs on each other, with the United States also announcing potential tariffs on Mexico near the end of May. In addition, expected industrial activity, as measured by the manufacturing Purchasing Managers' Index (PMI), declined across several countries in May, and the U.S. manufacturing PMI fell to its lowest level since 2009. These developments are contributing to concerns that economic growth could be lower than market participants' expectations, which would cause oil demand growth to also be lower than expected.

Declining crude oil production in Venezuela and Iran, as well as Saudi Arabian over-compliance with December 2018 Vienna agreement production cuts, pushed crude oil production among members of the Organization of the Petroleum Exporting Countries (OPEC) to 29.9 million barrels per day (b/d) in May, the lowest for any month since July 2014. In addition, production shut-ins in Russia related to contamination of the Druzhba crude oil pipeline have emerged, and the market effect of these reductions has been compounded by planned maintenance on crude oil production platforms in the North Sea, where crude oil grades are in many cases substitutable for the disrupted Russian barrels.

A weakening outlook for demand at the same time near-term oil supplies are disrupted has lowered spot prices of crude oil while increasing futures price backwardation (when near-term prices are higher than longer-dated ones). Despite the recent demand uncertainties, EIA still expects a need for inventory withdrawals to meet demand given its forecast of near-term global crude oil production. EIA forecasts that global oil inventory withdrawals in the second and third quarters of 2019 will average 0.2 million b/d and 0.6 million b/d, respectively. EIA estimates that, as of the end of May, crude oil and other petroleum inventories in the Organization for Economic Cooperation and Development (OECD) were enough to cover 61 days of demand, only 1% lower than the five-year (2014–18) average (**Figure 2**). EIA expects that inventory withdrawals in the coming months will reduce the days of coverage further.

Figure 2. Days of supply difference to five-year average and Brent 13-1 spread



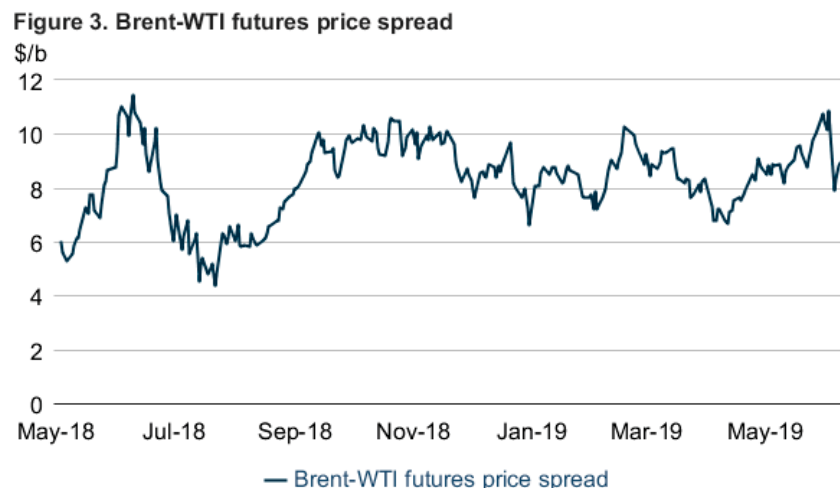
 U.S. Energy Information Administration, Short-Term Energy Outlook, Bloomberg L.P.

EIA is reducing its 2019 Brent crude oil price forecast to \$67/b, which is \$3/b lower than in the May STEO. The lower 2019 price forecast largely reflects recent global crude oil price declines as well as the uncertainty about global oil demand growth. EIA expects global oil demand to grow by 1.2 million b/d in 2019, 0.2 million b/d lower than the May forecast. EIA's forecast for 2019 non-OECD oil-weighted GDP growth, based on forecasts from Oxford Economics, is 2.7%, which would be the lowest growth since 2009 and the second-lowest growth on record in a data set going back to 1994. However, EIA expects that crude oil prices will increase from current levels by the end of the year. EIA forecasts that Brent prices will average \$68/b in the fourth quarter of 2019 as a result of inventory withdrawals during the summer, lower OPEC crude oil production than previously forecasted, and the expected increase in demand for light sweet crude oil ahead of the [implementation of low sulfur bunker fuel regulations](#) in January 2020. EIA expects that prices will remain near that level in 2020 based on EIA's forecast of relatively balanced global oil markets next year.

Crude oil price spreads: Notwithstanding the decline in overall price levels in May, several factors specific to Brent and WTI are widening the Brent–WTI futures price spread. The Brent–WTI futures price spread settled at \$8.94/b on June 6, an increase of 45 cents/b since May 1

(Figure 3). In late April, flows on parts of the Druzhba pipeline, which supplies Russian Urals crude oil to Europe, were suspended because of contamination of the crude oil. This disruption limited availability of Urals for several refiners in Europe that are regular purchasers of the crude oil grade. By early June, some Druzhba pipeline flows had been restored, but other refineries were still waiting for the contaminated crude oil to be removed from the pipeline so that flows of uncontaminated crude oil could resume. The contaminated crude oil will have to be stored for several months and gradually blended with clean crude oil to dilute the contaminants so the oil can be refined. Certain North Sea crude oil streams can substitute for Urals, which likely contributed to some relative upward price pressure for Brent in May. In addition, planned maintenance at some North Sea fields is expected to reduce available deliveries for June, which may have also put upward price pressure on Brent prices relative to other crude oils.

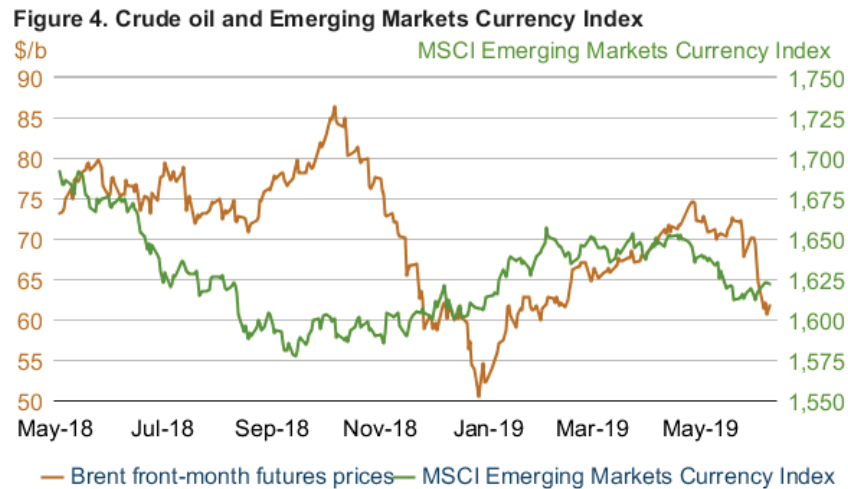
In contrast, Cushing WTI prices declined more than Brent prices in May because of logistical problems in the U.S. Midwest. Floods in the Midwest contributed to the temporary closure of several pipelines out of Cushing that provide feedstock to certain refiners. This disruption likely contributed to crude oil stocks in Cushing building by 4.8 million barrels from the [first week in May to the last week in May](#), a month in which Cushing stocks [typically draw by 2.1 million barrels](#), based on the five-year average stock change. Outside of the logistical issues in Cushing, U.S. commercial crude oil inventories increased in May. Total U.S. crude oil inventories increased by 15.7 million barrels in May, according to STEO estimates for the month, compared with a five-year average draw of 2.1 million barrels. If confirmed in monthly data, this year's stock build would be the largest for the month of May since 1991.



eia CME Group and Intercontinental Exchange, as compiled by Bloomberg L.P.

Emerging market currencies: Some of the demand-side concerns affecting crude oil markets could also be reducing the value of emerging market currencies compared with the U.S. dollar. The Morgan Stanley Capital International (MSCI) Emerging Market Currency Index tracks a basket of emerging market currencies that declined 1% from May 1 through June 6 (**Figure 4**). A lower value of the index indicates emerging market currencies are depreciating against the U.S.

dollar. The recent decline in the MSCI Emerging Market Currency index could indicate a reduction in economic activity in countries such as China or South Korea, countries with [relatively high weightings](#) in the index. The Chinese manufacturing [PMI](#) for May declined to 49.4. Any reading lower than 50 indicates a contraction in manufacturing activity. In addition, total [South Korean exports of all goods](#) declined 9.4% from May 2018 to May 2019, the sixth consecutive month of year-over-year declines.



eia Bloomberg L.P.

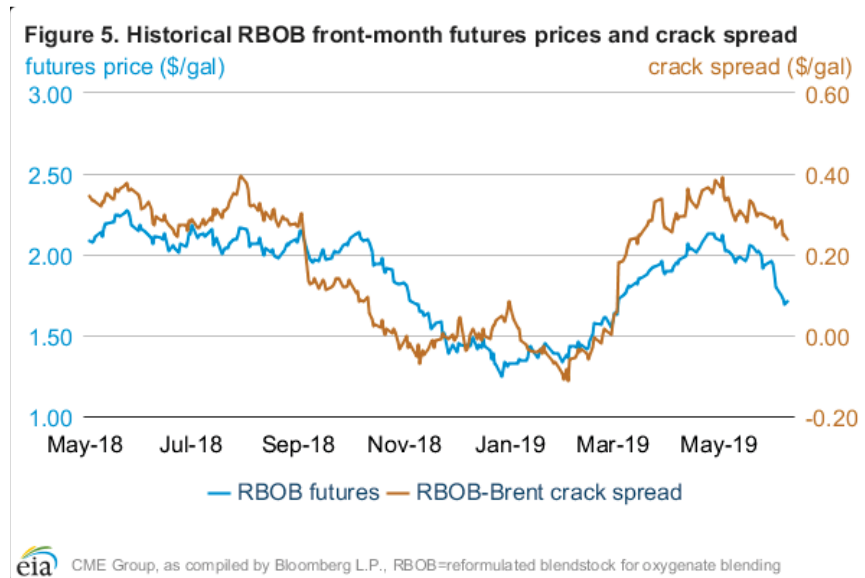
Petroleum products

Gasoline prices: The front-month futures price of reformulated blendstock for oxygenate blending (RBOB, the petroleum component of gasoline used in many parts of the country) settled at \$1.71 per gallon (gal) on June 6, down 36 cents/gal since May 1 (**Figure 5**). The RBOB–Brent crack spread (the difference between the price of RBOB and the price of Brent crude oil) declined by 11 cents/gal to settle at 24 cents/gal during the same period.

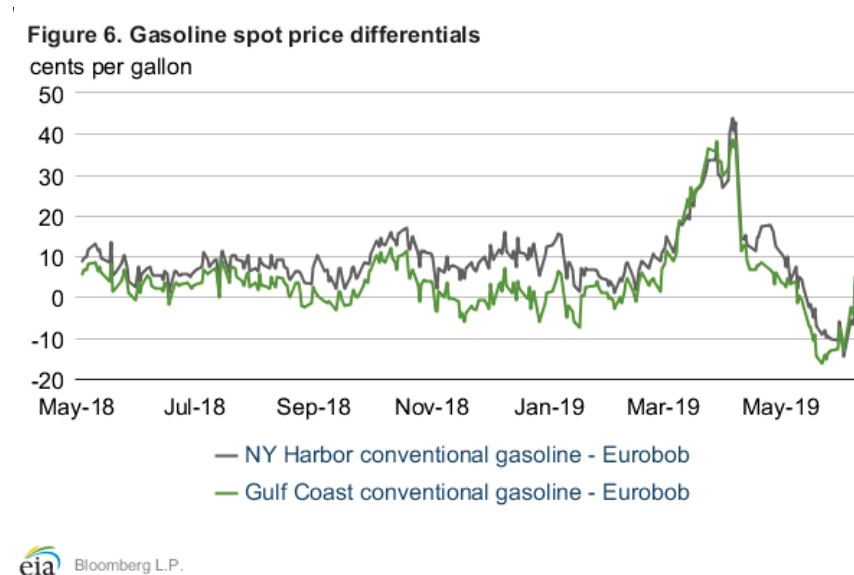
After increasing in April, the gasoline crack spread again dropped lower than the five-year (2014–18) range in May, averaging 4 cents below the previous five-year low of 35 cents for that month in 2018. Factors contributing to the smaller crack spread could include gasoline stock builds and gasoline consumption that were lower than year-ago levels. EIA estimates that U.S. gasoline consumption averaged 9.39 million barrels per day (b/d) in May, a decrease of 0.16 million b/d from the same period last year. Gasoline stocks increased during the month, ending close to the five-year average after ending April 6% lower than year-ago levels.

Flooding in the Midwest reduced [refinery operations](#) in Oklahoma and [limited crude oil](#) and product deliveries to the region’s refineries, preventing crude and product movement from the Gulf Coast to the Midwest and contributing to regional disparities in U.S. gasoline stock levels. In addition, [refinery issues on the West Coast](#) normalized mid-month, contributing to a stock build in that area. EIA estimates gasoline stocks ended May 4% higher than the five-year average on

the Gulf Coast and 6% higher than the five-year average on the West Coast, while gasoline stocks in the Midwest were 7% lower than the five-year average.

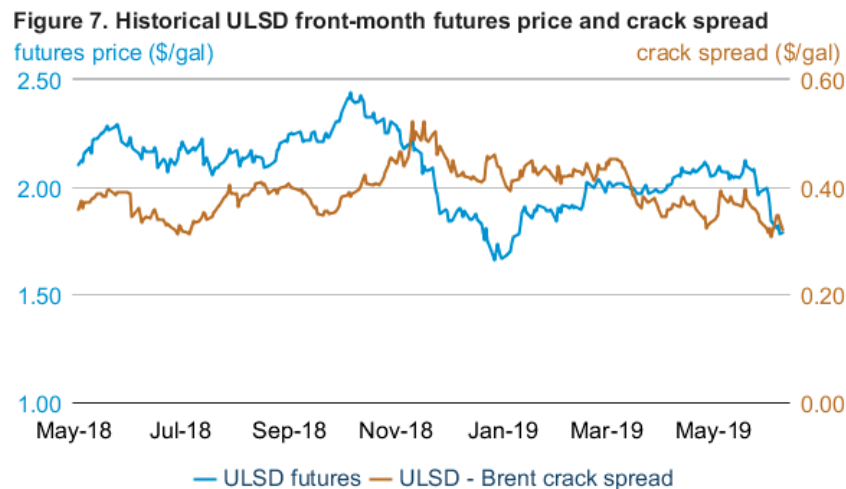


Gasoline spot price differentials: In contrast to the United States, gasoline prices increased in Northwest Europe in May (**Figure 6**). Refinery shutdowns in the region, combined with the contamination of crude oil import pipelines from Russia, contributed to reduced refinery runs and gasoline production in Europe. Northwest Europe’s gasoline–Brent spot crack spread rose higher than the five-year low for the first time in 6 months and higher than the five-year average for the first time in 17 months. On May 20, these factors contributed to the lowest Gulf Coast gasoline spot price relative to Northwest Europe since November 2015. On May 31, they contributed to the lowest New York Harbor gasoline spot price relative to Northwest Europe since August 2011.



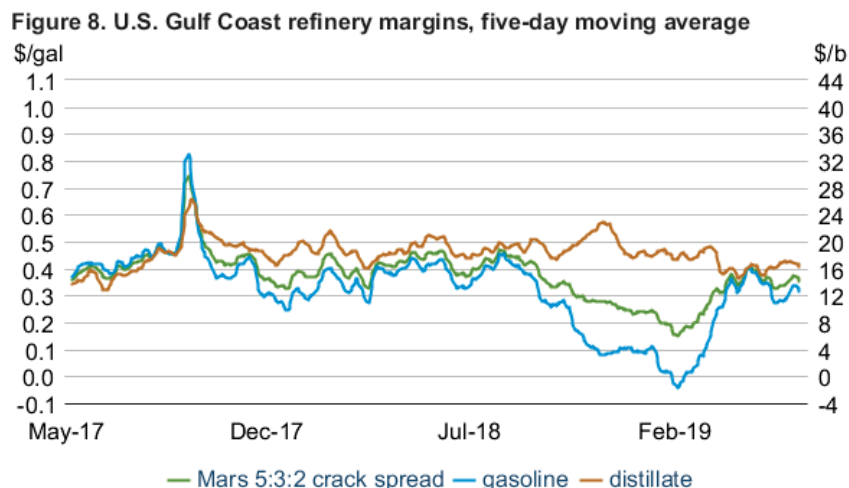
Ultra-low sulfur diesel prices: The ultra-low sulfur diesel (ULSD) front-month futures price decreased 31 cents/gal from May 1 to settle at \$1.79/gal on June 6. The ULSD–Brent crack spread (the difference between the price of ULSD and the price of Brent crude oil) declined 6 cents/gal to settle at 32 cents/gal during the same period (**Figure 7**).

EIA estimates that U.S. distillate consumption in May was 3.9 million b/d, 380,000 b/d lower than in May 2018 and 40,000 b/d lower than the five-year average. However, some of the available transportation data are mixed. The [truck tonnage data from the American Trucking Association](#) for April (most recent available) show a 7.7% year-over-year increase, whereas the [April 2019 Cass Freight Index report](#)—reflecting the volume of freight shipments via all modes of domestic freight transportation, including rail, truck, and air—shows a 3.2% contraction for the month. Despite these and other economic indicators reflecting a potential slowdown in growth, EIA estimates distillate consumption will return to year-over-year growth through the third quarter of 2019. EIA’s forecast is based on the expectation of a 2.7% growth in U.S. GDP in 2019, indicating future growth in overall diesel demand.



CME Group, as compiled by Bloomberg L.P., ULSD=ultra-low sulfur diesel

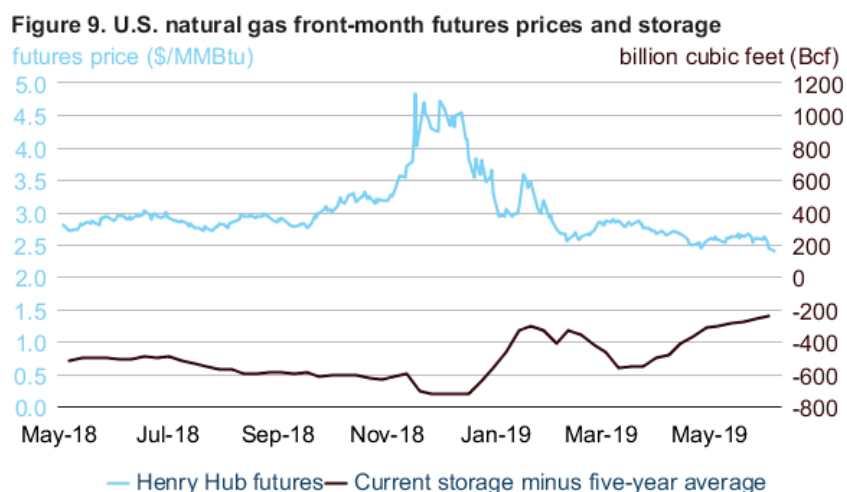
U.S. Gulf Coast refinery margins: The recent [increase](#) in medium and heavy crude oil prices that peaked in November 2018 reversed somewhat in March, April, and the first half of May 2019, before increasing again in late May. Reductions in crude oil production from Venezuela are likely increasing the price of medium and heavy crude oils compared with light crude oils. The 5:3:2 crack spread—refining three barrels of gasoline and two barrels of distillate from five barrels of Mars crude oil, which exemplifies a complex U.S. Gulf Coast refinery margin—averaged \$13.94 per barrel (b) in May, after reaching a 2019 high of \$16.95/b (40 cents/gal) on April 10 (**Figure 8**). Comparatively stable distillate crack spreads have supported total refinery margins. Although [U.S. Gulf Coast gasoline crack spreads](#) have remained positive since February, weaker crack spreads in May put downward pressure on margins from the April highs.



eia Bloomberg L.P.

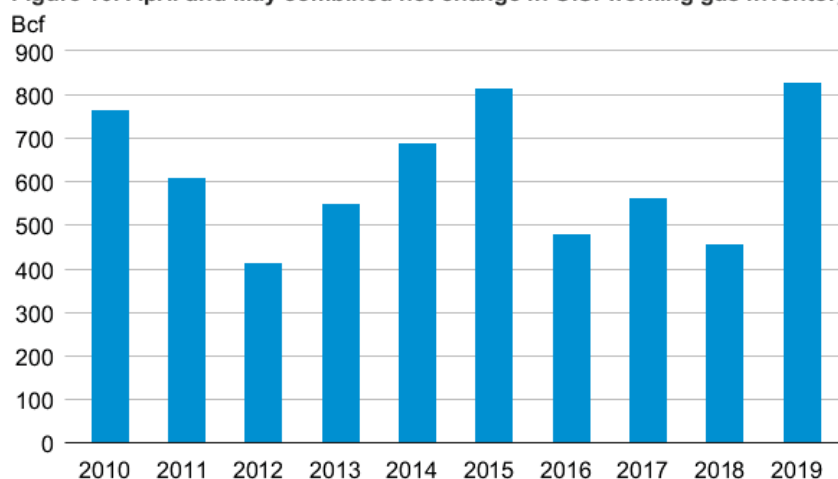
Natural Gas

Prices: The front-month natural gas futures contract for delivery at the Henry Hub settled at \$2.32/million British thermal units (MMBtu) on June 6, a decrease of 30 cents/MMBtu from May 1 (**Figure 9**). EIA estimates that U.S. natural gas production reached another record high in May. This persistent production growth contributed to injections of more than 100 billion cubic feet (Bcf) for five of the past six weeks, bringing U.S. working gas in underground storage levels closer to the five-year (2014–18) average, 9% higher than year-ago levels. Combined net injections into storage during April and May, in 2019, are estimated to be the largest on record for that two-month period at 831 Bcf (**Figure 10**), which helped to reduce futures prices even though inventories remain lower than the five-year average.



eia U.S. Energy Information Administration, CME Group, as compiled by Bloomberg L.P.

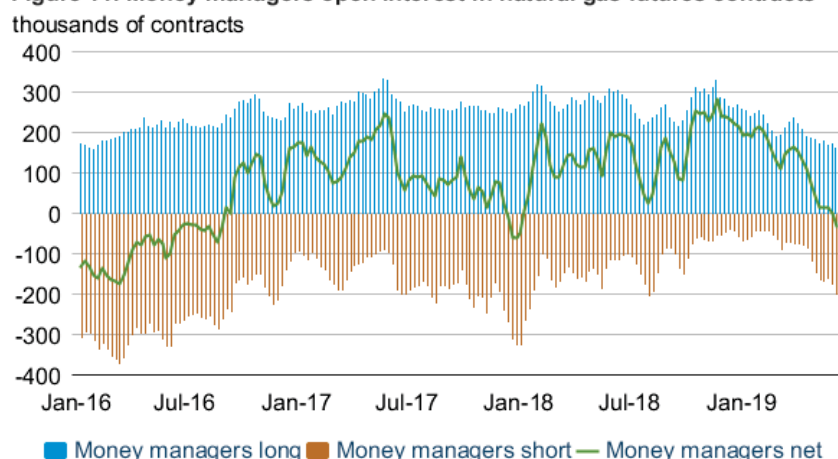
Figure 10. April and May combined net change in U.S. working gas inventory



eia U.S. Energy Information Administration, Short-Term Energy Outlook

Money manager positions: The number of futures short positions money managers reported holding for NYMEX natural gas contracts rose above long positions on May 21, 2019, for the first time since December 26, 2017 (**Figure 11**). The money manager category of the [Commitments of Traders](#) report, published weekly by the Commodity Futures Trading Commission, include fund managers that conduct organized futures trading on behalf of clients, and they are not involved in physical oil trading as their business activity. A short position indicates expectations of lower prices while a long position indicates the opposite. On November 13, 2018, money managers' net long positions reached a record high. Natural gas prices increased sharply in mid-November after colder-than-normal weather reduced natural gas inventories to about 700 Bcf lower than the five-year average. In April and May 2019, however, ongoing increases in natural gas production contributed to record injections into natural gas storage, which, combined with forecasts of below-normal temperatures for June, have lowered price expectations. The natural gas front-month futures price on June 6 of \$2.32/MMBtu was the lowest since May 2016.

Figure 11. Money managers open interest in natural gas futures contracts



eia Commodity Futures Trading Commission, Bloomberg, L.P.

Notable forecast changes

- EIA forecasts Brent crude oil prices will average \$67 per barrel (b) in 2019, down about \$3/b from last month's STEO forecast. The lower 2019 price forecast largely reflects recent price declines in global crude oil prices, which lowered the starting point for EIA's forecast, and uncertainty about global oil demand growth. Forecast global liquid fuels supply and consumption were both lowered by about 0.2-0.3 million barrels per day (b/d) for 2019 and for 2020. The lower global supply growth forecast is mostly the result of lower crude oil production growth in the United States because of lower expected oil prices and an expectation of increasing crude oil production declines in Venezuela. The reduction in global demand growth reflects both a revision to historical data that carries through to the forecast and lower oil consumption growth in 2019 because of reduction in forecast 2019 oil-weighted GDP growth among countries not part of the Organization for Economic Cooperation and Development (OECD).
- For more information, see the [detailed table of STEO forecast changes](#)

This report was prepared by the U.S. Energy Information Administration (EIA), the statistical and analytical agency within the U.S. Department of Energy. By law, EIA's data, analyses, and forecasts are independent of approval by any other officer or employee of the United States Government. The views in this report therefore should not be construed as representing those of the U.S. Department of Energy or other federal agencies.

Table 3a. International Petroleum and Other Liquids Production, Consumption, and Inventories

U.S. Energy Information Administration | Short-Term Energy Outlook - June 2019

	2018				2019				2020				Year		
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	2018	2019	2020
Supply (million barrels per day) (a)															
OECD	29.13	29.31	30.46	31.20	30.61	31.21	31.85	32.75	33.13	33.49	33.66	34.18	30.03	31.61	33.62
U.S. (50 States)	16.77	17.39	18.40	18.96	18.91	19.63	20.06	20.70	20.87	21.22	21.40	21.61	17.89	19.83	21.28
Canada	5.32	5.10	5.33	5.42	5.01	4.86	5.17	5.21	5.36	5.36	5.40	5.46	5.30	5.06	5.40
Mexico	2.17	2.13	2.09	1.95	1.92	2.08	2.06	2.03	2.01	1.99	1.97	1.95	2.08	2.02	1.98
Other OECD	4.88	4.68	4.64	4.86	4.77	4.64	4.57	4.80	4.89	4.92	4.88	5.17	4.76	4.69	4.96
Non-OECD	70.14	70.47	70.96	70.95	69.20	69.05	69.45	69.27	68.29	69.43	69.82	69.28	70.63	69.24	69.21
OPEC	37.46	37.07	37.34	37.29	35.86	35.17	35.19	35.10	34.66	34.74	34.89	34.65	37.29	35.33	34.73
Crude Oil Portion	32.10	31.78	32.02	31.94	30.47	29.89	30.19	30.08	29.66	29.72	29.87	29.60	31.96	30.15	29.71
Other Liquids (b)	5.36	5.29	5.33	5.36	5.39	5.28	5.00	5.02	5.01	5.01	5.02	5.05	5.33	5.17	5.02
Eurasia	14.44	14.44	14.63	14.89	14.83	14.48	14.67	14.87	14.95	15.02	15.04	15.11	14.60	14.72	15.03
China	4.79	4.84	4.78	4.86	4.92	4.89	4.87	4.91	4.89	4.92	4.92	4.97	4.82	4.90	4.93
Other Non-OECD	13.45	14.12	14.20	13.90	13.59	14.51	14.72	14.38	13.80	14.75	14.97	14.55	13.92	14.30	14.52
Total World Supply	99.27	99.78	101.42	102.14	99.81	100.26	101.30	102.01	101.42	102.92	103.47	103.46	100.66	100.85	102.82
Non-OPEC Supply	61.81	62.71	64.08	64.85	63.95	65.09	66.11	66.91	66.76	68.18	68.59	68.81	63.37	65.53	68.09
Consumption (million barrels per day) (c)															
OECD	47.62	46.99	47.93	47.52	47.39	46.69	48.09	48.17	47.56	47.07	48.30	48.23	47.52	47.59	47.79
U.S. (50 States)	20.24	20.33	20.63	20.60	20.29	20.33	21.02	20.92	20.53	20.75	21.25	21.01	20.45	20.64	20.89
U.S. Territories	0.10	0.08	0.09	0.11	0.12	0.11	0.12	0.13	0.12	0.11	0.12	0.13	0.10	0.12	0.12
Canada	2.32	2.34	2.56	2.49	2.33	2.37	2.48	2.45	2.41	2.35	2.45	2.43	2.43	2.41	2.41
Europe	14.09	14.23	14.69	14.12	14.02	14.14	14.64	14.34	13.99	14.19	14.70	14.40	14.28	14.28	14.32
Japan	4.27	3.43	3.53	3.89	4.11	3.37	3.44	3.76	3.98	3.26	3.34	3.67	3.78	3.67	3.56
Other OECD	6.60	6.57	6.42	6.32	6.53	6.38	6.41	6.56	6.54	6.41	6.44	6.59	6.48	6.47	6.50
Non-OECD	51.54	52.59	52.56	52.89	52.78	53.78	53.79	53.84	53.91	54.96	54.98	55.19	52.40	53.55	54.76
Eurasia	4.78	4.83	5.11	4.98	4.80	4.87	5.24	5.09	4.90	4.99	5.37	5.27	4.93	5.00	5.13
Europe	0.75	0.74	0.76	0.76	0.75	0.75	0.77	0.77	0.76	0.76	0.78	0.78	0.75	0.76	0.77
China	13.80	14.00	13.73	13.95	14.28	14.47	14.20	14.41	14.76	14.95	14.67	14.90	13.87	14.34	14.82
Other Asia	13.77	14.02	13.60	14.00	14.16	14.30	13.93	14.28	14.46	14.62	14.19	14.55	13.85	14.17	14.46
Other Non-OECD	18.44	19.00	19.36	19.20	18.78	19.38	19.66	19.29	19.04	19.97	19.97	19.70	19.00	19.28	19.58
Total World Consumption	99.16	99.58	100.49	100.42	100.17	100.47	101.89	102.01	101.48	102.03	103.28	103.43	99.92	101.14	102.56
Total Crude Oil and Other Liquids Inventory Net Withdrawals (million barrels per day)															
U.S. (50 States)	0.36	-0.06	-0.70	0.22	0.15	-0.63	-0.16	0.27	0.05	-0.37	-0.10	0.32	-0.05	-0.09	-0.03
Other OECD	-0.01	0.12	0.18	-0.08	-0.14	0.28	0.25	-0.09	0.00	-0.17	-0.03	-0.12	0.05	0.07	-0.08
Other Stock Draws and Balance	-0.46	-0.25	-0.41	-1.87	0.35	0.57	0.49	-0.18	0.00	-0.35	-0.06	-0.24	-0.75	0.31	-0.16
Total Stock Draw	-0.11	-0.19	-0.93	-1.73	0.36	0.21	0.58	-0.01	0.05	-0.89	-0.19	-0.04	-0.74	0.29	-0.27
End-of-period Commercial Crude Oil and Other Liquids Inventories (million barrels)															
U.S. Commercial Inventory	1,196	1,207	1,272	1,262	1,249	1,310	1,325	1,304	1,303	1,340	1,351	1,324	1,262	1,304	1,324
OECD Commercial Inventory	2,804	2,804	2,857	2,861	2,856	2,892	2,884	2,871	2,870	2,922	2,936	2,920	2,861	2,871	2,920

- = no data available

OECD = Organization for Economic Cooperation and Development: Australia, Austria, Belgium, Canada, Chile, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Latvia, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia, South Korea, Spain, Sweden, Switzerland, Turkey, the United Kingdom, the United States.

OPEC = Organization of the Petroleum Exporting Countries: Algeria, Angola, Congo (Brazzaville), Ecuador, Equatorial Guinea, Gabon, Iran, Iraq, Kuwait, Libya, Nigeria, Saudi Arabia, the United Arab Emirates, Venezuela.

(a) Supply includes production of crude oil (including lease condensates), natural gas plant liquids, biofuels, other liquids, and refinery processing gains.

(b) Includes lease condensate, natural gas plant liquids, other liquids, and refinery processing gain. Includes other unaccounted-for liquids.

(c) Consumption of petroleum by the OECD countries is synonymous with "petroleum product supplied," defined in the glossary of the EIA's *Petroleum Supply Monthly*, DOE/EIA-0109. Consumption of petroleum by the non-OECD countries is "apparent consumption," which includes internal consumption, refinery fuel and loss, and bunkering.

Notes: The approximate break between historical and forecast values is shown with historical data printed in bold; estimates and forecasts in italics.

Historical data: Latest data available from Energy Information Administration international energy statistics.

Minor discrepancies with published historical data are due to independent rounding.

Projections: EIA Regional Short-Term Energy Model.

Table 4a. U.S. Petroleum and Other Liquids Supply, Consumption, and Inventories

U.S. Energy Information Administration | Short-Term Energy Outlook - June 2019

	2018				2019				2020				Year		
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	2018	2019	2020
Supply (million barrels per day)															
Crude Oil Supply															
Domestic Production (a)	10.23	10.54	11.24	11.81	11.81	12.20	12.44	12.83	13.05	13.24	13.32	13.44	10.96	12.32	13.26
Alaska	0.51	0.48	0.43	0.49	0.49	0.49	0.45	0.49	0.51	0.50	0.46	0.49	0.48	0.48	0.49
Federal Gulf of Mexico (b)	1.67	1.58	1.85	1.86	1.85	1.94	1.91	2.02	2.11	2.10	2.03	2.03	1.74	1.93	2.06
Lower 48 States (excl GOM)	8.05	8.47	8.96	9.46	9.48	9.76	10.07	10.31	10.43	10.64	10.83	10.92	8.74	9.91	10.71
Crude Oil Net Imports (c)	6.18	6.19	5.84	4.82	4.25	4.39	4.82	4.26	4.21	4.64	4.54	4.21	5.75	4.43	4.40
SPR Net Withdrawals	-0.03	0.06	0.00	0.12	0.00	0.05	0.00	0.04	0.04	0.04	0.01	0.03	0.04	0.02	0.03
Commercial Inventory Net Withdrawals	-0.02	0.09	-0.01	-0.28	-0.19	-0.15	0.09	-0.09	-0.32	0.09	0.15	-0.08	-0.06	-0.09	-0.04
Crude Oil Adjustment (d)	0.05	0.26	0.25	0.52	0.33	0.43	0.21	0.15	0.19	0.19	0.21	0.15	0.27	0.28	0.19
Total Crude Oil Input to Refineries	16.41	17.14	17.32	16.99	16.20	16.91	17.56	17.19	17.17	18.20	18.23	17.76	16.97	16.97	17.84
Other Supply															
Refinery Processing Gain	1.11	1.12	1.17	1.16	1.06	1.13	1.14	1.19	1.20	1.25	1.27	1.28	1.14	1.13	1.25
Natural Gas Plant Liquids Production	4.01	4.30	4.54	4.54	4.66	4.86	5.05	5.25	5.20	5.25	5.35	5.42	4.35	4.96	5.31
Renewables and Oxygenate Production (e)	1.21	1.22	1.25	1.22	1.18	1.23	1.20	1.21	1.19	1.24	1.23	1.23	1.23	1.20	1.22
Fuel Ethanol Production	1.05	1.04	1.06	1.04	1.01	1.05	1.04	1.04	1.04	1.06	1.05	1.05	1.05	1.04	1.05
Petroleum Products Adjustment (f)	0.21	0.21	0.21	0.22	0.20	0.22	0.22	0.23	0.22	0.24	0.24	0.24	0.21	0.22	0.23
Product Net Imports (c)	-3.13	-3.44	-3.17	-3.91	-3.35	-3.50	-3.91	-4.46	-4.79	-4.93	-4.80	-5.28	-3.41	-3.81	-4.95
Hydrocarbon Gas Liquids	-1.22	-1.53	-1.49	-1.38	-1.33	-1.77	-1.81	-1.93	-1.98	-1.98	-1.98	-2.07	-1.41	-1.71	-1.99
Unfinished Oils	0.39	0.32	0.35	0.28	0.21	0.36	0.38	0.35	0.50	0.62	0.61	0.51	0.33	0.33	0.56
Other HC/Oxygenates	-0.18	-0.15	-0.13	-0.15	-0.13	-0.12	-0.12	-0.10	-0.13	-0.12	-0.12	-0.12	-0.15	-0.12	-0.12
Motor Gasoline Blend Comp.	0.50	0.78	0.66	0.37	0.43	0.69	0.45	0.45	0.44	0.65	0.49	0.45	0.58	0.50	0.51
Finished Motor Gasoline	-0.94	-0.71	-0.72	-1.00	-0.82	-0.59	-0.67	-1.02	-1.15	-1.03	-0.89	-1.29	-0.84	-0.78	-1.09
Jet Fuel	-0.10	-0.10	-0.06	-0.13	-0.08	-0.02	-0.04	-0.03	-0.03	-0.08	-0.09	-0.08	-0.10	-0.04	-0.07
Distillate Fuel Oil	-0.87	-1.30	-1.14	-1.19	-0.91	-1.38	-1.35	-1.31	-1.51	-1.92	-1.87	-1.63	-1.13	-1.24	-1.73
Residual Fuel Oil	-0.10	-0.14	-0.10	-0.09	-0.08	-0.07	-0.02	-0.03	-0.03	-0.13	-0.03	-0.06	-0.11	-0.05	-0.06
Other Oils (g)	-0.62	-0.61	-0.53	-0.61	-0.64	-0.59	-0.74	-0.84	-0.95	-0.94	-0.92	-0.99	-0.59	-0.70	-0.95
Product Inventory Net Withdrawals	0.41	-0.21	-0.69	0.38	0.34	-0.52	-0.25	0.33	0.33	-0.50	-0.27	0.36	-0.03	-0.03	-0.02
Total Supply	20.23	20.33	20.63	20.60	20.29	20.33	21.02	20.92	20.53	20.75	21.25	21.01	20.45	20.64	20.89
Consumption (million barrels per day)															
Hydrocarbon Gas Liquids	3.22	2.67	2.85	3.22	3.48	2.86	3.08	3.46	3.60	3.10	3.23	3.52	2.99	3.22	3.36
Unfinished Oils	0.13	-0.04	-0.10	0.00	-0.03	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00
Motor Gasoline	9.01	9.51	9.51	9.25	8.96	9.54	9.53	9.25	9.00	9.56	9.59	9.24	9.32	9.32	9.35
Fuel Ethanol blended into Motor Gasoline	0.91	0.94	0.96	0.94	0.91	0.98	0.96	0.95	0.91	0.98	0.98	0.95	0.94	0.95	0.95
Jet Fuel	1.64	1.73	1.78	1.70	1.65	1.79	1.84	1.81	1.74	1.81	1.86	1.83	1.71	1.77	1.81
Distillate Fuel Oil	4.18	4.13	4.05	4.18	4.28	3.92	4.11	4.22	4.22	4.11	4.19	4.27	4.13	4.13	4.20
Residual Fuel Oil	0.28	0.32	0.34	0.34	0.27	0.28	0.35	0.31	0.28	0.23	0.31	0.27	0.32	0.30	0.27
Other Oils (g)	1.78	2.01	2.22	1.91	1.68	1.95	2.11	1.88	1.69	1.94	2.07	1.87	1.98	1.90	1.89
Total Consumption	20.24	20.33	20.63	20.60	20.29	20.33	21.02	20.92	20.53	20.75	21.25	21.01	20.45	20.64	20.89
Total Petroleum and Other Liquids Net Imports	3.05	2.75	2.67	0.91	0.89	0.89	0.91	-0.20	-0.58	-0.28	-0.26	-1.07	2.34	0.62	-0.55
End-of-period Inventories (million barrels)															
Commercial Inventory															
Crude Oil (excluding SPR)	423.4	414.8	416.1	441.8	459.3	473.4	465.2	473.9	502.9	494.7	480.8	487.8	441.8	473.9	487.8
Hydrocarbon Gas Liquids	139.3	180.8	224.8	188.5	163.0	215.8	252.2	208.7	168.4	217.4	252.6	207.9	188.5	208.7	207.9
Unfinished Oils	98.3	92.6	92.0	85.9	92.0	95.4	89.4	81.9	92.5	92.5	89.2	82.3	85.9	81.9	82.3
Other HC/Oxygenates	30.5	28.8	30.5	31.4	32.8	31.8	31.0	31.7	33.4	32.4	31.7	32.3	31.4	31.7	32.3
Total Motor Gasoline	239.6	240.3	239.7	246.3	236.1	232.3	222.3	235.5	234.5	229.5	224.1	236.9	246.3	235.5	236.9
Finished Motor Gasoline	23.1	24.7	24.8	25.7	21.7	23.3	23.6	24.3	23.9	22.7	23.6	23.9	25.7	24.3	23.9
Motor Gasoline Blend Comp.	216.5	215.6	214.9	220.5	214.4	209.0	198.6	211.2	210.6	206.8	200.5	213.0	220.5	211.2	213.0
Jet Fuel	40.4	40.8	46.9	41.6	41.6	38.8	41.2	39.8	40.2	41.9	43.4	41.6	41.6	39.8	41.6
Distillate Fuel Oil	130.4	120.4	137.1	140.0	132.4	131.2	136.3	141.0	131.3	133.7	138.8	143.8	140.0	141.0	143.8
Residual Fuel Oil	35.0	30.0	28.6	28.3	28.7	30.4	32.3	34.3	37.0	37.1	35.3	35.1	28.3	34.3	35.1
Other Oils (g)	59.3	58.8	56.1	58.7	63.2	61.4	55.1	57.0	62.3	60.7	54.7	56.7	58.7	57.0	56.7
Total Commercial Inventory	1,196	1,207	1,272	1,262	1,249	1,310	1,325	1,304	1,303	1,340	1,351	1,324	1,262	1,304	1,324
Crude Oil in SPR	665	660	660	649	649	645	645	641	638	634	633	630	649	641	630

- = no data available

(a) Includes lease condensate.

(b) Crude oil production from U.S. Federal leases in the Gulf of Mexico (GOM).

(c) Net imports equals gross imports minus gross exports.

(d) Crude oil adjustment balances supply and consumption and was previously referred to as "Unaccounted for Crude Oil."

(e) Renewables and oxygenate production includes pentanes plus, oxygenates (excluding fuel ethanol), and renewable fuels.

(f) Petroleum products adjustment includes hydrogen/oxygenates/renewables/other hydrocarbons, motor gasoline blend components, and finished motor gasoline.

(g) "Other Oils" includes aviation gasoline blend components, finished aviation gasoline, kerosene, petrochemical feedstocks, special naphthas, lubricants, waxes, petroleum coke, asphalt and road oil, still gas, and miscellaneous products.

Notes: The approximate break between historical and forecast values is shown with historical data printed in bold; estimates and forecasts in italics.

SPR: Strategic Petroleum Reserve

HC: Hydrocarbons

Historical data: Latest data available from Energy Information Administration databases supporting the following reports: *Petroleum Supply Monthly*, DOE/EIA-0109;*Petroleum Supply Annual*, DOE/EIA-0340/2; and *Weekly Petroleum Status Report*, DOE/EIA-0208.

Minor discrepancies with published historical data are due to independent rounding.

Projections: EIA Regional Short-Term Energy Model.

Table 5a. U.S. Natural Gas Supply, Consumption, and Inventories

U.S. Energy Information Administration | Short-Term Energy Outlook - June 2019

	2018				2019				2020				Year		
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	2018	2019	2020
Supply (billion cubic feet per day)															
Total Marketed Production	84.93	87.39	91.50	94.79	95.89	<i>97.05</i>	<i>98.22</i>	<i>99.09</i>	<i>99.01</i>	<i>99.11</i>	<i>99.30</i>	<i>98.88</i>	89.69	<i>97.57</i>	<i>99.07</i>
Alaska	1.00	0.92	0.86	0.96	0.96	<i>0.85</i>	<i>0.78</i>	<i>0.95</i>	<i>1.00</i>	<i>0.87</i>	<i>0.79</i>	<i>0.95</i>	0.94	<i>0.89</i>	<i>0.90</i>
Federal GOM (a)	2.57	2.48	2.86	2.77	2.81	<i>2.97</i>	<i>2.85</i>	<i>2.83</i>	<i>2.90</i>	<i>2.85</i>	<i>2.72</i>	<i>2.69</i>	2.67	<i>2.86</i>	<i>2.79</i>
Lower 48 States (excl GOM)	81.37	83.98	87.79	91.05	92.12	<i>93.23</i>	<i>94.59</i>	<i>95.32</i>	<i>95.10</i>	<i>95.39</i>	<i>95.79</i>	<i>95.25</i>	86.08	<i>93.83</i>	<i>95.38</i>
Total Dry Gas Production	79.13	81.17	84.96	88.22	89.14	<i>90.14</i>	<i>91.17</i>	<i>91.93</i>	<i>91.80</i>	<i>91.84</i>	<i>91.97</i>	<i>91.54</i>	83.40	<i>90.60</i>	<i>91.79</i>
LNG Gross Imports	0.33	0.10	0.15	0.26	0.28	<i>0.17</i>	<i>0.17</i>	<i>0.21</i>	<i>0.32</i>	<i>0.18</i>	<i>0.18</i>	<i>0.20</i>	0.21	<i>0.21</i>	<i>0.22</i>
LNG Gross Exports	2.64	2.79	2.95	3.48	4.01	<i>4.44</i>	<i>4.82</i>	<i>6.08</i>	<i>6.61</i>	<i>6.14</i>	<i>6.75</i>	<i>7.91</i>	2.97	<i>4.84</i>	<i>6.86</i>
Pipeline Gross Imports	8.76	7.63	7.50	7.22	8.35	<i>7.11</i>	<i>6.94</i>	<i>7.53</i>	<i>8.36</i>	<i>6.85</i>	<i>6.96</i>	<i>7.46</i>	7.77	<i>7.48</i>	<i>7.41</i>
Pipeline Gross Exports	7.02	6.16	7.07	7.48	7.84	<i>7.20</i>	<i>7.12</i>	<i>7.89</i>	<i>9.43</i>	<i>8.12</i>	<i>7.73</i>	<i>8.26</i>	6.93	<i>7.51</i>	<i>8.38</i>
Supplemental Gaseous Fuels	0.21	0.17	0.19	0.18	0.19	<i>0.19</i>	<i>0.19</i>	<i>0.19</i>	<i>0.19</i>	<i>0.19</i>	<i>0.19</i>	<i>0.19</i>	0.19	<i>0.19</i>	<i>0.19</i>
Net Inventory Withdrawals	18.31	-8.85	-8.23	2.58	16.94	<i>-13.90</i>	<i>-10.78</i>	<i>2.97</i>	<i>16.15</i>	<i>-11.21</i>	<i>-7.90</i>	<i>4.33</i>	0.88	<i>-1.26</i>	<i>0.33</i>
Total Supply	97.09	71.26	74.55	87.49	103.05	<i>72.07</i>	<i>75.74</i>	<i>88.87</i>	<i>100.78</i>	<i>73.59</i>	<i>76.93</i>	<i>87.56</i>	82.55	<i>84.87</i>	<i>84.70</i>
Balancing Item (b)	0.52	-0.56	-0.46	-1.37	-0.31	<i>0.00</i>	<i>-0.83</i>	<i>-1.65</i>	<i>0.05</i>	<i>-0.49</i>	<i>-0.51</i>	<i>-0.34</i>	-0.47	<i>-0.70</i>	<i>-0.32</i>
Total Primary Supply	97.61	70.71	74.09	86.12	102.74	<i>72.07</i>	<i>74.91</i>	<i>87.22</i>	<i>100.83</i>	<i>73.10</i>	<i>76.42</i>	<i>87.22</i>	82.08	<i>84.17</i>	<i>84.38</i>
Consumption (billion cubic feet per day)															
Residential	25.77	7.98	3.45	17.53	27.13	<i>7.75</i>	<i>3.66</i>	<i>17.29</i>	<i>25.65</i>	<i>7.48</i>	<i>3.74</i>	<i>16.72</i>	13.63	<i>13.90</i>	<i>13.38</i>
Commercial	15.36	6.61	4.58	11.65	16.07	<i>6.70</i>	<i>4.74</i>	<i>11.02</i>	<i>14.95</i>	<i>6.43</i>	<i>4.69</i>	<i>10.47</i>	9.53	<i>9.61</i>	<i>9.13</i>
Industrial	24.30	21.82	21.30	23.41	24.91	<i>21.97</i>	<i>21.62</i>	<i>24.45</i>	<i>25.29</i>	<i>22.65</i>	<i>21.92</i>	<i>25.01</i>	22.70	<i>23.23</i>	<i>23.72</i>
Electric Power (c)	24.91	27.62	37.78	26.04	26.62	<i>28.30</i>	<i>37.39</i>	<i>26.50</i>	<i>26.60</i>	<i>28.90</i>	<i>38.29</i>	<i>26.89</i>	29.11	<i>29.72</i>	<i>30.18</i>
Lease and Plant Fuel	4.55	4.68	4.90	5.08	5.14	<i>5.20</i>	<i>5.26</i>	<i>5.31</i>	<i>5.31</i>	<i>5.31</i>	<i>5.32</i>	<i>5.30</i>	4.81	<i>5.23</i>	<i>5.31</i>
Pipeline and Distribution Use	2.60	1.88	1.97	2.29	2.73	<i>2.00</i>	<i>2.11</i>	<i>2.52</i>	<i>2.89</i>	<i>2.19</i>	<i>2.33</i>	<i>2.70</i>	2.18	<i>2.34</i>	<i>2.53</i>
Vehicle Use	0.12	0.12	0.12	0.12	0.13	<i>0.13</i>	<i>0.13</i>	<i>0.13</i>	<i>0.14</i>	<i>0.14</i>	<i>0.14</i>	<i>0.14</i>	0.12	<i>0.13</i>	<i>0.14</i>
Total Consumption	97.61	70.71	74.09	86.12	102.74	<i>72.07</i>	<i>74.91</i>	<i>87.22</i>	<i>100.83</i>	<i>73.10</i>	<i>76.42</i>	<i>87.22</i>	82.08	<i>84.17</i>	<i>84.38</i>
End-of-period Inventories (billion cubic feet)															
Working Gas Inventory	1,391	2,196	2,951	2,709	1,185	<i>2,449</i>	<i>3,441</i>	<i>3,169</i>	<i>1,699</i>	<i>2,720</i>	<i>3,446</i>	<i>3,047</i>	2,709	<i>3,169</i>	<i>3,047</i>
East Region (d)	229	465	778	659	216	<i>560</i>	<i>909</i>	<i>809</i>	<i>319</i>	<i>641</i>	<i>889</i>	<i>765</i>	659	<i>809</i>	<i>765</i>
Midwest Region (d)	261	459	846	777	242	<i>583</i>	<i>994</i>	<i>858</i>	<i>315</i>	<i>579</i>	<i>902</i>	<i>762</i>	777	<i>858</i>	<i>762</i>
South Central Region (d)	614	846	846	880	520	<i>919</i>	<i>1,063</i>	<i>1,074</i>	<i>754</i>	<i>1,037</i>	<i>1,121</i>	<i>1,060</i>	880	<i>1,074</i>	<i>1,060</i>
Mountain Region (d)	87	140	179	141	63	<i>123</i>	<i>174</i>	<i>148</i>	<i>106</i>	<i>151</i>	<i>193</i>	<i>158</i>	141	<i>148</i>	<i>158</i>
Pacific Region (d)	169	253	263	214	115	<i>234</i>	<i>269</i>	<i>248</i>	<i>174</i>	<i>281</i>	<i>311</i>	<i>272</i>	214	<i>248</i>	<i>272</i>
Alaska	31	33	38	37	30	<i>31</i>	<i>31</i>	<i>31</i>	<i>31</i>	<i>31</i>	<i>31</i>	<i>31</i>	37	<i>31</i>	<i>31</i>

- = no data available

(a) Marketed production from U.S. Federal leases in the Gulf of Mexico.

(b) The balancing item represents the difference between the sum of the components of natural gas supply and the sum of components of natural gas demand.

(c) Natural gas used for electricity generation and (a limited amount of) useful thermal output by electric utilities and independent power producers.

 (d) For a list of States in each inventory region refer to *Weekly Natural Gas Storage Report, Notes and Definitions* (<http://ir.eia.gov/ngs/notes.html>) .

Notes: The approximate break between historical and forecast values is shown with historical data printed in bold; estimates and forecasts in italics.

LNG: liquefied natural gas.

Historical data: Latest data available from Energy Information Administration databases supporting the following reports: *Natural Gas Monthly* , DOE/EIA-0130; and *Electric Power Monthly* , DOE/EIA-0226.

Minor discrepancies with published historical data are due to independent rounding.

Projections: EIA Regional Short-Term Energy Model.

BP's 2018 Natural Gas/LNG Data Reminds That LNG Price Pressures Should Continue In 2020/2021

Posted: Wednesday June 13, 2019. 8:30am Mountain

The key message in BP's Statistical Review of World Energy highlighted primary energy was +2.9% YoY in 2018 and it was *"the fastest growth seen since 2010"*. And natural gas was the big winner, BP said *"2018 was a bonanza year for natural gas, with both global consumption and production increasing by over 5%, one of the strongest growth rates in either gas demand or output for over 30 years"*. This is an excellent database, but it is backward looking. The numbers were strong, but don't take away from the pricing pressure risk to LNG in 2020 and 2021 in the face of Russia's two big gas export pipelines start up in 2019 and 2020 – the 3.6 bcf/d Power of Siberia gas export pipeline to China, and the 5.3 bcf/d Nord Stream 2 gas export pipeline to Germany. The fear remains that these two projects can almost cover (replace) any expected LNG demand growth in 2020 and 2021. The BP data showed it was a good 2018 for natural gas, but its not big to allay our fears that we detailed in our March 30, 2019 blog *"LNG Price Pressures 2020/2021 With Gazprom Adding ~8.9 Bcf/D Export Gas Pipeline Capacity Into Europe And China"* [\[LINK\]](#). So it was a good 2018 for natural gas, but we still believe the big issues for LNG in 2020 and 2021 are these Gazprom pipelines and that they should cause continued pressure on LNG prices.

BP Statistical Review of World Energy for 2018 – natural gas demand growth was the good news story. It is probably the most referenced energy data document, yesterday BP issued its annual Statistical Review of World Energy that provides an excellent look back at all the 2018 data for energy. This is a must add to reference libraries for the report [\[LINK\]](#), the chief economist speech [\[LINK\]](#), and the excel database [\[LINK\]](#). BP's overall energy comment is *"Global primary energy grew by 2.9% in 2018 – the fastest growth seen since 2010"*. BP highlighted natural gas as the good news story *"as I mentioned, 2018 was a bonanza year for natural gas, with both global consumption and production increasing by over 5%, one of the strongest growth rates in either gas demand or output for over 30 years. BP also said "This acceleration was particularly pronounced in natural gas demand, which increased 5.3%, one of its strongest growth rates for over 30 years, accounting for almost 45% of the entire growth in global energy consumption"*.

BP highlighted China within the natural gas story. BP had a good writeup on China starting with *"China gas consumption grew by an astonishing 18% last year"*. BP noted how the growth was driven by the push to clean up its air. BP wrote *"This strength stemmed largely from a continuation of environmental policies encouraging coal-to-gas switching in industry and buildings in order to improve local air quality, together with robust growth in industrial activity during the first half of the year. These coal-to-gas switching policies have been instrumental in increasing Chinese gas consumption by over a third in the past two years alone. Official estimates suggest that as many as 10 million households – roughly half the number of households in the UK – switched from coal-to-gas boilers over this 2-year period, with even greater switching in the industrial sector. Importantly, a series of improvements in import capacity, distribution and demand management meant that this second successive year of rapid growth in Chinese gas consumption was achieved largely without a repeat of the price spikes and shortages which characterised the winter of 2017/18, with increased imports from both LNG and pipeline"*. This theme of China being serious about dealing with pollution was what we saw in the summer of 2017, and why we wrote our Sept 20, 2017 blog *"China's Plan To Increase Natural Gas To 10% Of Its Energy Mix Is A Global Game Changer Including For BC LNG"* [\[LINK\]](#).

In 2018, China was 22% of YoY world gas demand growth, 55% of YoY world LNG imports growth. In 2018, BP estimated global natural gas consumption of 372.4 bcf/d, which was up 18.9 bcf/d or 5.3% YoY. For China, BP estimated natural gas consumption in 2018 was 27.4 bcf/d, which was up 4.1 bcf/d or 17.6% YoY. But what is important as we look ahead to 2020 and 2021 is that BP estimates China's LNG imports were only +2.0 bcf/d. We built the below table to show how China compared to the world for natural gas consumption and LNG imports.

World Vs China 2018 Natural Gas Demand Vs Supply

bcf/d	2016	2017	YoY 17 v 16 % Change YoY	2018	YoY 18 v 17 % Change YoY
World					
Consumption	342.6	353.5	10.9	372.4	18.9
Pipeline Imports	46.3	49.4	3.1	49.6	0.2
LNG Imports	34.6	38.1	3.5	41.7	3.6
China					
Consumption	20.2	23.3	3.1	27.4	4.1
Supply					
Production	13.3	14.4	1.1	15.6	1.2
Pipeline Imports	3.6	3.9	0.3	4.6	0.8
LNG Imports	3.6	5.1	1.6	7.1	2.0
	20.4	23.4	3.0	27.3	4.0
Gas % of China Energy Mix	5.91%	6.58%	0.67%	7.43%	0.85%
China Share of World					
Consumption	5.9%	6.6%	28.4%	7.4%	21.7%
Pipeline Imports	7.7%	7.8%	10.0%	9.3%	385.0%
LNG Imports	10.3%	13.4%	44.9%	17.1%	55.3%

*Numbers may be off due to rounding

Source: BP, SAF Group

China's natural gas imports in 2018 were strong considering natural gas is still only 7.43% share of total energy mix. The above table shows China's natural gas imports in 2018 were +2.8 bcf/d YoY, including pipeline imports +0.8 bcf/d YoY and LNG imports +2.0 bcf/d YoY. We had expected, at least in 2018, that LNG imports would have been higher, but we did not expect the pipeline imports to be up as high as 0.8 bcf/d YoY in 2018. China's target is to have natural gas be 10% of its energy mix in 2020, but it was only 7.43% in 2018. It is still behind the pace needed to hit its target. At 7.43% of the energy mix, we view 2.8 bcf/d YoY increase in total natural gas imports to be a strong number. In our Sept 20, 2017 blog, we said that if China were to get natural gas to a 10% share of its energy mix, it would need to increase its imports by ~3.5 bcf/d to ~4.5 bcf/d per year.

Pricing pressure on 2020 LNG prices – Gazprom's 3.6 bcf/d Power of Siberia export pipeline to China starts up Dec 1, 2019. The BP report is primarily a look back report, so there is no mention of why we see this data as reminding of the risk to LNG prices in 2020 and 2021. BP has limited forward looking comments throughout the report and speech, so it is no surprise they do not highlight Gazprom's new 3.6 bcf/d Power of Siberia gas export pipeline that is on track to begin deliveries to China on Dec 1, 2019. This links back to our March 30, 2019 blog "LNG Price Pressures 2020/2021 With Gazprom Adding ~8.9 Bcf/D Export Gas Pipeline Capacity Into Europe And China" [\[LINK\]](#). Our concern for 2019 is slower YoY growth rate increases. It has been a slow start to LNG demand due to the mild Asian winter. YTD Apr 30, 2019, China's LNG imports are only up ~1.5 bcf/d YoY. If we look thru the mild winter and use China's 2018 +4.1 bcf/d YoY in 2018 for natural gas consumption as a baseline normal level, we would expect natural gas consumption to be at least 5 bcf/d YoY. If we assume China production continues to grow by ~1 bcf/d, it leaves the need for 4 bcf/d of either pipeline or LNG or a combination in 2020. The problem is that the Gazprom 3.6 bcf/d Power of Siberia gas export pipeline to China is on track for deliveries in Dec 2019 and it will almost, by itself take care of all China need for LNG or pipeline imports. From a total world perspective, China was 55% of the YoY growth in LNG imports in 2018, and if Power of Siberia can basically take care of China's natural gas import needs, then it means there will likely be LNG cargos originally destined for China being redirected once again to NW Europe.

Even bigger pricing pressures whenever Gazprom's 5.3 bcf/d Nord Stream 2 export pipeline to Germany starts ie. either in 2020 or 2021. On Sunday, we tweeted [\[LINK\]](#) "Gazprom says 5.6 bcf/d Nord Stream 2 export pipeline to German is now 57.2% completed and work is going on every day to complete. Don't know when Denmark will approve, but will only take ~5 weeks to complete ~130 km in Danish waters ...". Gazprom's target for in service was by the end of 2019. It still isn't clear when Gazprom will get the final Danish Energy Agency route sign off, but the expectation is that Gazprom will likely miss its yr end 2019 in service with a more likely time frame being in H1/2020. Adding 5.3 bcf/d in mid 2020 will be a

big negative to LNG prices as soon as it starts up and its pressure on LNG prices will continue at least thru the end of 2020. By itself, Nord Stream 2 will likely cover the vast majority of incremental LNG demand in 2020.

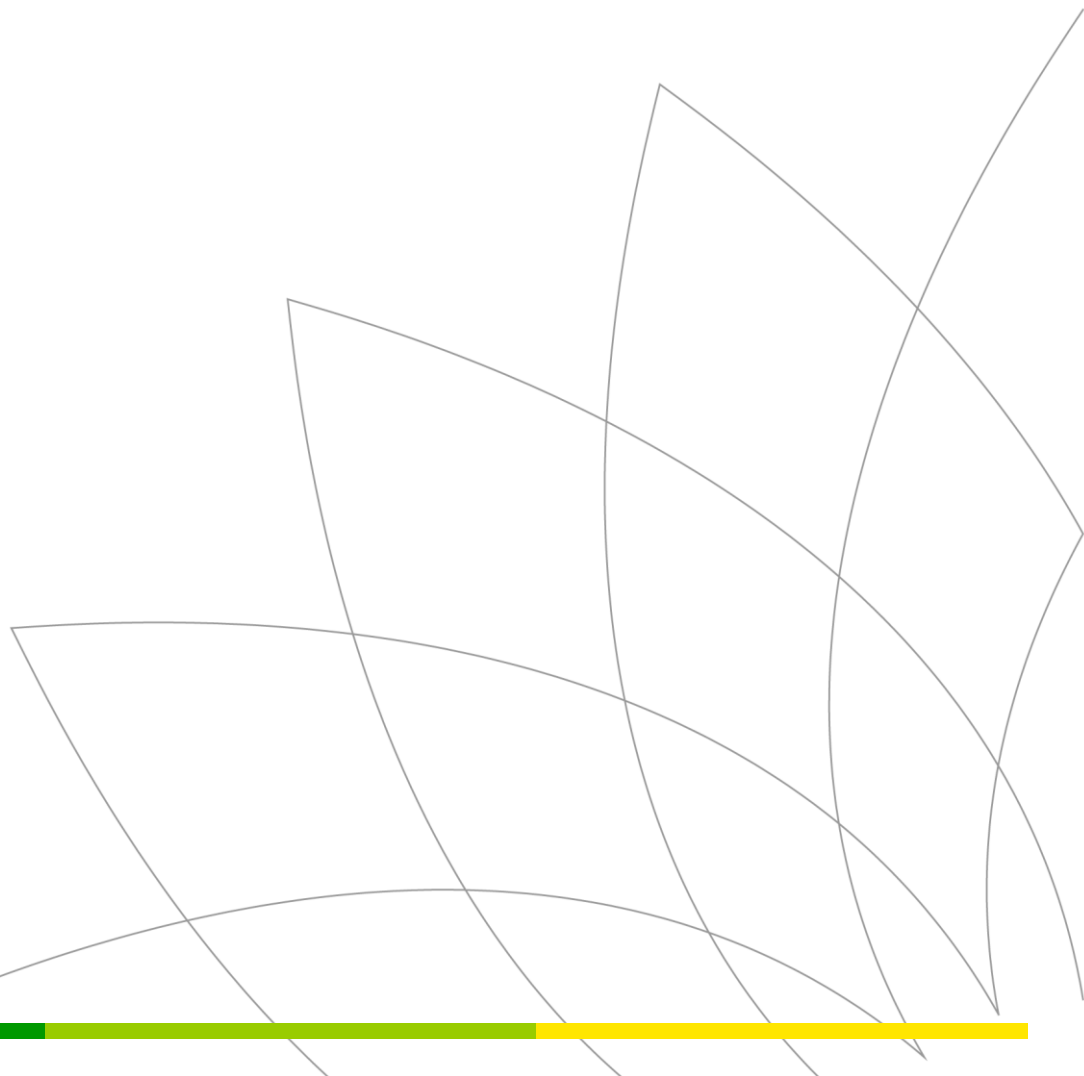


Energy in 2018: an unsustainable path

Spencer Dale

Group chief economist

London
11 June 2019



1. Introduction

This is the 68th edition of the Stats Review.

As I have travelled around the world with BP over the past few years, I have come to appreciate the esteem in which the Statistical Review is held.

One of the most tangible examples of this is when executives or officials in different parts of the world pull me towards their bookshelves to show me a set of Stats Review booklets going back the past 20 or 30 years.

At first I was a little perplexed by this: why keep a copy of last year's Stats Review once a new updated Review and dataset have been published.

Even more so, given that all the data are available online.

But I came to realise that the commentary that's also included in the Stats Review provides a snapshot of the issues dominating the industry in that year.

It's a bit like those birthday cards which reproduce newspaper headlines from the year in which the person was born. They jolt your memory of different events.

As well as the raw data, the Stats Review provides a record of key energy developments and events of the day.

My guess is that when our successors look back at Statistical Reviews from around this period, they will observe a world in which there was growing societal awareness and demands for urgent action on climate change, but where the actual energy data continued to move stubbornly in the wrong direction.

A growing mismatch between hopes and reality.

In that context, I fear – or perhaps hope – that 2018 will represent the year at which this mismatch peaked.

As people protested, school children went on strike and shareholders passed resolutions, energy demand and carbon emissions grew at their fastest rate for years.

The Stats Review can't solve this mismatch, but it can provide an objective assessment of the factors driving energy developments in 2018 and their possible implications for the future.

2. Key features of 2018

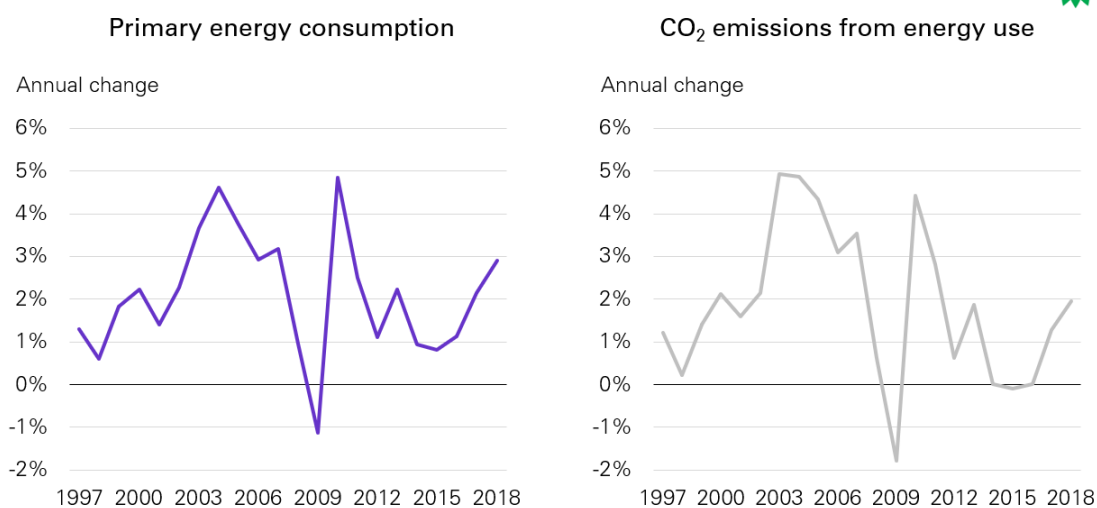
So what happened in 2018?

The headline numbers are the rapid growth in energy demand and carbon emissions.

Global primary energy grew by 2.9% in 2018 – the fastest growth seen since 2010.

This occurred despite a backdrop of modest GDP growth and strengthening energy prices.

Growth in primary energy and carbon emissions



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At the same time, carbon emissions from energy use grew by 2.0%, again the fastest expansion for many years, with emissions increasing by around 0.6 gigatonnes.

That's roughly equivalent to the carbon emissions associated with increasing the number of passenger cars on the planet by a third.

These increases are material.

So what drove these increases in 2018? And how worried should we be?

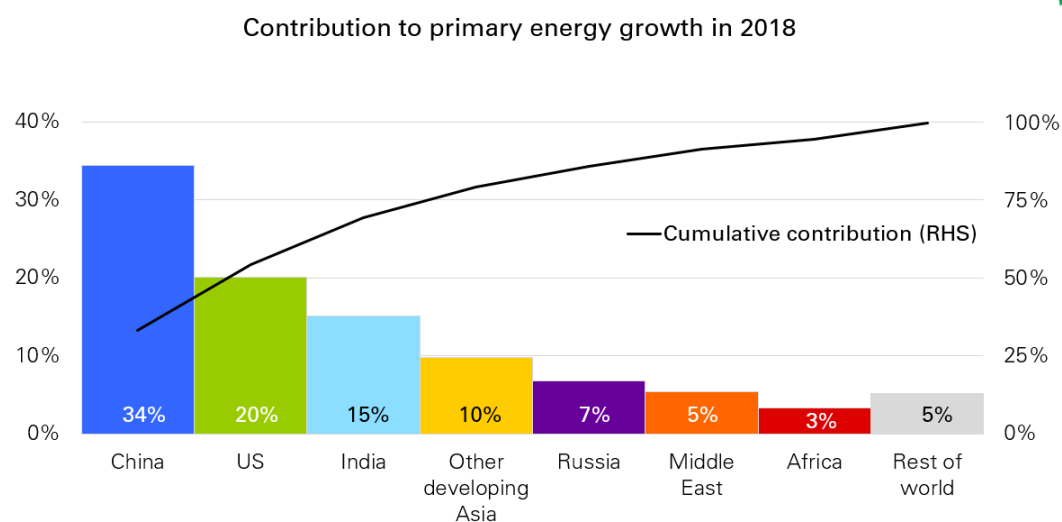
Starting first with energy consumption.

As I said, energy demand grew by 2.9% last year.

This growth was largely driven by China, US and India which together accounted for over two thirds of the growth.

Relative to recent historical averages, the most striking growth was in the US, where energy consumption increased by a whopping 3.5%, the fastest growth seen for 30 years and in sharp contrast to the trend decline seen over the previous 10 years.

Primary energy

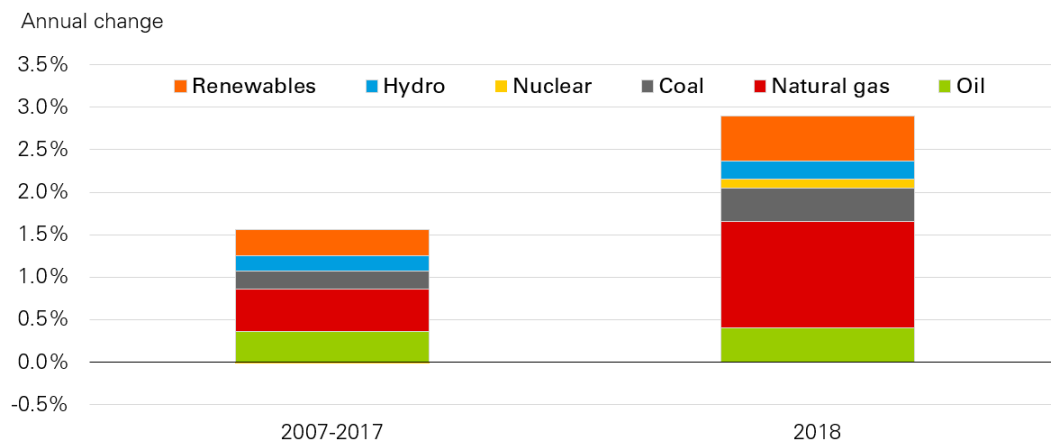


The strength in energy consumption was pretty much reflected across all the fuels, most of which grew more strongly than their historical averages.

This acceleration was particularly pronounced in natural gas demand, which increased 5.3%, one of its strongest growth rates for over 30 years, accounting for almost 45% of the entire growth in global energy consumption.

Growth in renewable energy (14.5%) eased back slightly relative to past trends although remained by far the world's fastest growing energy source.

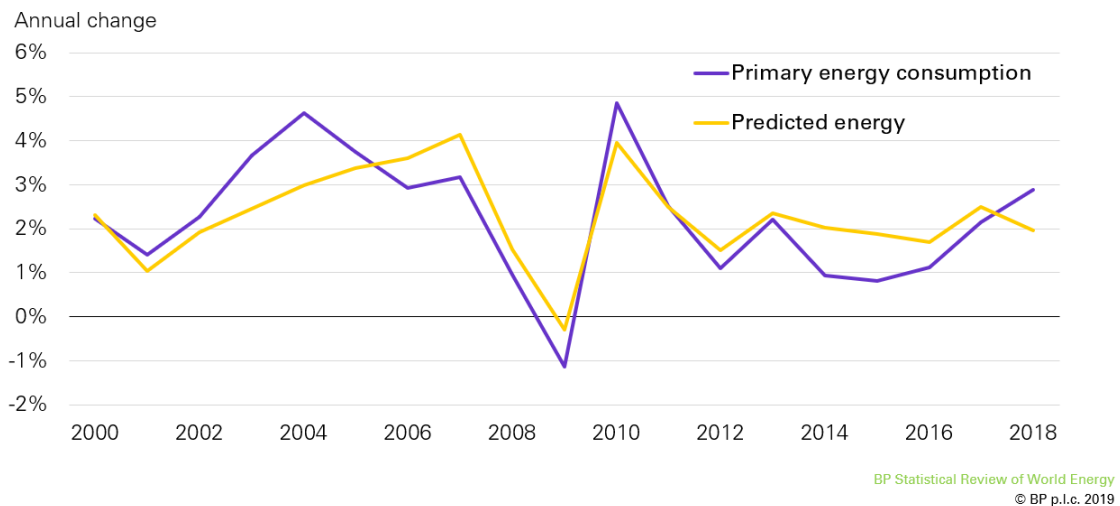
Primary energy growth by fuel



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In terms of why energy demand was so strong: the chart provides a way of gauging the extent of the surprise in this year's energy data.

Global energy consumption growth



The 'predicted' line uses a simple framework of GDP growth and changes in oil prices (as a proxy for energy prices) to predict primary energy growth at a country level and then aggregates to global energy.

Although very simple, the framework is able to explain much of the broad contours in energy demand over the past 20 years or so.

This framework predicts that the growth in energy demand should have slowed a little last year, reflecting the slightly weaker economic backdrop and the strengthening in energy prices.

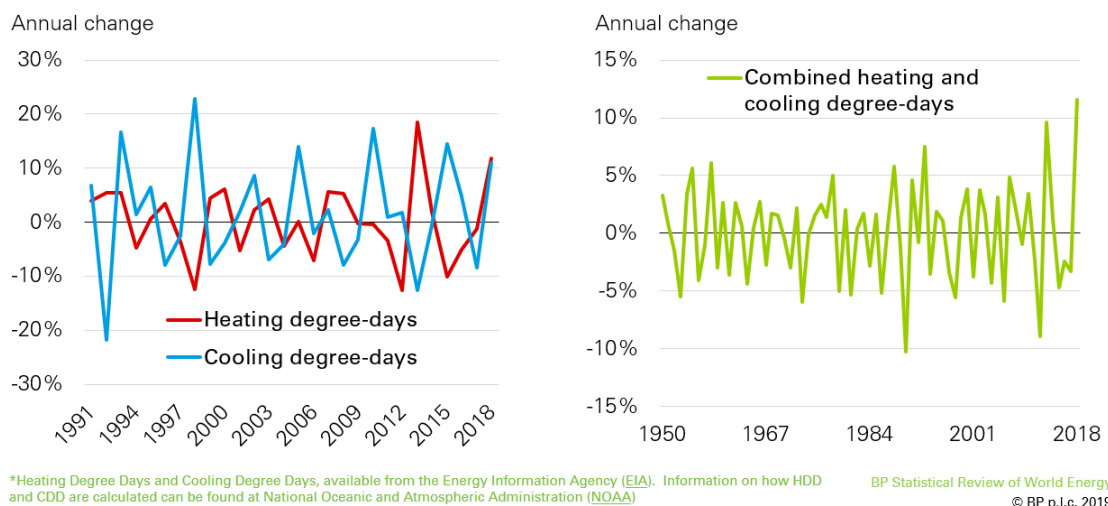
Instead, energy demand picked up quite markedly.

Digging into the data further, it seems that much of the surprising strength in energy consumption in 2018 may be related to weather effects. In particular, there was an unusually large number of both hot and cold days last year, which led to higher energy consumption as the demand for cooling and heating services increased.

The increasing frequency and intensity of heating and cooling days was pretty widespread across many of the world's major demand centres last year, particularly in the US, China and Russia helping to explain the strong growth in energy consumption in each of these countries.

To give a little more context, the chart shows a measure of US heating and cooling days which combines both the frequency and intensity of unusually cold and hot days. What was particularly unusual about the US last year was that there was an increase in both heating and cooling days; in past years, high numbers of heating days have tended to coincide with low numbers of cooling days or vice versa. As a result, the increase in the combined number of US heating and cooling days last year was its highest since the 1950s, boosting US energy demand.

US heating and cooling days*

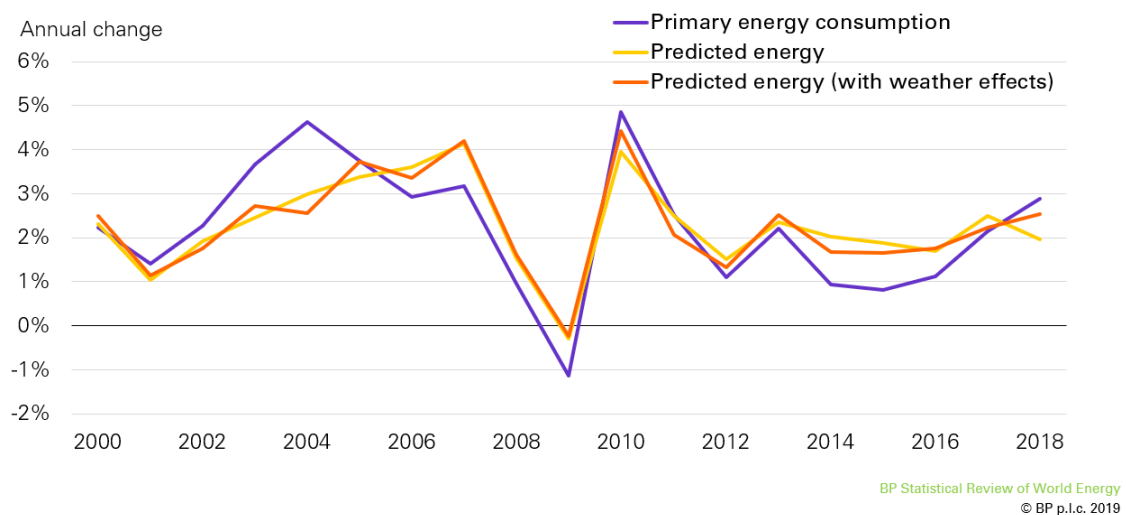


If we augment our framework to include a measure of heating and cooling days for those countries for which data are available, this greatly reduces the extent of the surprise in last year's energy growth.¹

Indeed, this analysis suggests that the stimulus from weather effects in US, China and Russia alone could account for around a quarter of the increase in energy consumption last year.

¹ The framework is based on estimating individual relationships for 79 countries and 12 small regions. Historical observations going back to mid-1990s for heating and cooling days are available for 21 countries, accounting for around 70% of global energy demand.

Global energy consumption growth

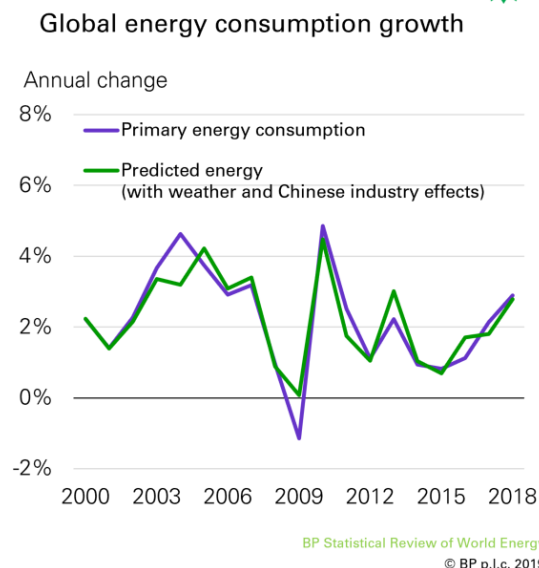
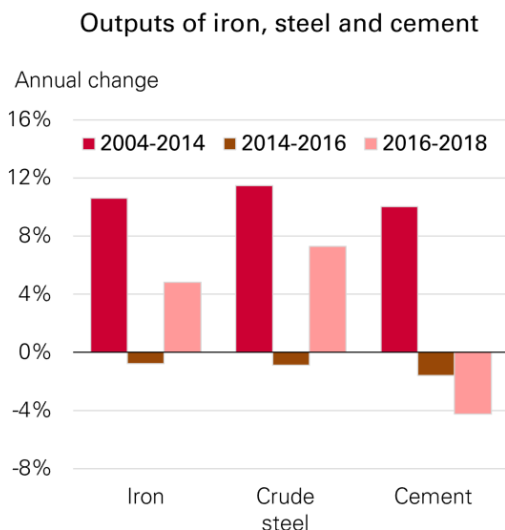


Once these weather effects are included, the growth in energy demand in 2018 still looks a little stronger than expected, but more striking is the surprising weakness of demand growth in the period 2014-16, which is far lower than the framework predicts.

For those loyal stalwarts amongst you who have been regular followers of the Stats Review in recent years, you may recall that much of this weakness appears to stem from the pattern of Chinese economic growth during this period, in particular the pronounced weakness of some of China's most energy-intensive sectors – iron, steel and cement – which account for around a quarter of China's energy consumption and greatly dampened overall energy growth.

At the time, I speculated that some of the slowing in these sectors reflected the structural rebalancing of the Chinese economy towards more consumer and service-facing sectors and so was likely to persist. But I also noted that the scale of the slowdown suggested that some of it was likely to be cyclical and would reverse over time. And indeed that is what began to happen in iron and steel in 2017 and gathered significant pace last year.

Chinese industrial growth



If we adjust the framework to also take account of movements in these key Chinese industrial sectors, the over-prediction of energy growth in 2014-16 is greatly reduced, as is the remaining 'unexplained' strength of energy demand in 2018.

So in answer to the question of why energy demand was so strong in 2018: it appears that the strength of demand last year was largely due to weather-related effects – especially in the US, China and Russia – together with a further unwinding of cyclical factors in China.

How does this relate to the worrying acceleration in carbon emissions?

To a very large extent, the growth in carbon emissions is simply a direct consequence of the increase in energy growth. Relative to the average of the previous five years, growth in energy demand was 1.5 percentage points higher in 2018 and the growth in carbon emissions was 1.4 percentage points higher.

One led to the other.

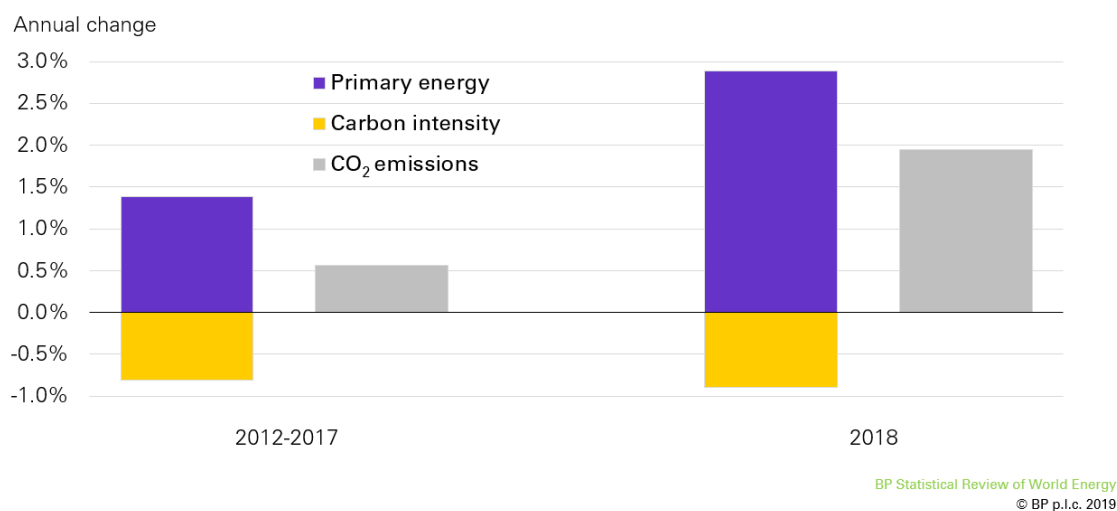
If anything, given the growth in energy demand, the growth in carbon emissions could have been even greater.

This reflects the fact that year-to-year growth in non-fossil fuels, especially renewable energy, is largely determined by policy and technological factors, and so are typically less responsive to cyclical movements in energy growth than are oil, gas and coal.

As a result, strong growth in overall energy demand tends to be associated with a greater-than-normal contribution from hydrocarbons, as they expand to balance the system. This shift in the fuel mix means the carbon intensity of the fuel mix tends to increase during periods of strong energy growth, further adding to carbon emissions.

And indeed, oil, gas and coal collectively accounted for almost three-quarters of the growth in energy demand in 2018 – its highest share for five years. But thankfully much of this growth was in natural gas, gaining share relative to coal and oil, such that the improvement in the carbon intensity of the fuel mix last year was similar to its recent average.

Energy demand and carbon emissions



Finally in terms of the headline data, what signal might the increasing growth of energy demand and carbon emissions in 2018 contain for the future?

I think this depends in large part on how you interpret the increasing number of heating and cooling days last year.

I should stress that this is not my area of competence, but there seems to be (at least) two possibilities.

On the one hand, to the extent that the unusually high number of hot and cold days last year just reflects random variation, we might expect weather effects in the future to revert to more normal levels, allowing the growth in energy demand and carbon emissions to fall back.

On the other hand, if there is a link between the growing levels of carbon in the atmosphere and the types of weather patterns observed in 2018 this would raise the possibility of a worrying vicious cycle: increasing levels of carbon leading to more extreme weather patterns, which in turn trigger stronger growth in energy (and carbon emissions) as households and businesses seek to offset their effects.

As I said, there are zillions of people better qualified than I to make judgements on this.

But even if these weather effects are short lived, such that the growth in energy demand and carbon emissions slows over the next few years, the recent trends still feel very distant from the types of transition paths consistent with meeting the Paris climate goals.

Hopes and reality.

So, in that sense, there are grounds for us to be worried.

That is all I wanted to say in terms of the headline data on energy demand and carbon emissions. My plan now is to consider the key fuels in a little more detail, starting with oil.

3. Oil and refining

2018 was another rollercoaster year for oil markets, with prices starting the year on a steady upward trend, reaching the dizzying heights of \$85/bbl in October before plunging in the final quarter to end the year at close to \$50/bbl.

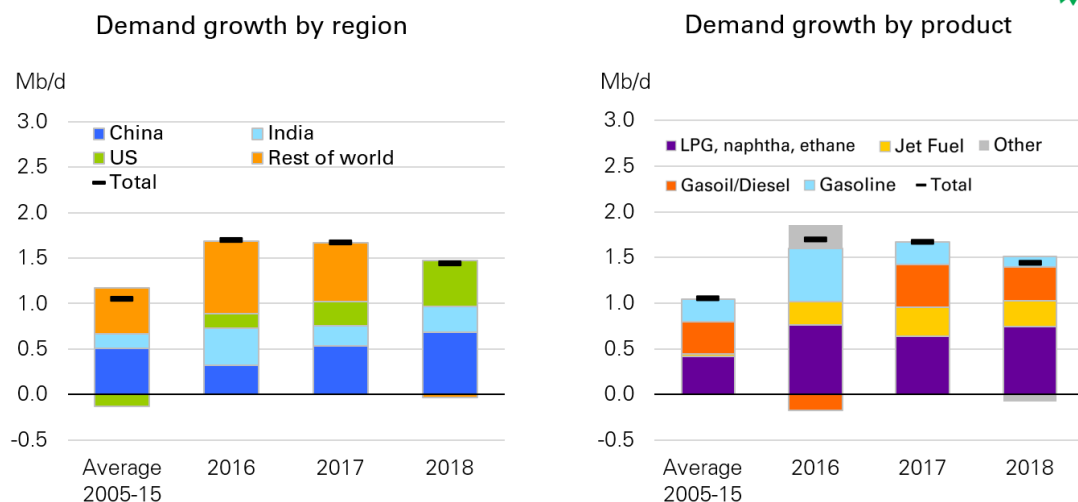
Oil demand provided a relatively stable backdrop for this excitement, continuing to grow robustly, increasing 1.4 Mb/d last year. In an absolute sense, the growth in demand was dominated by the

developing world, with China (0.7 Mb/d) and India (0.3 Mb/d) accounting for around two thirds of the global increase.

But relative to the past 10 years or so, the big outlier was the US, where oil demand grew by 0.5 Mb/d in 2018, its largest increase for well over 10 years and in sharp contrast to the trend decline seen in the decade or so prior to the oil price crash of 2014.

The strength in US oil demand in recent years has been concentrated in first gasoline and then diesel, buoyed by lower prices and economic recovery respectively. But the further step up in growth seen last year was driven by increased demand for ethane as new production capacity came on stream.

Oil demand



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The increased importance of petrochemicals in driving oil demand growth was also evident in the global product breakdown, with products most closely related to petrochemicals (ethane, LPG and naphtha) accounting for around half of the overall growth in demand last year.

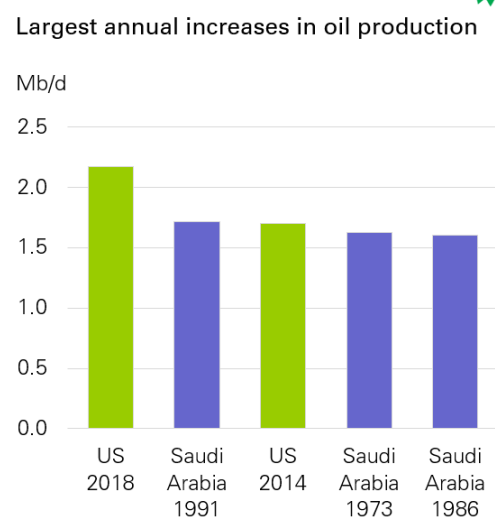
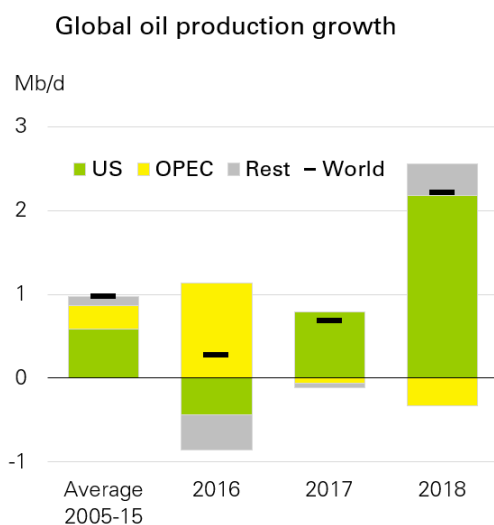
Against this backdrop of solid demand growth, all the fun and excitement of the fair came from the supply side, where global production grew by a whopping 2.2 Mb/d, more than double its historical average.

The vast majority of this growth was driven by the 2.2 Mb/d increase in US production, which flowed almost entirely from increases in tight oil and natural gas liquids (NGLs). There was also growth in some other non-OPEC countries, led by Canada (0.4 Mb/d) and Russia (0.2 Mb/d).

The increase in US production was the largest-ever annual increase by any country.

Indeed, since 2011 and the onset of the tight oil revolution, US production has increased by over 7 Mb/d – broadly equivalent to Saudi Arabia’s crude oil exports – an astonishing increase which has transformed both the structure of the US economy and global oil market dynamics. Largely as a consequence, US net oil imports shrunk to less than 3 Mb/d last year, compared with over 12 Mb/d in 2005.

Oil production



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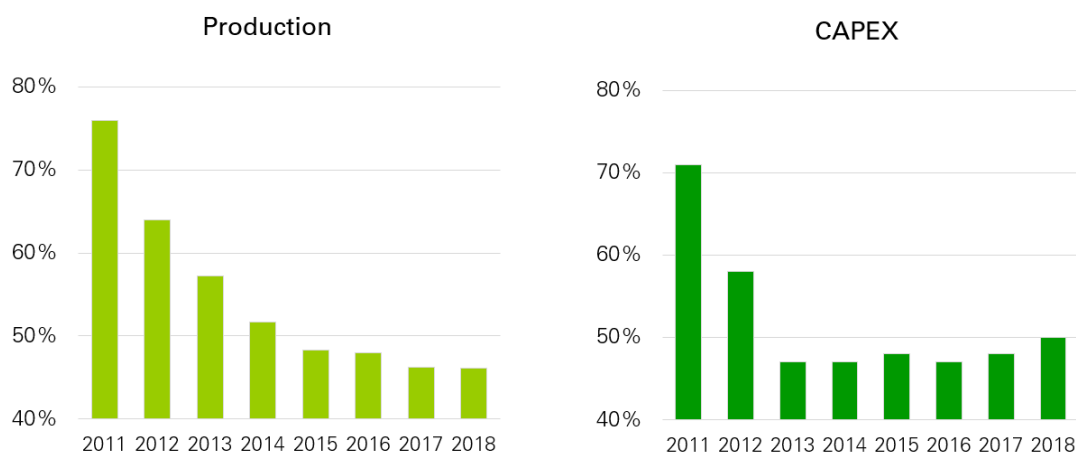
There has been much talk recently about the changing structure of L48 production, as Big Oil has increased its footprint and the incentives for consolidation to exploit the benefits of scale and contiguous acreage have increased.

Interestingly, this process of consolidation is not yet evident in the extent to which production is concentrated amongst the top few producers. Indeed, the ratio of total production accounted for by the top 10 US tight oil producers has declined pretty consistently over the past decade as the tight oil revolution has taken hold.

Concentration of US tight oil production and CAPEX



Share of top 10 US tight oil firms by:



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That said, there is evidence of increasing concentration in investment spending, which may be a leading indicator for production. And the corresponding ratio for US shale gas production has increased over the past couple of years to a little over 55% – quite a bit higher. So levels of concentration may start to increase in coming years.

The extent to which it does could have an important bearing on the future dynamics of US tight oil production, particularly in terms of its responsiveness to oil prices and to the availability of capital.

Watch this space.

Switching from US production to OPEC: OPEC production fell by 0.3 Mb/d in 2018, with a marked increase in Saudi Arabian production (+0.4 Mb/d) offset by falls in Venezuela (-0.6 Mb/d) and Iran (-0.3 Mb/d). But this year-on-year comparison doesn't do justice to the intra-year twists and turns in OPEC production.

The ride began in the first half of 2018 with the continuation of the OPEC+ agreement from December 2016, which included OPEC, together with 10 non-OPEC countries led by Russia. The OPEC+ group consistently overshoot their agreed production cuts during 2017 and this overshooting increased further during the first half of 2018, largely reflecting continuing falls in Venezuelan output.

These production cuts helped push OECD inventories below their five year moving average for the first time since the collapse in oil prices in 2014.

The first major OPEC twist came in the middle of 2018, amid growing concerns surrounding the possible scale of future supply disruptions. Venezuelan production was continuing to fall. Moreover, the US announced in May its intention to impose sanctions on all Iranian oil exports.

In response, the OPEC+ group in June committed to achieving 100% compliance of their production cuts for the group as a whole. This commitment contained two important signals. First, given the extent to which production was below the target level, it signalled the prospect of an immediate increase in production. Second, it helped reduce the uncertainty associated with the possibility of future disruptions to either Iranian and Venezuelan production since the commitment to maintain “100% compliance” in essence signalled the willingness of other members of the OPEC+ group to offset any lost production.

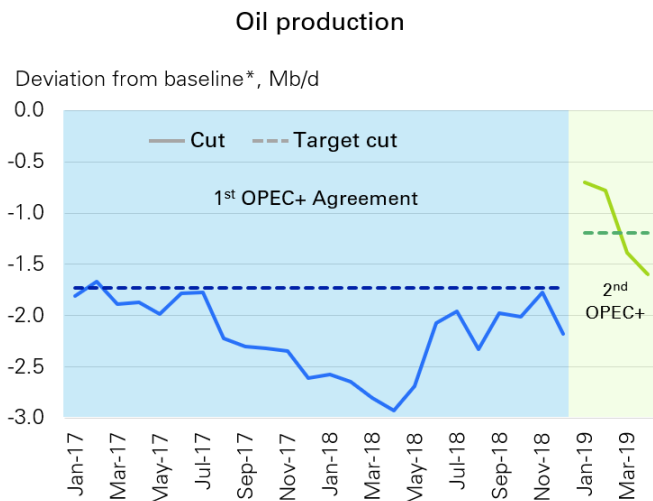
And that is exactly what happened between May and November of last year: net production by the OPEC+ group increased by 900 Kb/d, close to achieving the 100% compliance, despite Iranian and Venezuelan production falling by a further 1 Mb/d.

Job done. Or was it?

The problem with trying to stabilise oil markets is that there is always some other pesky development that you hadn't expected.

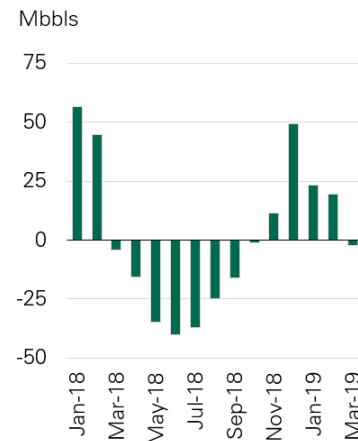
In this case, oil production by Libya and Nigeria – neither of which were part of the OPEC+ agreement – increased by almost 600 Kb/d between June and November of last year. As a result, rather than OECD inventories stabilising, they started to grow again, reversing much of the falls relative to the five year average. This growing sense of excess supply was compounded by the US announcing in November that it would grant temporary waivers for some imports of Iranian oil.

OPEC+ production agreements and OECD oil stocks



*Baseline in the 1st OPEC+ Agreement was October 2016.
For the 2nd OPEC+ Agreement it was October 2018

OECD stocks: deviation from 5-year moving average



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This triggered another twist: a new OPEC+ group was formed in December of last year – this time excluding Iran and Venezuela, as well as Libya, but including Nigeria – with a commitment to reduce production by 1.2 Mb/d relative to October 2018 levels. After a slow start, by the spring of this year, the reconstituted OPEC+ group was once again overshooting their production cuts. These reductions, together with further sharp falls in Venezuela production, have been sufficient to cause inventories to fall back to around their five year average.

It's tempting to interpret these twists and turns as indicative of OPEC's waning powers. But I'm not sure that's the correct interpretation. The role that OPEC+ played in more than offsetting the falls in Iranian and Venezuelan output last year was very significant. For me, the twists and turns simply reflect the difficulty of market management, especially in a world of record supply growth in one part of the world and heightened geopolitical tensions in others.

It feels like the oil market rollercoaster will run for some time to come.

The gyrations in supply, together with a host of macroeconomic factors, including the festering trade dispute between the US and China, were reflected in oil prices, which trended higher through much of the year, before tumbling in the final quarter. For the year as a whole, Brent averaged \$71/bbl, up from \$54/bbl in 2017.

Oil price



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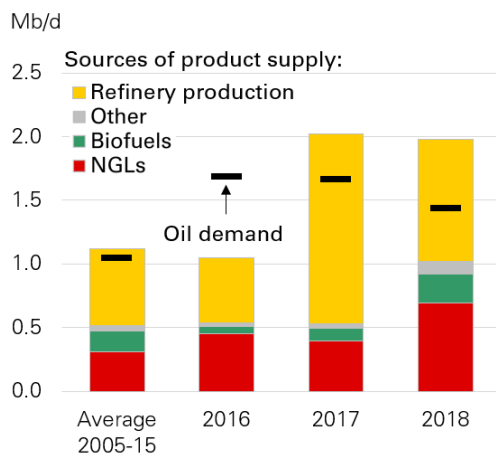
Turning briefly to refining.

Refinery throughput increased by 1.0 Mb/d in 2018, quite a bit weaker than the increase seen in the previous year (1.5 Mb/d). Some of this slower growth stems from the easing in overall oil demand growth, but more important was the strong growth in non-refined liquids, especially the record growth in the production of NGLs (0.7 Mb/d), which are separately identified in the Statistical Review for the first time.

Refinery production and utilization

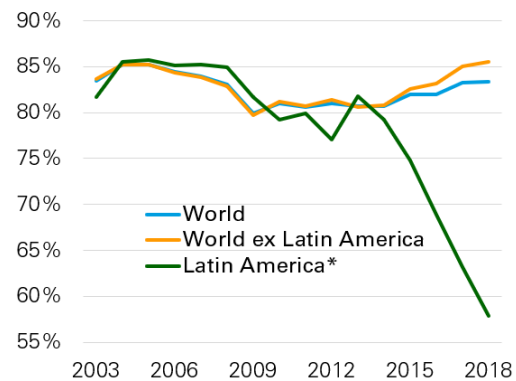


Growth of oil demand and product supply



* S&C America + Mexico

Refinery utilization by region

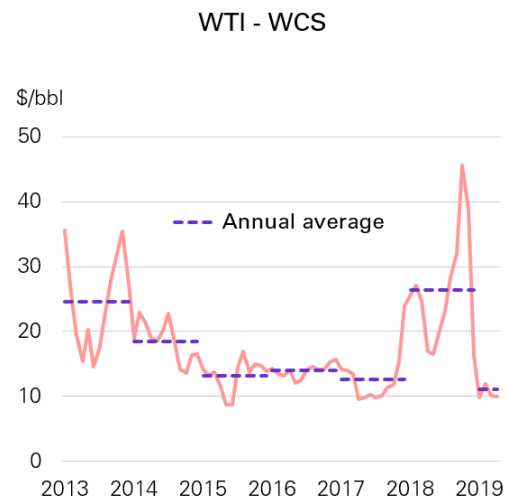
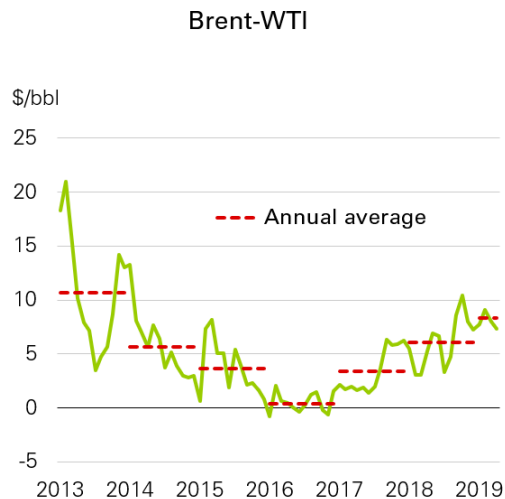


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Despite the smaller increase in refining runs, measured utilisation rates increased for the fourth consecutive year in 2018 to reach their highest level for more than 10 years. Indeed, taking account of the large and growing disruptions to refining capacity in Latin America and Africa, 'effective' utilisation rates were even higher, as evidenced by utilisation rates outside of Latin America reaching record high levels. Despite increasing levels of utilisation, margins eased slightly relative to last year as the impact of Hurricane Harvey unwound and product stock levels increased.

Oil price differentials continued to be dominated by logistical constraints and bottlenecks. The limited pipeline capacity to transport Canadian heavy oil to the US caused the WTI-WCS differential to blow out to around \$45/bbl in October of last year, before the Albertan government stepped in to regulate production causing the differential to narrow sharply. Likewise, bottlenecks and constraints associated with both transporting crude to the Gulf coast and subsequently exporting some of this crude caused the average Brent-WTI differential to widen to over \$6/bbl in 2018.

North American crude differentials



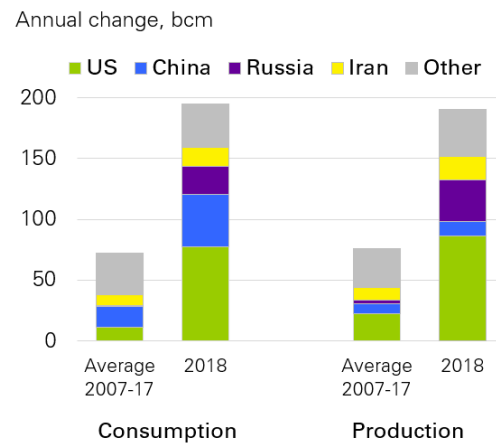
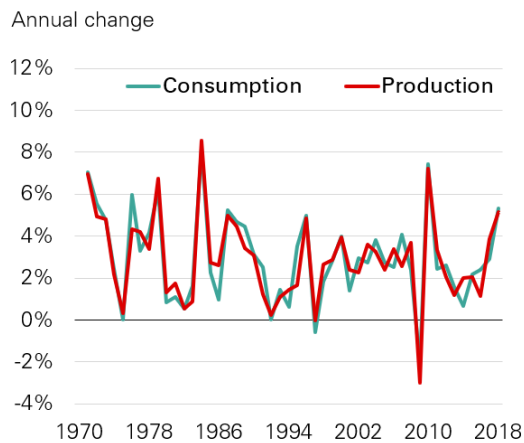
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4. Natural Gas

Turning next to natural gas.

As I mentioned, 2018 was a bonanza year for natural gas, with both global consumption and production increasing by over 5%, one of the strongest growth rates in either gas demand or output for over 30 years.

Global growth in natural gas



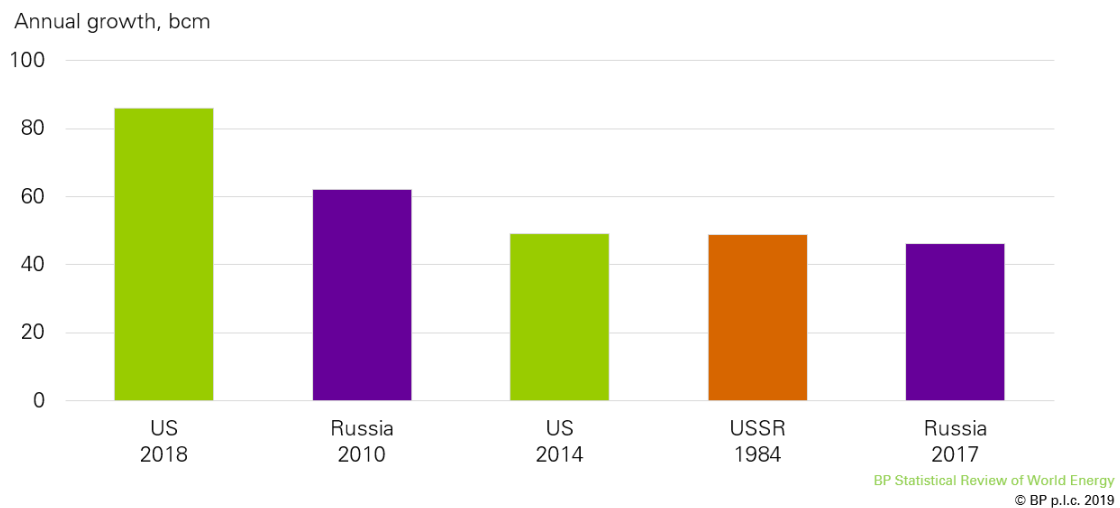
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The main actor here was the US, accounting for almost 40% of global demand growth and over 45% of the increase in production.

US gas production increased by 86 bcm, an increase of almost 12%, driven by shale gas plays in Marcellus, Haynesville and Permian. Indeed, the US achieved a unique double first last year, recording the single largest annual increases by any country in both oil and gas production.

In case there was any doubt: the US shale revolution is alive and kicking.

Largest increases in gas production



The gains in global gas production were supported by Russia (34 bcm), Iran (19 bcm) and Australia (17 bcm).

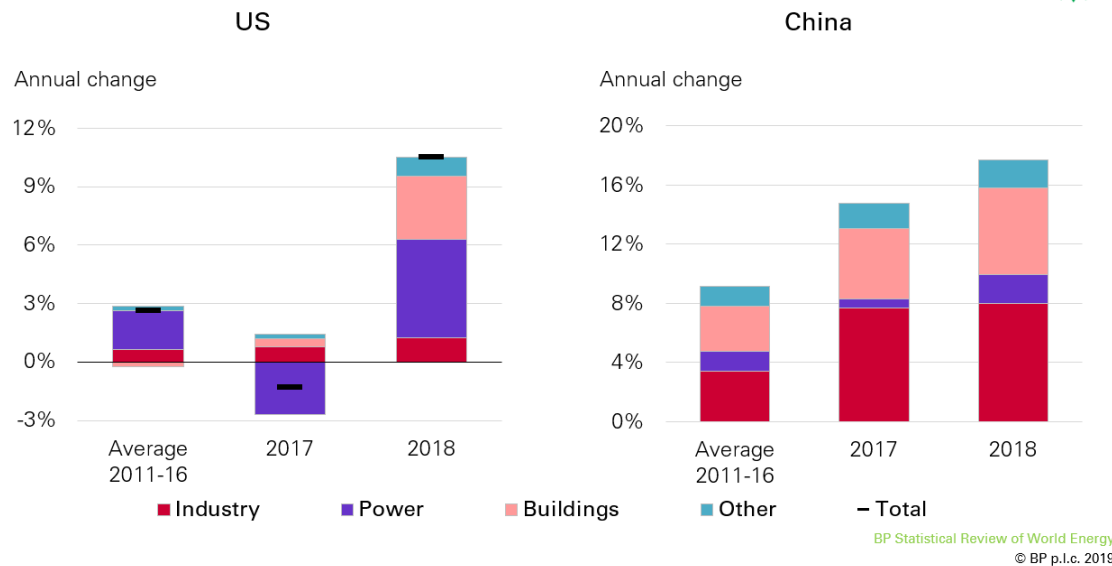
Although some of the increase in US gas supplies was used to feed the three new US LNG trains which came on stream last year, the majority was used to quench the thirst of domestic demand.

US gas consumption increased by 78 bcm last year – to put that in context, that is roughly the same growth as achieved over the previous six years in the US; or broadly equivalent to the entire gas consumption of the UK.

You will not be surprised to hear that this exceptional strength appears to be largely driven by the same weather-related effects, with rising demands for space heating and cooling fuelling increased gas consumption, both directly in commercial and residential buildings, and, more importantly, indirectly via growing power demand. The expansion of gas consumption within the US power sector was further boosted by around 17 gigawatts of coal-fired generation capacity being retired last year.

Overall, the growth in gas-fired power generation accounted for around half of the increase in US gas consumption last year.

Growth in US and Chinese gas consumption



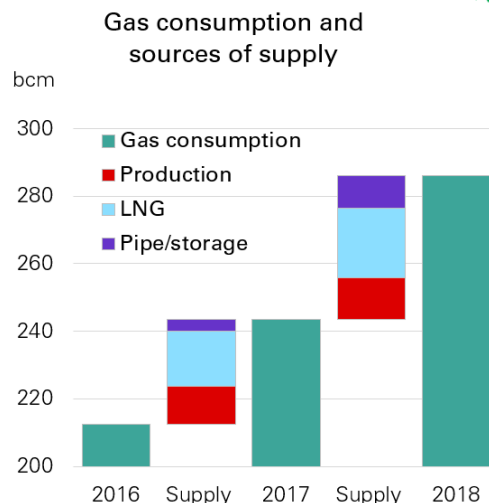
Outside of the US, the growth in global gas demand was concentrated across three other countries: China (43 bcm), Russia (23 bcm) and Iran (16 bcm), which together with the US, accounted for 80% of global growth.

China gas consumption grew by an astonishing 18% last year. This strength stemmed largely from a continuation of environmental policies encouraging coal-to-gas switching in industry and buildings in order to improve local air quality, together with robust growth in industrial activity during the first half of the year.

These coal-to-gas switching policies have been instrumental in increasing Chinese gas consumption by over a third in the past two years alone. Official estimates suggest that as many as 10 million households – roughly half the number of households in the UK – switched from coal-to-gas boilers over this 2-year period, with even greater switching in the industrial sector.

Importantly, a series of improvements in import capacity, distribution and demand management meant that this second successive year of rapid growth in Chinese gas consumption was achieved largely without a repeat of the price spikes and shortages which characterised the winter of 2017/18, with increased imports from both LNG and pipelines.

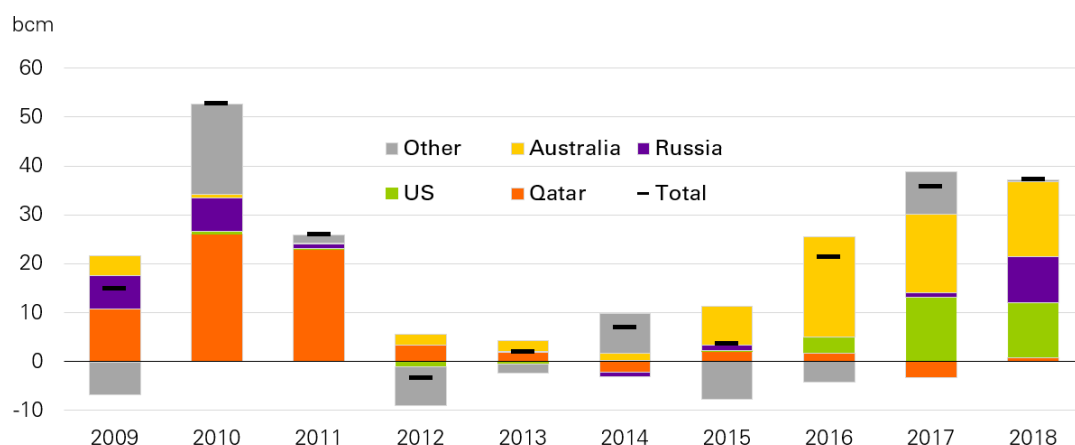
China gas prices and consumption



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Global LNG supplies continued their rapid expansion last year, increasing by almost 10% (37 bcm) as a number of new liquefaction plants in Australia, US and Russia were either started or ramped up.

Annual increase in LNG exports



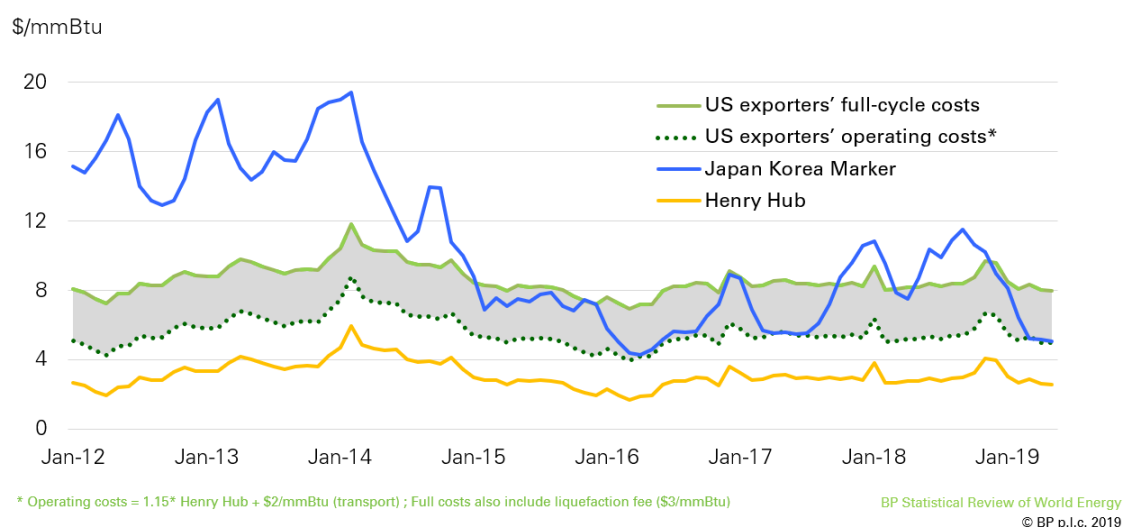
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For much of the year, the strength of Asian gas demand, led by China, was sufficient to absorb these increasing supplies. But a waning in the strength of Asian demand towards the end of the year,

combined with a mini-surge in LNG exports, caused prices to fall back and the differential between Asian and European spot prices to narrow significantly.

Asian prices have fallen further in the first part of this year, towards the bottom of the price band defined by US exporters' full-cycle and operating costs. The prospect of further substantial expansion of LNG supplies this year means there is a possibility of a first meaningful curtailment of some LNG supply capacity.

US LNG exporters' costs & Asian spot prices

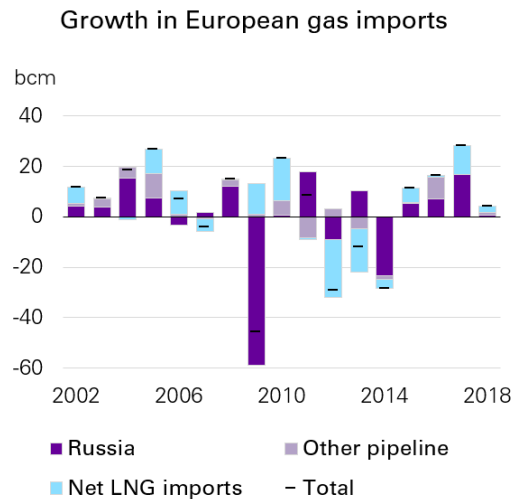


The extent of any eventual shut-in will depend importantly on the European market, which acts as the de facto 'market of last resort' for LNG supplies.

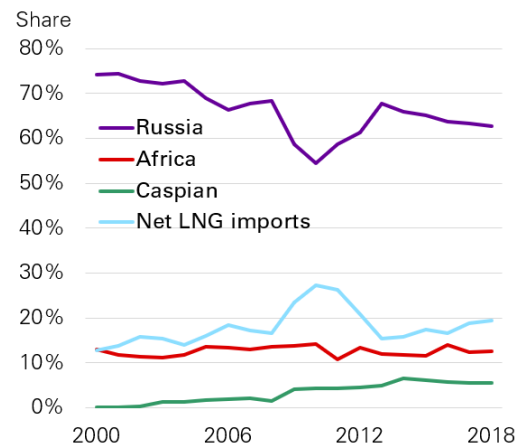
Europe's gas demand contracted by a little over 2% (11 bcm) last year, but this fall in demand was more than matched (-13 bcm) by continuing declines in Europe's aging gas fields. The small increase in European gas imports was largely met by LNG cargos diverted from Asia towards the end of the year as the Asian premium over European prices almost disappeared.

Russian pipeline exports to Europe were largely unchanged on the year, maintaining the record levels built up in recent years, although with a slight decline in their share of Europe's gas imports. A key factor determining the role that Europe will play in balancing the global LNG market over coming years will be the extent to which Russia seeks to maintain its market share.

European gas imports



European gas imports by source



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5. Coal

2018 saw a further bounce back in coal – building on the slight pickup seen in the previous year – with both consumption (1.4%) and production (4.3%) increasing at their fastest rates for five years.

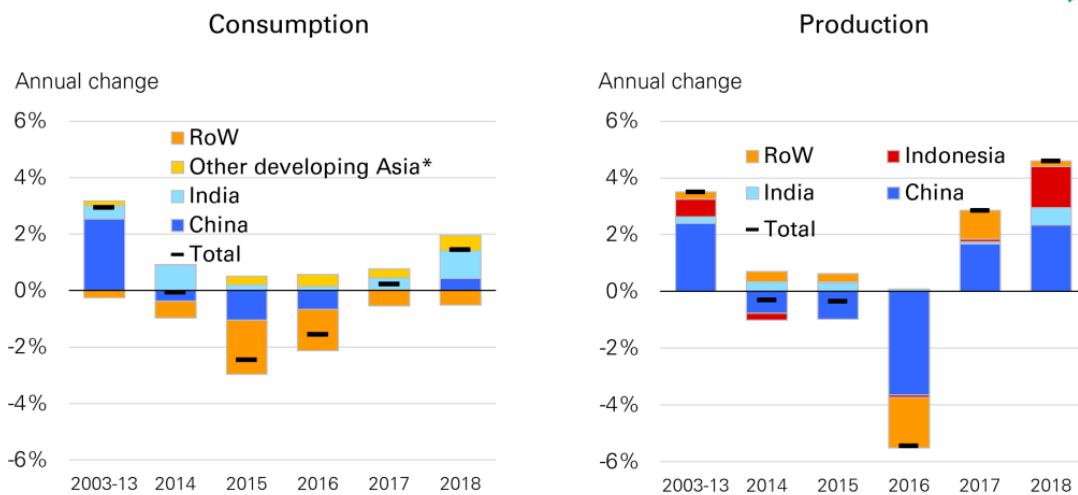
This strength was concentrated in Asia, with India and China together accounting for the vast majority of the gains in both consumption and production.

The growth in coal demand was the second consecutive year of increases, following three years of falling consumption. As a result, the peak in global coal consumption which many had thought had occurred in 2013 now looks less certain: another couple of years of increases close to that seen last year would take global consumption comfortably above 2013 levels.

The growth in coal consumption was more than accounted for by increasing use in the power sector. This is despite continuing strong growth in renewables: renewable energy increased by over 25% in both India and China last year, which together accounted for around half of the global growth in

renewable energy. So really rapid growth. But even this was not sufficient to keep pace with the strong gains in power demand, with coal being sucked into the power sector as the balancing fuel.

Global coal consumption and production



* Other emerging Asia is defined as all Asia-Pacific countries excluding four OECD countries, China, and India.

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This highlights an obvious but important point: even if renewables are growing at truly exceptional rates, the pace of growth of power demand, particularly in developing Asia, limits the pace at which the power sector can decarbonize.

We can explore this point in more detail by looking at the power sector specifically.

6. Power sector and renewable energy

As I have bored many of you for several years now, the power sector needs to play a central role in any transition to a low carbon energy system: it is the single largest source of carbon emissions within the energy system; and it is where much of the lowest-hanging fruit lie for reducing carbon emissions over the next 20 years.

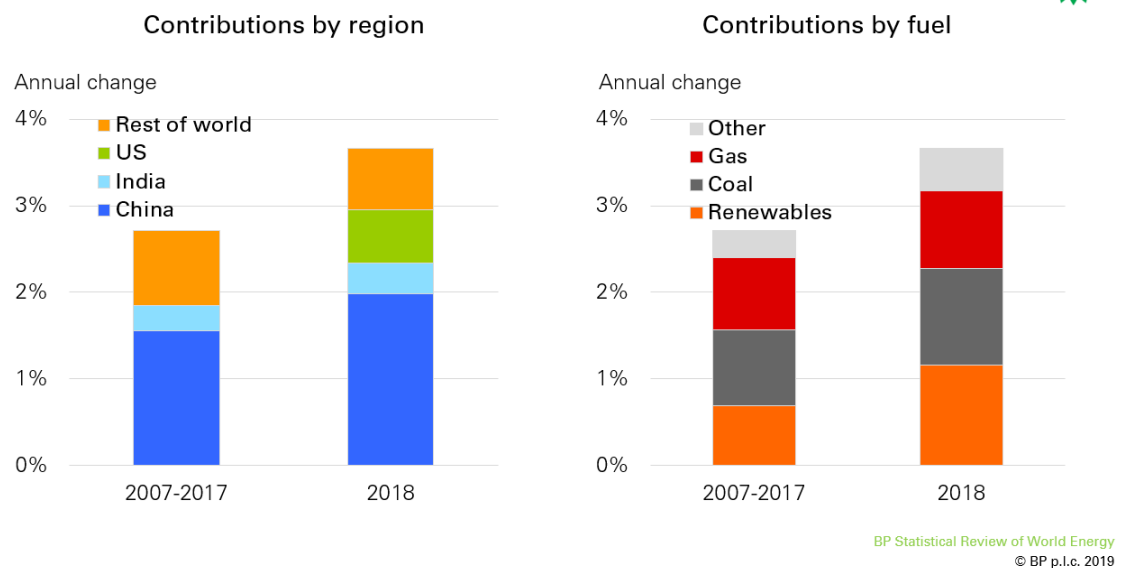
So what happened last year?

Global power demand grew by 3.7%, which is one of the strongest growth rates seen for 20 years, absorbing around half of the growth in primary energy.

The developing world continued to drive the vast majority (81%) of this growth, led by China and India who together accounted for around two thirds of the increase in power demand.

But the particularly strong growth of power demand in 2018 owed much to the US, where power demand grew by a bumper 3.7%, boosted by those weather effects, in sharp contrast to a slight trend decline seen over the past 10 years.

Growth in power generation



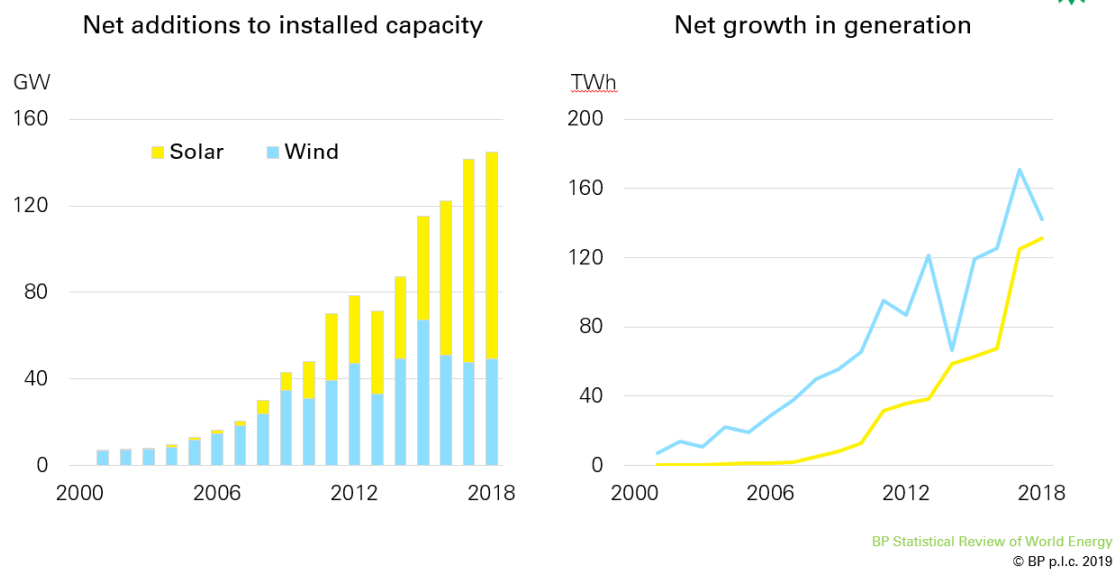
On the supply side, the growth in power generation was led by renewable energy, which grew by 14.5%, contributing around a third of the growth; followed by coal (3.0%) and natural gas (3.9%).

China continued to lead the way in renewables growth, accounting for 45% of the global growth in renewable power generation, more than the entire OECD combined.

One feature of last year's data is that the increase in wind and solar capacity flattened out in 2018 at around 150 GW. This is at odds with much of the past 20 years where the scale of capacity increases has tended to increase year after year. Although it's important not to overplay this flattening: the growth in renewable capacity last year was still at its highest ever level.

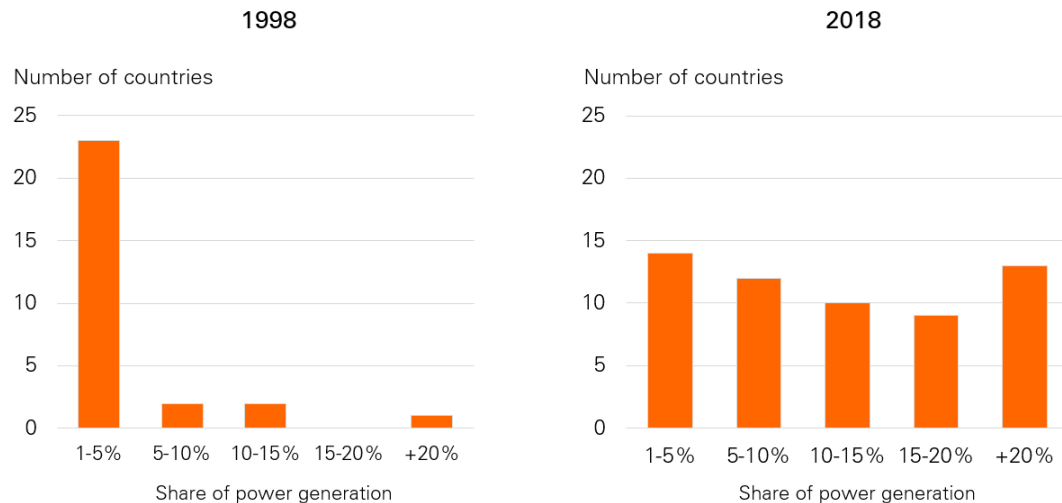
The growth in power generation was also close to its highest ever increase, with wind and solar providing broadly similar increments.

Wind and solar power



Stepping back from this year's data and looking at the growth of renewables over a longer period, these two histograms summarise the increasing adoption and penetration of renewable energy over the past 20 years, focussing on the 78 major countries which are individually tracked in the Stats Review.

Penetration of renewables



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Going back 20 years to 1998, only around a third of the tracked countries had any form of renewable power, with the vast majority of those countries with renewable energy employing only very small quantities, clustered in the 1-5% range of domestic power generation.

Fast-forward 20 years to 2018 and the picture has changed quite substantially. Three-quarters of the tracked countries have adopted some form of renewable energy, with the degree of penetration pretty evenly spread across the range.

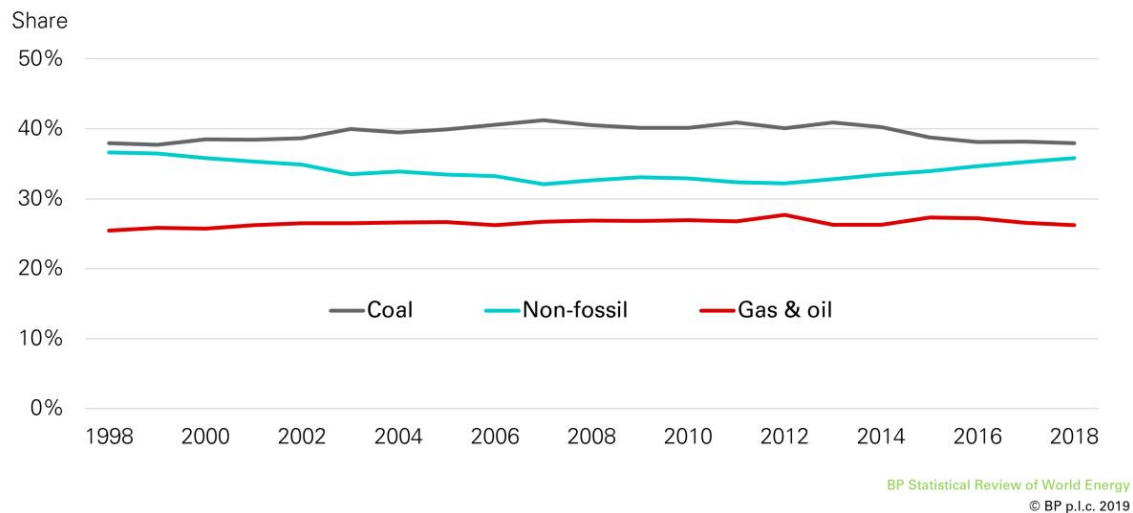
Renewable energy has come of age.

The 13 countries in the 20%+ penetration range are almost entirely European, with the only exception being New Zealand.

But to repeat a point I made last year, despite the increasing adoption and penetration of renewable power, the fuel mix in the global power system remains depressingly flat, with the shares of both non-fossil fuels (36%) and coal (38%) in 2018 unchanged from their levels 20 years ago.

Three flat lines.

Power sector fuel mix



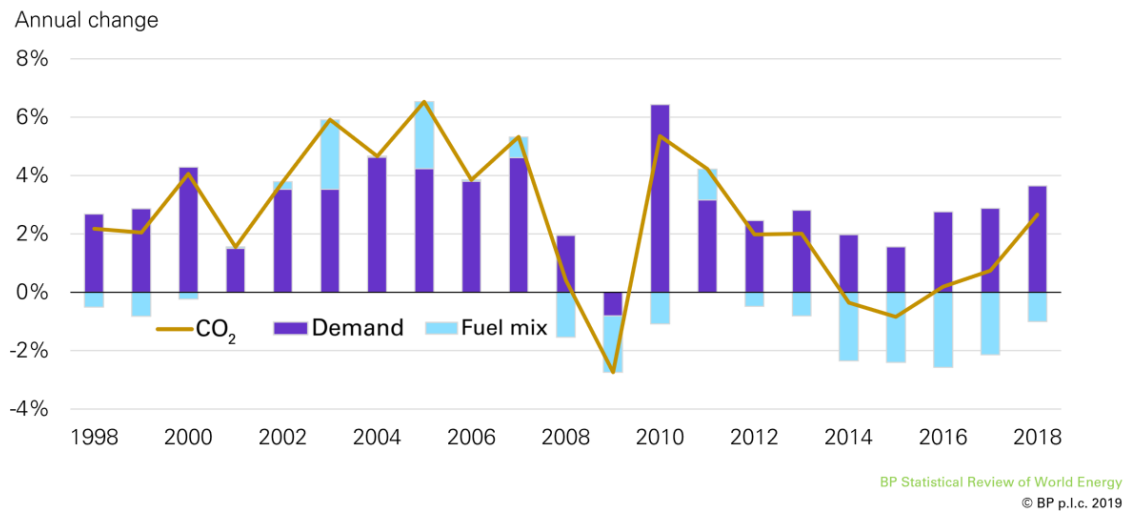
This persistence in the fuel mix highlights a point that the International Energy Agency (IEA) and others have stressed recently; namely that a shift towards greater electrification helps as a pathway to a lower-carbon energy system only if it goes hand-in-hand with a decarbonization of the power sector.

Electrification without decarbonizing power is of little use.

In that vein, carbon emissions from the power sector are estimated to have increased by 2.7% in 2018, their highest rate of growth for seven years, accounting for around half of the growth in global carbon emissions.

For much of the past 20 years, changes in the carbon intensity of the power sector have been relatively small (or even perverse), such that increases in power demand fed through directly into higher carbon emissions.

Carbon emissions from power sector



Electrification without decarbonization.

Over the past five years or so, the rapid growth in renewable energy, together with an edging down in the coal share, has led to a more sustained improvement in the carbon intensity of the power sector, such that the impact of increasing power demand on carbon emissions has been partially offset.

But it's still only partial: despite the rapid gains in renewable energy, the pace of growth in power demand has meant that overall carbon emissions from the power sector have increased substantially over the past three years.

It hasn't been possible to decarbonize the power sector quickly enough to offset the growth in demand.

To give a sense of the challenge posed by the strength of growth in power demand, I did a simple thought experiment of the extent to which the mix of fuels used by the power sector would have needed to change over the past three years to maintain the level of carbon emissions from the power sector at its 2015 level, for the same growth in power demand.

That is, the pace of decarbonization necessary to offset the entire growth in demand.

If we focus solely on renewable energy, renewable generation over the past three years would need to have grown more than twice as quickly than it actually did. Rather than growing by a little over 800 Twh over the past three years, renewable generation would have needed to grow by over 1800 Twh.

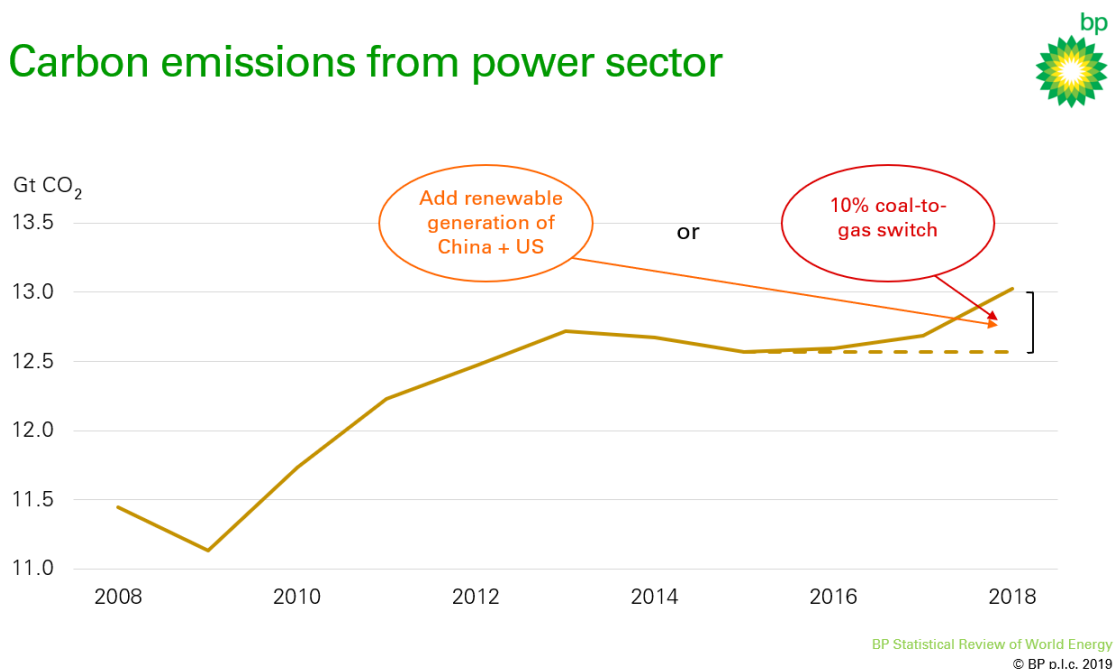
A staggering number: that additional renewable generation of around 1000 Twh is roughly equivalent to the entire renewable generation of China and the US combined in 2018.

So in addition to the rapid growth in renewable generation we actually saw, the world would have also needed to have added the entire renewable generation of China and the US, in just three years, just to keep carbon emissions from the power sector flat.

Alternatively, the same outcome for carbon emissions could have been achieved by replacing around 10% of coal in the power sector with natural gas.

The intuition is that renewables are still a relatively small share of power generation relative to coal, and so the proportional movements in coal are a lot smaller.

Carbon emissions from power sector



I took two points from this simple thought experiment.

First, the general point that the robust growth in power demand, particularly in the developing world, greatly adds to the difficulty of decarbonizing the power sector.

You have to run very fast just to stand still.

Second, relying solely on renewables to achieve this is an almost impossible task.

Rapid growth in renewable energy is essential but it's unlikely to be sufficient.

This highlights the importance of adopting a range of technologies and fuels; rather than just relying on renewables.

To win the race to Paris, the world is likely to require many fuels and technologies for many years to come.

This includes widespread coal-to-gas switching; significant adoption of carbon capture use and storage (CCUS); and increasing energy efficiency, especially in the developed world, where the vast majority of people already enjoy relatively high levels of electricity consumption.

7. Conclusions

Let me conclude.

At a time when society is increasing its demands for an accelerated transition to a low carbon energy system, the energy data for 2018 paint a worrying picture, with both energy demand and carbon emissions growing at the fastest rates seen for years.

As I explained, in a statistical sense, it's possible to explain this acceleration in terms of a combination of weather-related effects and an unwinding of cyclical movements in China's pattern of growth.

What is less clear is how much comfort we can take from this explanation.

What does seem fairly clear is that the underlying picture is one in which the actual pace of progress is falling well short of the accelerated transition envisaged by the Paris climate goals.

Last year's developments sound yet another warning alarm that the world is on an unsustainable path.

It is sometimes said that history is written by the victors.

Although the Statistical Review provides a history of sorts, it is a very specific, near-term, history: documenting the developments in the global energy system in the previous year.

In that context, the only victors are the power of comprehensive, objective data.

The data write the story.

That is the role the Stats Review has been playing for the past 68 years.

More importantly, looking ahead, I hope that the understanding and insight provided by future Statistical Reviews will continue to inform judgements and decisions as society navigates its path to a low carbon energy system.

Director's Cut

Lynn Helms
NDIC Department of Mineral Resources

Oil Production

March	43,144,557 barrels = 1,391,760 barrels/day (Final)
April	41,735,647 barrels = 1,391,188 barrels/day
	(All-time high was Jan 2019 - 1,403,808 barrels/day)
	1,336,438 barrels/day or 96% from Bakken and Three Forks
	54,750 barrels/day or 4% from legacy conventional pools

Gas Production

March	87,952,264 MCF = 2,837,170 MCF/day
April	85,866,784 MCF = 2,862,893 MCF/day (NEW all-time high)

Producing Wells

March	15,365
April	15,490 (Preliminary) (New all-time high)
	13,956 wells or 90% are now unconventional Bakken – Three forks wells
	1,534 wells or 10% produce from legacy conventional pools

Permitting

March	133 drilling and 0 seismic
April	129 drilling and 0 seismic
May	140 drilling and 0 seismic (All-time high was 370 in 10/2012)

Crude Price¹

	North Dakota Light Sweet	WTI
March	\$48.00/barrel	\$55.01/barrel
April	\$52.50/barrel	\$63.58/barrel
May	\$50.50/barrel	\$61.78/barrel
Today	\$40.50/barrel	\$52.28/barrel
All-time High (7/3/08)	\$136.29/barrel	\$145.29/barrel

Rig Count

March	66
April	63
May	65
Today	61 (All-time high was 218 on 5/29/2012)

The statewide rig count is down 72% from the high and in the five most active counties rig count is down as follows:

Divide	-92% (High was 3/2013)
Dunn	-76% (High was 6/2012)
McKenzie	-67% (High was 1/2014)
Mountrail	-63% (High was 6/2011)
Williams	-75% (High was 10/2014)

¹ Pricing Source: Flint Hills Resources

Fort Berthold Reservation Activity

	Total	Fee Land	Trust Land
Oil Production	302,773 barrels/day	98,267 barrels/day	204,506 barrels/day
Drilling Rigs	14	4	10
Active Wells	2,098	573	1,525
Waiting on completion	139		
Approved Drilling Permits	447	98	349
Potential Future Wells	4,454	1,191	3,263

Drilling and Completions Activity

The drilling rig count has become very stable in the mid-sixties. Operators have shifted from running the minimum number of rigs to incremental increases and decreases based on gas capture, completion crew availability, and oil price. Current operator plans are to hold the rig count steady or perhaps 2-5 fewer rigs second half of 2019 depending on oil price, workforce, and infrastructure constraints.

The number of well completions has become variable again due to oil price, gas capture, workforce, and weather:

February	66 (Final)
March	62 (Revised)
April	78 (Preliminary)

Over 99% of drilling now targets the Bakken and Three Forks formations.

From end of March to end of April:

- Estimated wells waiting on completion² is 962 (Down 6)
- Estimated inactive well count³ is 1,625 (Down 72)

Lower crude oil price, gas capture, workforce, and competition with the Permian and Anadarko shale oil plays for capital continue to limit drilling rig count. Utilization rate for rigs capable of 20,000+ feet is 55-65% and for shallow well rigs (7,000 feet or less) 40-50%.

Drilling permit activity is normal. Operators continue to maintain a permit inventory that will accommodate varying oil prices for the next 12 months.

Rigs actively drilling on federal surface in the Dakota Prairie Grasslands is down one to one.

² The number of wells waiting on completions is an estimate on the part of the director based on idle well count and a typical five year average. Neither the State of North Dakota, nor any agency officer, or employee of the State of North Dakota warrants the accuracy or reliability of this product and shall not be held responsible for any losses caused by this product. Portions of the information may be incorrect or out of date. Any person or entity that relies on any information obtained from this product does so at his or her own risk.

³ Includes all well types on IA and AB statuses: **IA** = Inactive shut in >3 months and <12 months;
AB = Abandoned (Shut in >12 months)

Seismic

Seismic activity is very slow.

Active Surveys	Recording	NDIC Reclamation Projects	Remediating	Suspended	Permitted
3	0	2	0	1	2

Gas Capture

US natural gas storage increased to 10% below the five-year average indicating little potential for price improvement in the future. North Dakota shallow gas exploration could be economic at future gas prices, but is not at the current price.

The price of natural gas delivered to Northern Border at Watford City is down \$.12 at \$1.98/MCF. This results in a current oil to gas price ratio of 21 to 1. The state wide gas flared volume from March to April decreased 10,339 MCF to 545,010 MCF per day and percent flared decreased to 19.0% with a Bakken capture percentage of 81%.

The historical high flared percent was 36% in 09/2011.

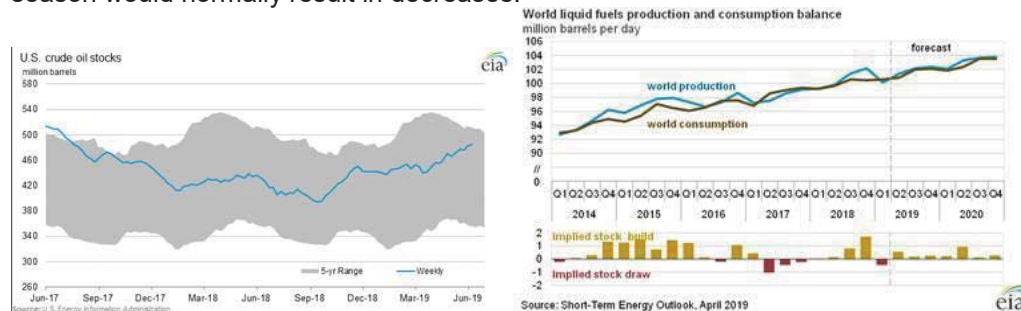
March captured	70,488,687 MCF = 2,273,829 MCF/day
April captured	69,537,445 MCF = 2,317,915 MCF/day (NEW all-time high)
Statewide.....	81%
Statewide Bakken.....	81%
Non-FBIR Bakken.....	84%
FBIR Bakken.....	71%
Trust FBIR Bakken...	70%
Fee FBIR.....	78%

The Commission has established the following gas capture goals:

74%	October 1, 2014 through December 31, 2014
77%	January 1, 2015 through March 31, 2016
80%	April 1, 2016 through October 31, 2016
85%	November 1, 2016 through October 31, 2018
88%	November 1, 2018 through October 31, 2020
91%	Beginning November 1, 2020

Crude Oil Markets

OPEC is in discussions with Russia over production restrictions needed to balance Venezuela's export collapse, US sanctions on Iran, and the slowing world economy. Futures markets and EIA continue to anticipate increasing crude oil oversupply through year end 2020. US crude oil inventories are now well above the long-term average and increasing when the high demand season would normally result in decreases.



Crude oil takeaway capacity including rail deliveries to coastal refineries is more than adequate, but Washington state Senate Bill 5579 threatens to disrupt 150,000-200,000 barrels per day.

MONTHLY UPDATE

APRIL 2019 PRODUCTION & TRANSPORTATION

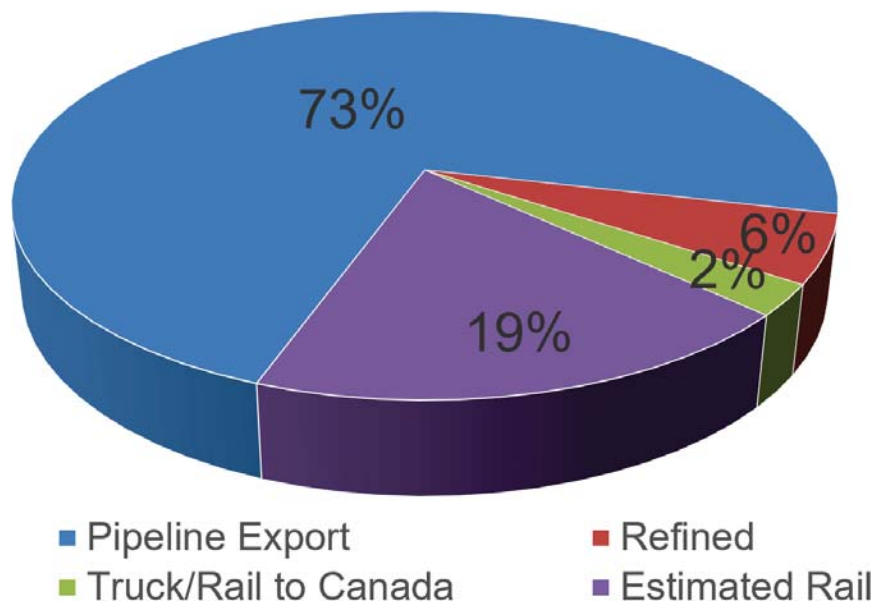
North Dakota Oil Production

Month	Monthly Total, BBL	Average, BOPD
Mar. 2019 - Final	43,144,557	1,391,760
Apr. 2019 - Prelim.	41,735,647	1,391,188

North Dakota Natural Gas Production

Month	Monthly Total, MCF	Average, MCFD
Mar. 2019 - Final	87,952,264	2,837,170
Apr. 2019 - Prelim.	85,886,784	2,862,893

Estimated Williston Basin Oil Transportation, Apr. 2019



CURRENT DRILLING ACTIVITY:

NORTH DAKOTA¹

61 Rigs

EASTERN MONTANA²

0 Rigs

SOUTH DAKOTA²

0 Rigs

SOURCE (JUNE 14, 2019):

1. ND Oil & Gas Division
2. Baker Hughes

PRICES:

Crude (WTI): \$52.66

Crude (Brent): \$61.98

NYMEX Gas: \$2.39

**SOURCE: BLOOMBERG
(JUNE 14, 2019)**

GAS STATS*

81% CAPTURED & SOLD

**16% FLARED DUE TO
CHALLENGES OR
CONSTRAINTS ON EXISTING
GATHERING SYSTEMS**

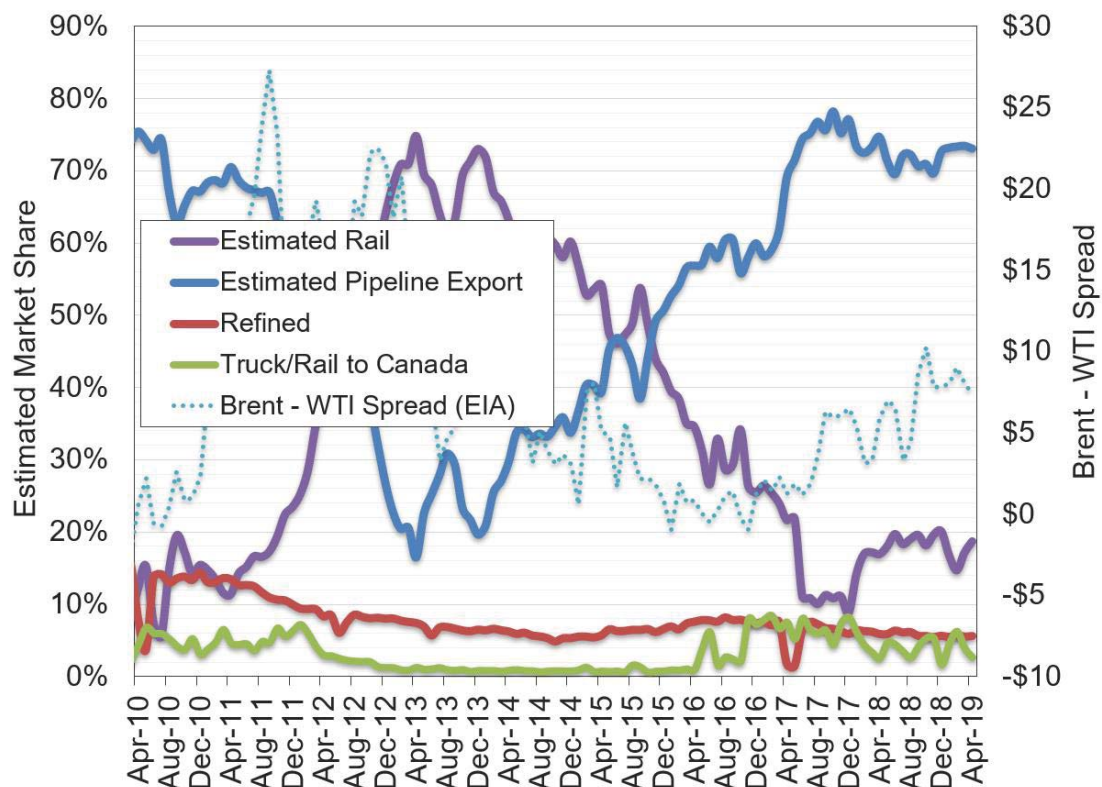
**3% FLARED FROM WELL
WITH ZERO SALES**

**APR. 2019 NON-CONF DATA*

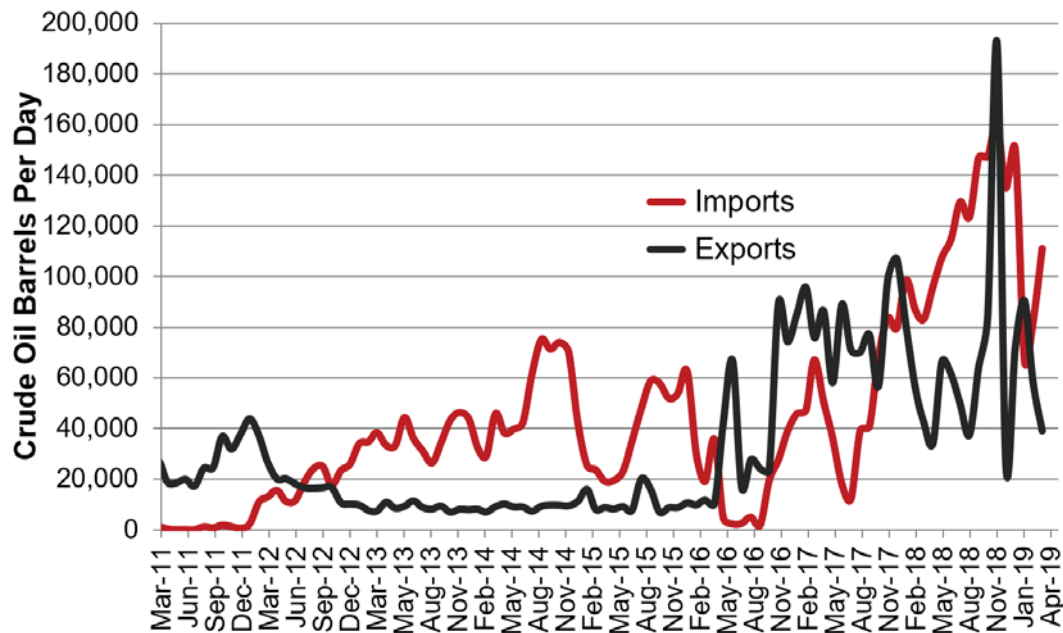
Estimated North Dakota Rail Export Volumes



Estimated Williston Basin Oil Transportation

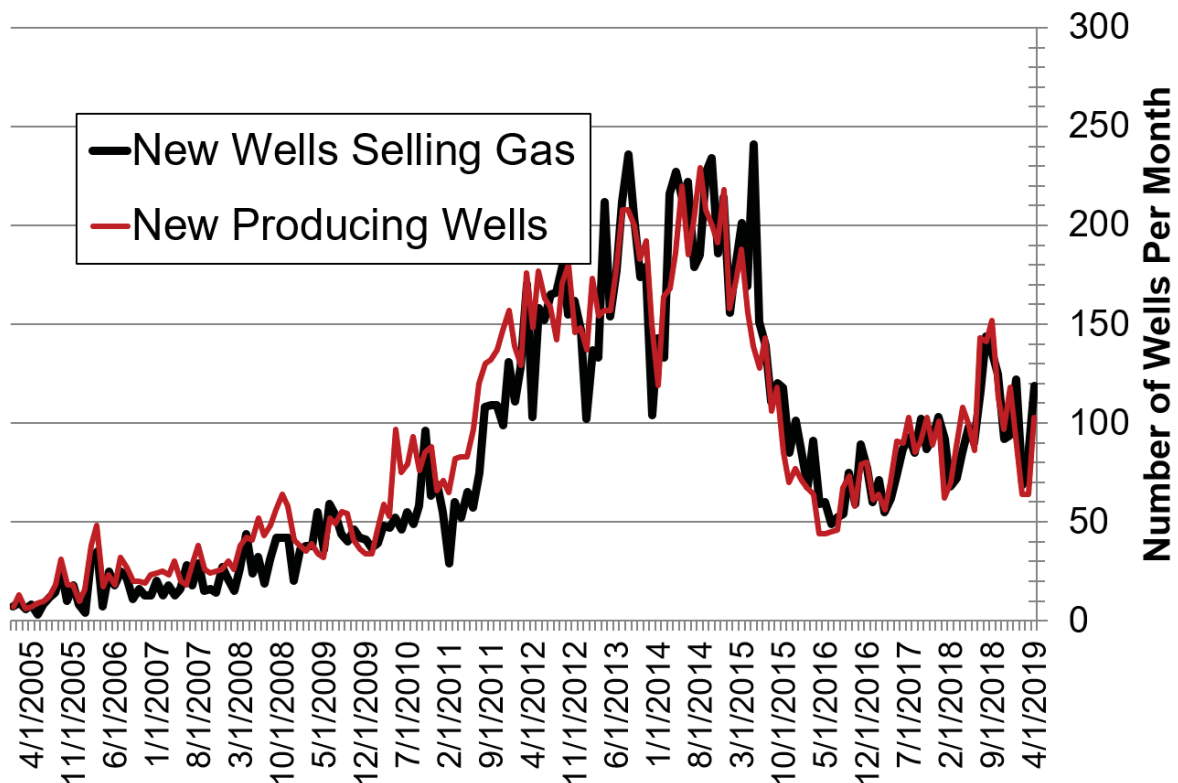


Williston Basin Truck/Rail Imports and Exports with Canada



Data for imports/exports chart is provided by the US International Trade Commission and represents traffic across US/Canada border in the Williston Basin area.

New Gas Sales Wells per Month



CRUDE OIL PRODUCTION AND SUPPLY FORECAST

Over the next two decades, the world's population is expected to grow by nearly two billion while the global middle class is expected to nearly double.^{6,7} Countries will be more urbanized and industrialized, and will consume more energy than today. Canada thus has the potential to become an even more significant supplier in meeting global crude oil demand. Canada is the world's sixth-largest oil producer and is home to a vast 170 billion barrels of crude oil reserves. However, the path to realizing this potential is paved with challenges regarding uncertainty as to when or whether additional pipeline capacity will become available.

Total Canadian oil production, including pentanes and condensate, is expected to rise to 5.86 million barrels per day (b/d) by 2035 from 4.59 million b/d in 2018. Due to the need to supplement domestic diluent supplies with imported volumes, the total supply from Western Canada is forecast to grow to 6.3 million b/d by 2035 from 4.7 million b/d in 2018. For comparison, in 2014 CAPP projected total supply from Western Canada would grow to 7.5 million b/d by 2030. This year's constrained production outlook is due to inefficient and duplicative regulations, reduced investor and producer confidence, and uncertainty around additional transportation capacity.

2.1 Production and Supply Forecast Methodology

CAPP's forecasts for western Canadian conventional production and eastern Canadian production were both developed through an internal analysis of historical trends, expected drilling activity, and discussions with industry stakeholders and government agencies.

To forecast oil sands production, CAPP surveyed oil sands producers in the first quarter of 2019 requesting the following information:

- Expected production for each project;
- Upgraded crude oil production volumes;
- Type and volume of diluent required to move heavy oil production to market.

Producers were asked to respond to the survey based on their company's view of the price outlook, as well as recent policy developments including federal and provincial climate policies and the impacts of Alberta's Crude Oil Curtailment Program. The survey results were risk adjusted by taking into consideration each project's stage of development, (i.e. announced, approved, under construction, operating) while giving consideration to each company's past performance for previous phases of projects relative to public announcements. The reasonableness of the overall forecast was then assessed against historical trends. No constraints were imposed to reflect any restrictions on the availability of condensate for blending purposes or the lack of transportation infrastructure, although company assessments on these issues may have impacted individual producer survey responses.

The volume of total crude oil supply delivered to pipelines and markets is greater than total production because imported diluent, in addition to domestic supplies, is needed to meet the blending requirements that enable heavy oil to be transportable by pipeline.

2.2 Canadian Production

Conventional crude oil is produced across the western Canadian provinces while the oil sands are located only in Alberta. Eastern Canada produces limited amounts of crude oil primarily from projects located offshore of Newfoundland and Labrador.

Of the 4.6 million b/d of Canadian production in 2018, Eastern Canada contributed 233,000 b/d, meaning western Canadian production contributed over 95 per cent of the total. Nearly two-thirds was comprised of oil sands production and the remainder, including pentanes and condensate, was from conventional production. By the end of the outlook period, oil sands production is expected to account for nearly 75 per cent of total production (Figure 2.1).

Figure 2.1 Canadian Oil Sands and Conventional Production

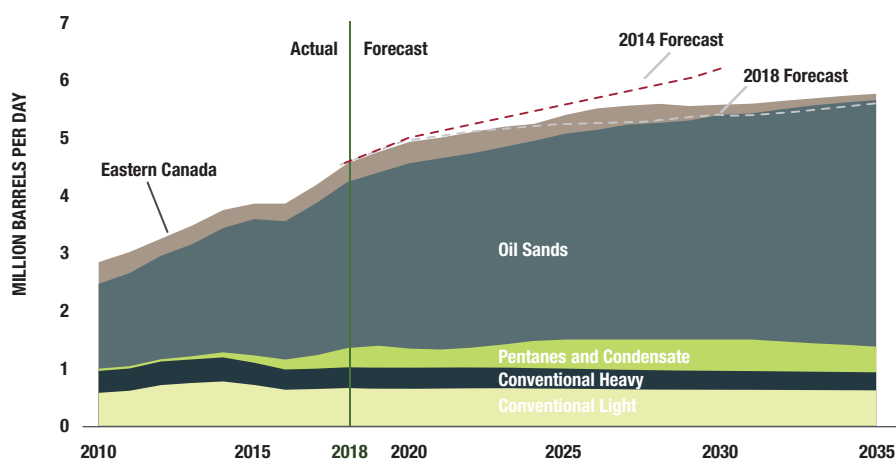


Table 2.1 Canadian Crude Oil Production

Million b/d	2018	2020	2025	2030	2035	Change
Eastern Canada	0.23	0.30	0.32	0.18	0.09	-0.14
Western Canada	4.36	4.64	5.17	5.48	5.76	1.41
Total Canada*	4.59	4.94	5.49	5.66	5.86	1.27

*Totals may not add up due to rounding

Production in Eastern Canada is forecast to peak at 354,000 b/d in 2026 before falling to roughly 91,000 b/d in 2035. Production growth in Western Canada is expected to more than offset this decline, as it is forecast to increase by more than 1.4 million b/d, reaching 5.76 million b/d in 2035 from 4.36 million b/d in 2018 (Table 2.1).

2.3 Eastern Canada Production

Ontario and New Brunswick produce small volumes of crude oil; however, most of the crude oil from Eastern Canada is produced from offshore Newfoundland and Labrador. Hibernia, Terra Nova, White Rose and Hebron are the four major offshore projects currently producing oil. The growth forecast for production in Eastern Canada through 2024 can largely be attributed to production ramping up from Hebron, the newest major offshore project, and satellite field additions to other existing projects. At its peak, Hebron is designed to produce 150,000 b/d.



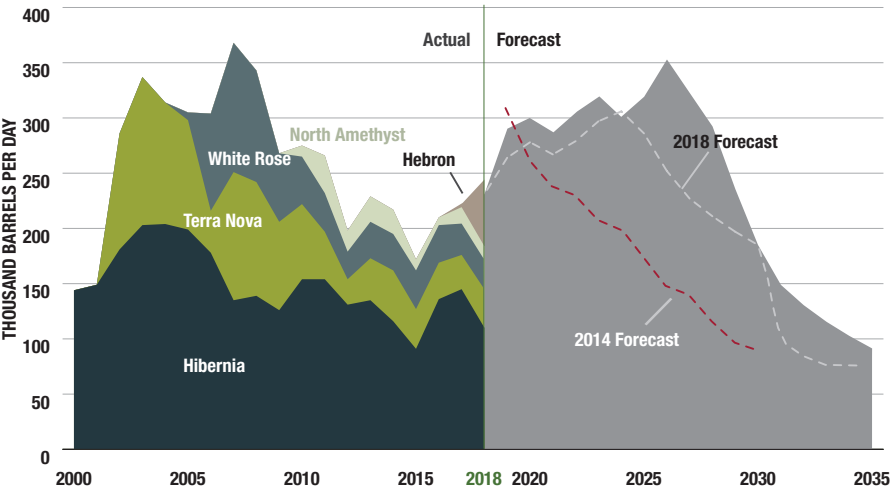
Table 2.2 Atlantic Canada Projects and Recent Discoveries

Source: Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB)

Producing field	Cumulative Production to December 2018 (millions of barrels)	Estimated Recoverable Reserves (millions of barrels)
Hibernia	1055 (67% of reserves)	1,644
Terra Nova	402 (82% of reserves)	506
White Rose and North Amethyst	285 (62% of reserves)	479
Hebron	23 (3% of reserves)	707

Recent Discoveries	Year Discovered	Estimated Recoverable Reserves (millions of barrels)
Mizzen	2009	102 (heavy oil)
Harpoon	2013	Under Evaluation
Bay du Nord	2013	300 - 600 (light oil)

Figure 2.2 Newfoundland and Labrador Production



High decline rates are associated with offshore drilling as the large upfront capital costs and fixed operating costs incent maximizing production. However, while production from mature fields is expected to decline quickly, production from associated satellite pools can extend the lives of the projects and slow the overall rate of decline. Relative to last year's forecast, CAPP anticipates existing projects will be slightly more productive through 2024 than previously projected. It is probable that an additional new project could achieve first oil in 2025, boosting the production profile through the latter half of the forecast period (Figure 2.2).

2.4 Western Canada Production

Western Canada provides 95 per cent of Canada's total production. The oil sands contributed nearly two-thirds of the 4.36 million b/d produced in Western Canada in 2018, and will be responsible for the 1.41 million b/d of growth anticipated by 2035 (Table 2.3). Conventional production, including pentanes and condensate, will be stable and is forecast to contribute an average of more than one million b/d annually through the forecast period.

CAPP anticipates existing projects will be slightly more productive through 2024 than previously projected.

Table 2.3 Western Canada Crude Oil Production

Million b/d	2018	2020	2025	2030	2035	Change
Conventional	1.44	1.45	1.59	1.60	1.51	0.07
Crude oil	1.04	0.99	1.00	0.98	0.95	(0.09)
Pentanes and Condensate	0.41	0.45	0.59	0.61	0.56	0.16
Oil sands						
Bitumen + Upgraded	2.91	3.20	3.57	3.88	4.25	1.34
Total Western Canada*	4.36	4.64	5.17	5.48	5.76	1.41

*Totals may not add up due to rounding

2.4.1 Conventional

In 2018, Western Canada saw 1.44 million b/d of conventional production, including 405,000 b/d of pentanes and condensate. Excluding pentanes and condensate, conventional crude oil production is expected to decline slightly over the forecast period. The level of drilling in Western Canada is at depressed levels resulting from market access constraints. However, improvements in market access as a result of additional pipeline and rail capacity would enable producers to more fully develop the tremendous resource opportunities available in the WCSB. As natural gas producers increasingly focus their efforts in the liquids-rich Montney and Duvernay plays, pentanes and condensate production from Western Canada is forecast to grow significantly, exceeding more than 600,000 b/d prior to the end of the forecast period before declining slightly in later years, as a result of current technological limitations combined with ongoing field maturity.

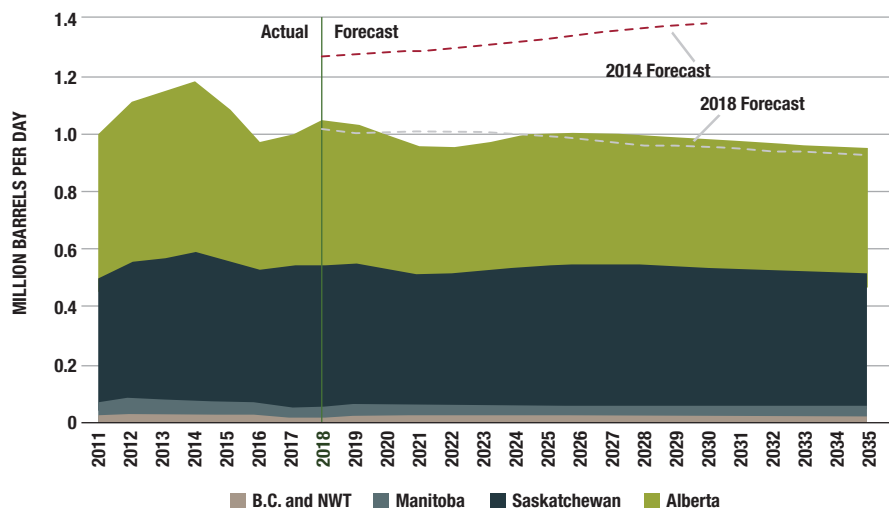
Crude Oil

In 2018, the combined production from Alberta and Saskatchewan accounted for 95 per cent of the total 1.44 million b/d of conventional crude oil produced in Western Canada. British Columbia and Manitoba produce relatively small volumes. The National Energy Board (NEB) estimates that the region could hold as much as 8.5 billion barrels of remaining conventional crude oil resources; however, a lack of infrastructure and pipelines means these resources have insufficient market access. Crude oil resources are also located in the Northwest Territories, however, the relatively small amounts of conventional production from this region ceased altogether in 2017, due to the temporary shutdown of Enbridge's Line 21. Production restarted in late 2018 when Line 21 was put back into service.

Conventional crude oil production tends to respond more quickly to changes in crude oil prices than oil sands production, given the smaller scale of these developments. Excessive price differentials arising from market access constraints have negatively affected producers' desire to invest in new wells in the WCSB. Government initiatives such as the Crude Oil Curtailment Program may also discourage additional wells if producers are concerned about remaining within their production limits. This forecast assumes the pace of drilling oil wells in Western Canada recovers somewhat from today's depressed levels. However, this anticipated increase in drilling activity remains constrained due to regulatory challenges, markets access constraints, and reduced competitiveness relative to other oil-producing countries. By 2035, conventional crude oil production excluding pentanes and condensate is anticipated to be eight per cent lower than it was in 2018.



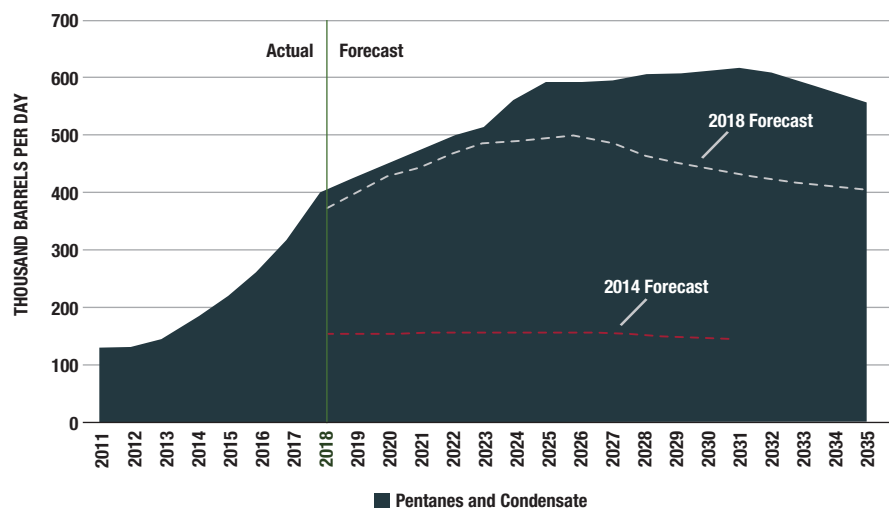
Figure 2.3 Western Canada Conventional Crude Oil Production



Pentanes and Condensate

Pentanes and condensate are the preferred diluent for blending with heavy oil and bitumen to enable transportation via pipeline. In 2018, 405,000 b/d of pentanes and condensate were produced in Western Canada, with about 80 per cent contributed by Alberta and 20 per cent contributed by B.C. Demand for pentanes and condensate from oil sands for blending with bitumen exceeds domestic production and demand will continue be driven by projected growth in heavy crude oil production. From 2014 to 2018, pentanes and condensate production more than doubled. This was due to the strong demand for diluent from oil sands producers and the presence of prolific liquids-rich natural gas plays in the Montney and Duvernay formations. Production of pentanes and condensate is forecast to grow significantly and achieve more than 600,000 b/d before the end of the forecast period. In the longer term, however, declines are anticipated as these fields mature.

Figure 2.4 Western Canadian Pentanes and Condensate Production



Production of pentanes and condensate is forecast to grow significantly.



2.4.2 Oil Sands

The oil sands resources are situated almost entirely in Alberta and can be delineated by the Athabasca, Cold Lake and Peace River deposits (Figure 2.5). In this constrained environment, oil sands production, which can be recovered either by mining or in situ projects, is forecast to grow by 1.34 million b/d, reaching 4.25 million b/d by 2035 from 2.91 million in 2018. From 2019 to 2021, annual oil sands production growth is expected to average four per cent. This growth rate, however, is less than half that of 2017 and 2018. Given the current regulatory environment and producers' lack of confidence in market access alleviation, from 2022 onward the average production growth in the oil sands is expected to be only two per cent annually.

Mining projects are large-scale in nature and require more upfront capital than smaller scale in situ projects, where production can be brought on in phases. The Fort Hills mining project started continuous production in January 2018 and ramped up to just over 200,000 b/d in December. By 2035, production from mining operations will grow by 470,000 b/d (Table 2.4). In situ production is forecast to yield 880,000 b/d of additional production (Figure 2.6) by 2035. Part of this includes CNOOC International's expansion at Long Lake, proposed to add 26,000 b/d, and Imperial Oil Limited's Aspen project, which Imperial expects will begin production in 2023 and add 75,000 b/d.

Table 2.4 Oil Sands Production

Million b/d	2018	2020	2025	2030	2035	Change
Mining	1.35	1.51	1.63	1.72	1.82	0.47
In Situ	1.56	1.68	1.95	2.16	2.44	0.88
Total Oil Sands*	2.91	3.20	3.57	3.88	4.25	1.34

*Totals may not add up due to rounding

Figure 2.6 Western Canada Oil Sands Production

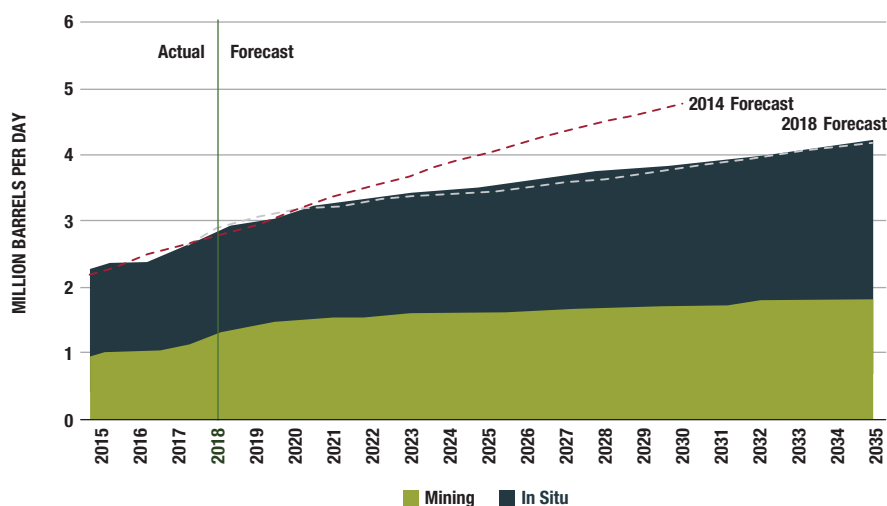


Figure 2.5 Oil Sands Regions



Curtailment

In December 2018, the Government of Alberta announced its Crude Oil Curtailment Program that was applied to production commencing in January 2019 and will terminate on December 31, 2019. Initially the program limited production in Alberta to 3.56 million b/d with the intention to create enough shipping space to clear the large buildup of storage volumes that had occurred in the province. Once storage volumes have been substantially reduced, the program intends to allow higher production limits for the balance of 2019.

Curtailment is only applied to operator volumes in excess of 10,000 b/d and as such will have limited impacts on small producers. While these cuts may affect some of the larger conventional producers, the majority of the impact is expected to affect oil sands producers, which typically have larger scale developments. Responding to market conditions and producer concerns regarding the safety issues surrounding cutting production, the government raised the production ceiling for the month of June to more than 3.7 million b/d.

This policy is a direct result of continued regulatory delay resulting in a lack of market access. The dramatically lower pace of growth in production at the latter end of the forecast period, relative to recent history and the near-term outlook, is the product of the industry's concerns around slow progress on new pipeline capacity and heightened levels of regulatory uncertainty. In addition, Canada's fiscal and tax policies have been diverging from those in the U.S., resulting in challenges for Canadian producers competing with their American counterparts to attract investment capital.

Upgrading

The production volumes from oil sands projects are derived by combining raw bitumen production and upgraded crude oil production from integrated projects. By volume, there is generally a yield loss associated with the upgrading process, which converts mined bitumen into an upgraded (lighter) crude oil. The yield losses associated with upgrading volumes from oil sands projects without associated upgraders is accounted for in the calculation of supply volumes discussed in Part 2.5 below. Refer to Appendix A.1 for detailed production data. Since CNOOC International idled the upgrader at its Long Lake in situ project in July 2016, there are no in situ projects with integrated upgrader facilities. Some in situ volumes from Suncor's Firebag and Mackay River projects can be upgraded at its Millennium mine upgrader but, in general, upgraders at smaller in situ operations are not considered economical.

The following is a list of the existing integrated mining and upgrading projects:

- Canadian Natural Resources' (CNRL) Albian Sands, which includes the Muskeg River and Jackpine mines;
- CNRL's Horizon mine;
- Suncor's Steepbank and Millennium mines;
- Syncrude Canada's Mildred Lake and Aurora mines.

Imperial's Kearl mine and Suncor's newly operating Fort Hills mine are both stand-alone mines with no associated upgrading facilities.

Partial upgrading technology produces a medium or heavy crude oil that reduces the requirement for diluent volumes for blending. However, since partial upgrading technologies are still being assessed and haven't been commercially implemented in Canada, this technology is not anticipated to have an impact on production in the near- and medium-terms.

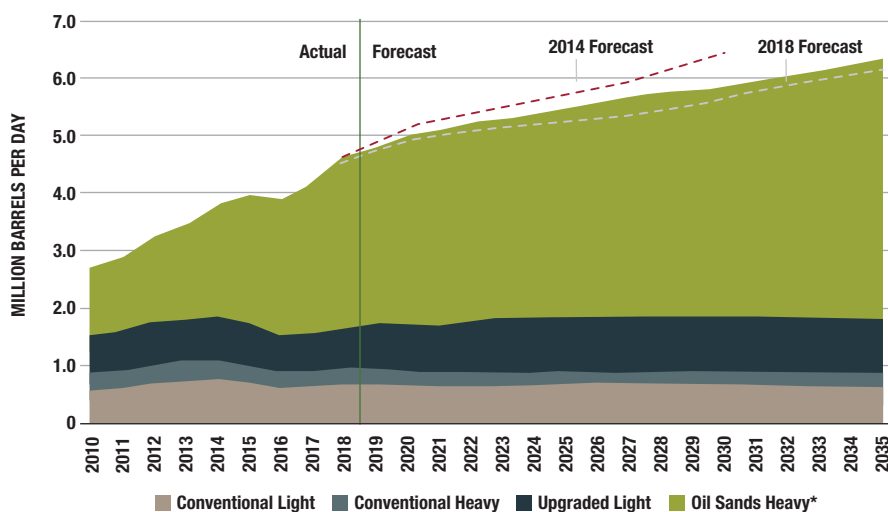


2.5 Western Canada Supply

Crude oil supply refers to the crude oil that is delivered to the end-use market.

Conventional supply is projected to decline to 867,000 b/d in 2035 from 960,000 b/d in 2018. Upgraded light crude oil supply is expected to be stable and is forecast to average 948,000 b/d over the outlook period. Oil Sands heavy supply will grow by 1.52 million b/d to reach 4.5 million b/d in 2035 from 2.98 million b/d in 2018 (Figure 2.7).

Figure 2.7 Western Canada Oil Sands and Conventional Supply



*Oil Sands Heavy includes some volumes of upgraded heavy sour crude oil and bitumen blended with diluent or upgraded crude oil

On a volumetric basis, supply volumes reported in Appendix A.2 are greater than the corresponding production shown in Appendix A.1 because the addition of imported diluent volumes supplement domestic supplies used for blending both conventional heavy crude oil and oil sands bitumen that is not upgraded.

Pentanes and condensate are the main sources of diluent, and when combined with bitumen result in a heavy crude oil mixture known as "dilbit." Imports of condensate supplement domestic supplies and compensate for the shortfall between this blending demand and available domestic supplies. Synthetic bitumen, or "synbit" results when other bitumen volumes are diluted with upgraded light crude oil. Blending for dilbit requires about a 70:30 bitumen to condensate blending ratio, while synbit requires approximately a 50:50 ratio. Relatively small volumes of bitumen with a reduced diluent requirement is referred to as "railbit."

CAPP's forecast is not constrained by the availability of condensate imports, as CAPP assumes new sources of condensate will be available to meet market requirements. Western Canadian pentanes and condensate production is growing, but in 2018 458,000 b/d of imported condensate, upgraded crude oil, and butane were still needed for blending.



Table 2.5 shows the projections for total western Canadian crude oil supply. Total supply grows by almost 1.7 million b/d and reaches 6.34 million b/d from 4.66 million b/d in 2018. The growth is primarily driven by an increase in heavy crude oil supplies.

Table 2.5 Western Canada Crude Oil Supply

Million b/d	2018	2020	2025	2030	2035	Change
Light	1.40	1.49	1.62	1.64	1.61	0.21
Heavy	3.26	3.52	3.85	4.23	4.73	1.47
Total supply*	4.66	5.00	5.47	5.87	6.34	1.68

*Totals may not add up due to rounding

2.6 Crude Oil Production and Supply Summary

In addition to the oil sands, the vast majority of Canada's major conventional resources are concentrated in Western Canada. Eastern Canada has some crude oil production generated primarily from offshore projects.

- Production from Eastern Canada is forecast to grow and contribute over 350,000 b/d by 2026, but will subsequently fall to 91,000 b/d by 2035.
- Due to the constrained regulatory environment, growth from western Canadian oil sands production will increase by four per cent on average from 2019 to 2021 and after 2022 will slow to two per cent annually.
- Western Canada's conventional crude oil production, including pentanes and condensate, increases from 1.4 million b/d in 2018 to 1.5 million b/d in 2035. Pentanes and condensate production in Western Canada peaks at more than 600,000 b/d reflecting the higher potential for production from liquids-rich natural gas plays.
- Almost 1.7 million b/d of additional western Canadian crude oil supply is forecast by 2035. This additional supply of conventional and oil sands production, combined with diluent volumes to meet blending requirements will need substantial amounts of additional pipeline capacity.

The long-term pace of growth in the oil sands continues to be hampered by uncertainty and delays related to new pipeline capacity out of Western Canada. Such constraints on production will have negative implications if the Canadian economy is prevented from receiving the full potential business investment, exports, and job growth associated with an unconstrained production outlook that this tremendous resource base offers.

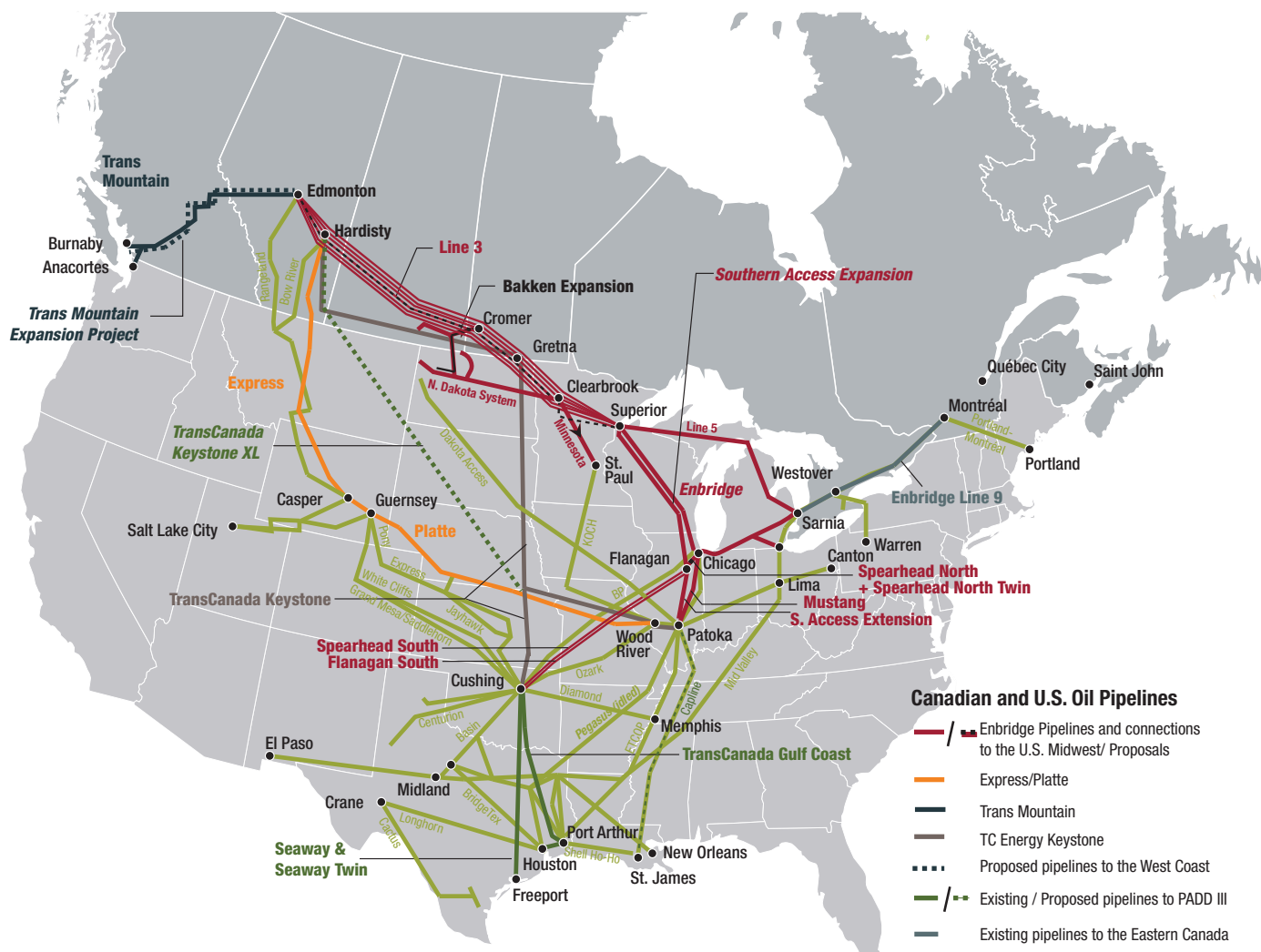
The long-term pace of growth in the oil sands continues to be hampered by uncertainty and delays to new pipeline capacity out of Western Canada.

TRANSPORTATION

A well-established network of pipelines connects western Canadian crude oil producers to the North American refinery market. As early as 1950 the Interprovincial Pipeline Company (now Enbridge) began shipping western Canadian crude oil to the U.S. This pipeline network was expanded as production of crude oil from Western Canada has grown and the demand from both Canadian and U.S. refineries has increased. Yet in recent years, regulatory timelines for pipeline development have become prolonged and the pipeline network no longer keeps pace with the demands of the market, resulting in producers facing substantial pipeline capacity constraints.

The existing pipeline infrastructure network shown in Figure 4.1 is able to transport crude oil produced in Western Canada to Canadian markets as far east as Montréal, and to the West Coast. There is also the ability to transport these crude oil supplies to the U.S. Gulf Coast through interconnections with pipelines in the U.S. Midwest. As this existing network is now operating at full capacity and the timing of new pipeline capacity remains uncertain, producers are increasingly relying on rail transportation to deliver incremental production to market.

Figure 4.1 Major Existing and Proposed Canadian and U.S. Crude Oil Pipelines



The price producers obtain for crude oil in any region is a function of the type of crude oil being produced and the transportation costs incurred for delivery from the production area. Pipelines are the preferred mode of shipping large volumes of crude oil long distances over land given the economics of scale. The associated costs of using rail is higher than pipelines or tankers over the same distance.

4.1 Crude Oil Pipelines Exiting Western Canada

At present, there is not enough crude oil capacity originating in Western Canada to meet the needs of producers. Both the Enbridge Mainline and Trans Mountain pipelines continue to operate under apportionment. This occurs when shipper nominations exceed the pipeline's capacity, so pipeline operators are forced to decrease shippers' nominated volumes on a pro-rata basis.

The combined nameplate capacity of major takeaway pipelines is more than four million b/d of crude oil from Western Canada. However, in 2018 about 635,000 b/d of capacity was unavailable as a result of equipment being offline, constraints on downstream pipelines, capacity being allocated for transporting refined petroleum products, and U.S. Bakken crude oil production taking up space otherwise available for western Canadian production (Table 4.1).

In 2018, most of the 4.66 million b/d of western Canadian crude oil supplies were transported to markets by pipeline but excess volumes depended on rail.

Refineries in Alberta and Saskatchewan that require delivery from a short distance may receive volumes from regional pipelines or trucks.



***Notes for estimating available capacity for Canadian crude oil to exit Western Canada on the major pipelines:**

Enbridge Mainline = design capacity x 95% for operational downtime and downstream constraints minus estimated RPP capacity as well as estimates for U.S. Bakken moved on this system. 2018 throughput source: NEB

Trans Mountain = design capacity minus estimate of RPP moved = 300-30 = 270

Express = design capacity x 89% (adjusted for crude type moved, historical operational downtime, and downstream constraints) 2018 throughput source: Express Pipeline LLC FERC Form 6

Keystone = design capacity x 95% (adjusted for crude type moved and historical operational constraints).

Table 4.1 Major Existing Crude Oil Pipelines Exiting Western Canada

Source: NEB

Pipeline	In Service	Outside Diameter Size (inches)	Distance (km)	Average Annual Capacity (000 b/d)	2018 Annual Throughput (000 b/d)	Est. Capacity Available for Crude Oil Exiting WCSB (000 b/d)
Enbridge Mainline	Operating since 1950	Various	Various	2,851	2,629	2,307
Trans Mountain	Operating since 1953	24 36 30	1,147 827 150 170	300	290	270
Enbridge Express	Operating since 1997	24	1,265	280	249	250
TC Energy Keystone			4,700	591	589	561
Phase 1	Operating since 2010	36	864			
Phase 2	Operating since 2011	30 36	2,592 468			
Gulf Coast Extension	Operating since 2014	36	700			
Houston Lateral	Operating since 2016	36	76			
TOTAL				4,022	3,757	3,388

Only three major pipeline projects remain under active development following the cancellation of the Energy East pipeline in October 2017 and Northern Gateway in November 2016. The combined capacity of Enbridge's Line 3 Replacement project, the Trans Mountain Expansion Project, and TC Energy's Keystone XL (Table 4.2) equals 1.79 million b/d. All of this capacity will be needed to meet the 1.68 million b/d of anticipated supply growth from Western Canada.

Table 4.2 Proposed Crude Oil Pipelines Exiting Western Canada

Pipeline	Outside diameter (inches)	Distance (km)	Target In service	Capacity (000 b/d)
Enbridge Line 3 Replacement	36	1,659	2020	370
Trans Mountain		1,184	2020+	590
Expansion	36	987 (new)		
	30	3.6 x 2 (new)		
	24	193 (reactivated)		
TC Energy Keystone XL	36	1,897	2020+	830
Total Proposed Additional Capacity				1,790

4.2 Proposed Pipeline Systems

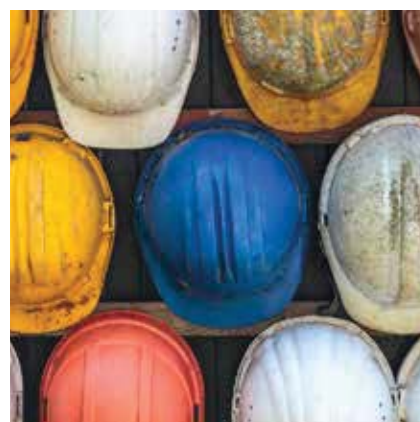
The next sections summarize the three proposed pipelines.

4.2.1 Line 3 Replacement Program

Line 3 is one of the Enbridge Mainline's primary pipelines. The original capacity of the line was 760,000 b/d but due to age and safety issues, since 2008 it has operated under voluntary pressure restrictions that have reduced its capacity to 390,000 b/d, and now requires extensive maintenance to operate even at this reduced level. The proposed Line 3 Replacement Program would replace the pipeline and restore it to its original capacity. This pipeline will be essential to ensure continued service required by refiners in Minnesota and neighbouring states, as well as Eastern Canada and the U.S. Gulf Coast.

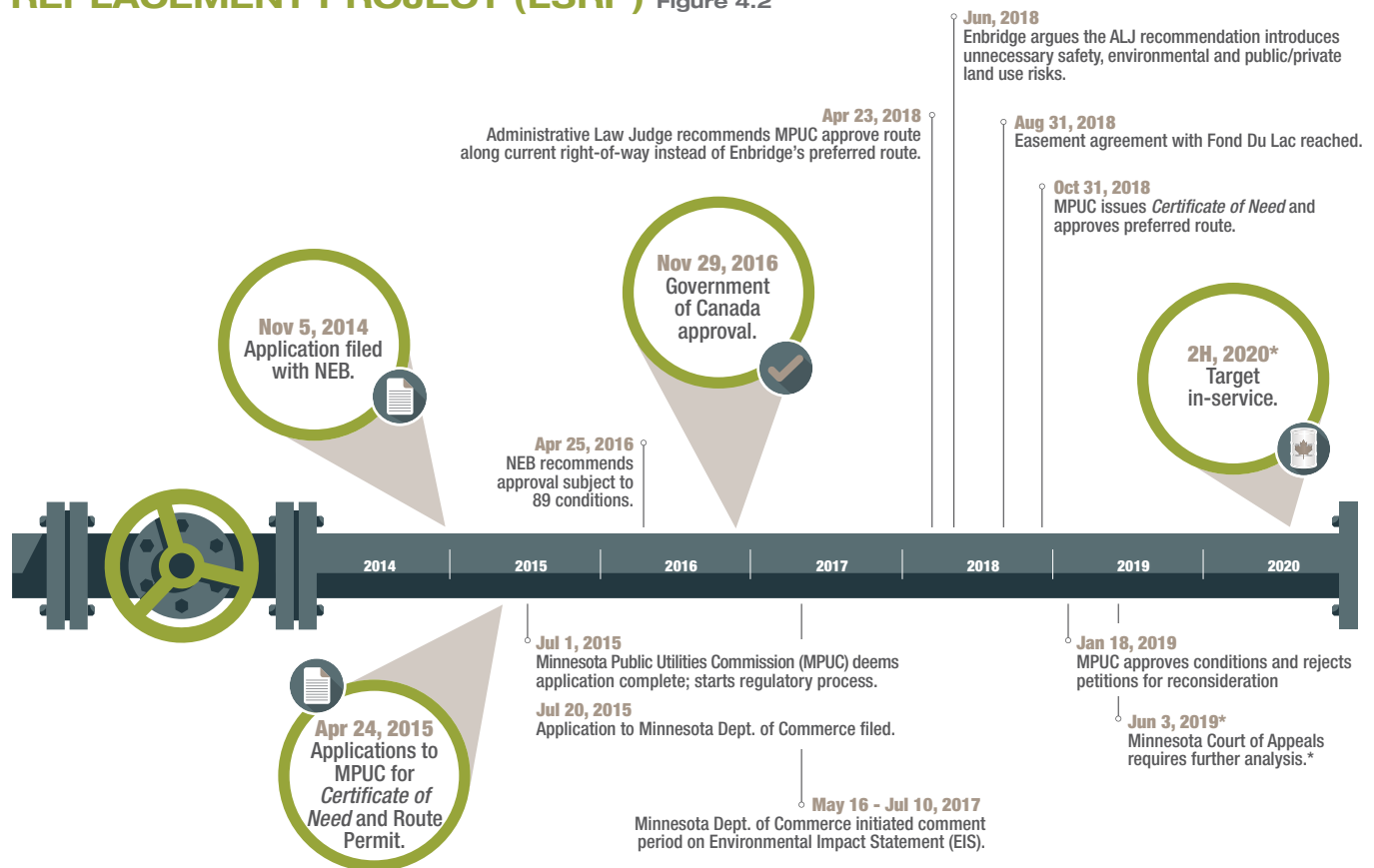
The line was expected to be in service by the end of 2019 but with a delay in permits from the State of Minnesota the line will not be ready until the second half of 2020.

On June 3 2019 the Minnesota Court of Appeals ordered further proceedings to consider the potential impact of an oil spill into the Lake Superior watershed.



ENBRIDGE LINE 3

REPLACEMENT PROJECT (L3RP) Figure 4.2



Successful completion of L3RP will put an additional

370,000

b/d of Canadian oil on the global market.

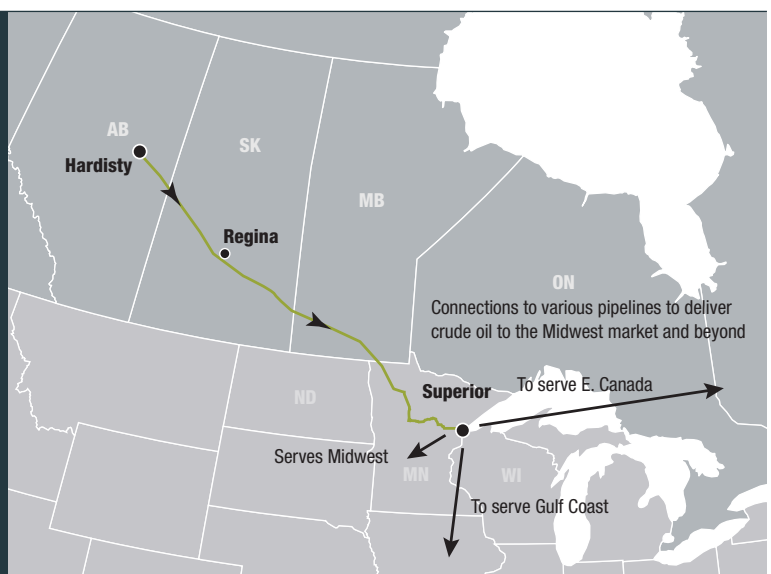
ENBRIDGE LINE 3 REPLACEMENT (L3RP)

COST: C\$5.3 billion (Canadian component)
US\$2.9 billion (American component)

INITIAL CAPACITY: 760,000 b/d
(replaces existing 390,000 b/d + 370,000 b/d new)

LENGTH: 1,659 kilometres

DIAMETER: 36 inch replacing 34 inch



4.2.2 Trans Mountain Expansion Project

The Government of Canada issued an Order-in-Council to approve the Trans Mountain Expansion Project (TMEP) in November 2016. Prior to that, in May 2016, the NEB determined the project was in the Canadian public interest and recommended approval of the expansion. In January 2017 the B.C. Environmental Assessment Office issued an environmental assessment certificate for the project.

The expansion essentially involves twinning the existing pipeline between Edmonton, Alberta and Burnaby, B.C. and will increase capacity from 300,000 b/d to 890,000 b/d.

In August 2018 the Federal Court of Appeal issued a decision to cancel the Order-in-Council, which had approved the Certificate of Public Convenience and Necessity for the expansion project. The NEB held public hearings to reconsider project-related environmental effects of marine shipping and further engagement with Indigenous groups. In February 2019 the NEB delivered its reconsideration report to the Government of Canada; the NEB again recommended approval of the project finding it to be in the Canadian public interest. The project is subject to 156 conditions enforceable by the NEB.

In April 2019, the Government of Canada announced that a decision on TMEP will be made June 18, 2019. CAPP expects a positive decision that will have enormous positive impacts on the Canadian economy by helping to alleviate market access constraints, resulting in increased producer and investor confidence, increased business investment and Canadian jobs, and an increase in exports. Construction beginning in the summer of 2019 should have the expansion in service by late 2022. Delays in the construction of TMEP cost Canadians \$693 million every year.⁸

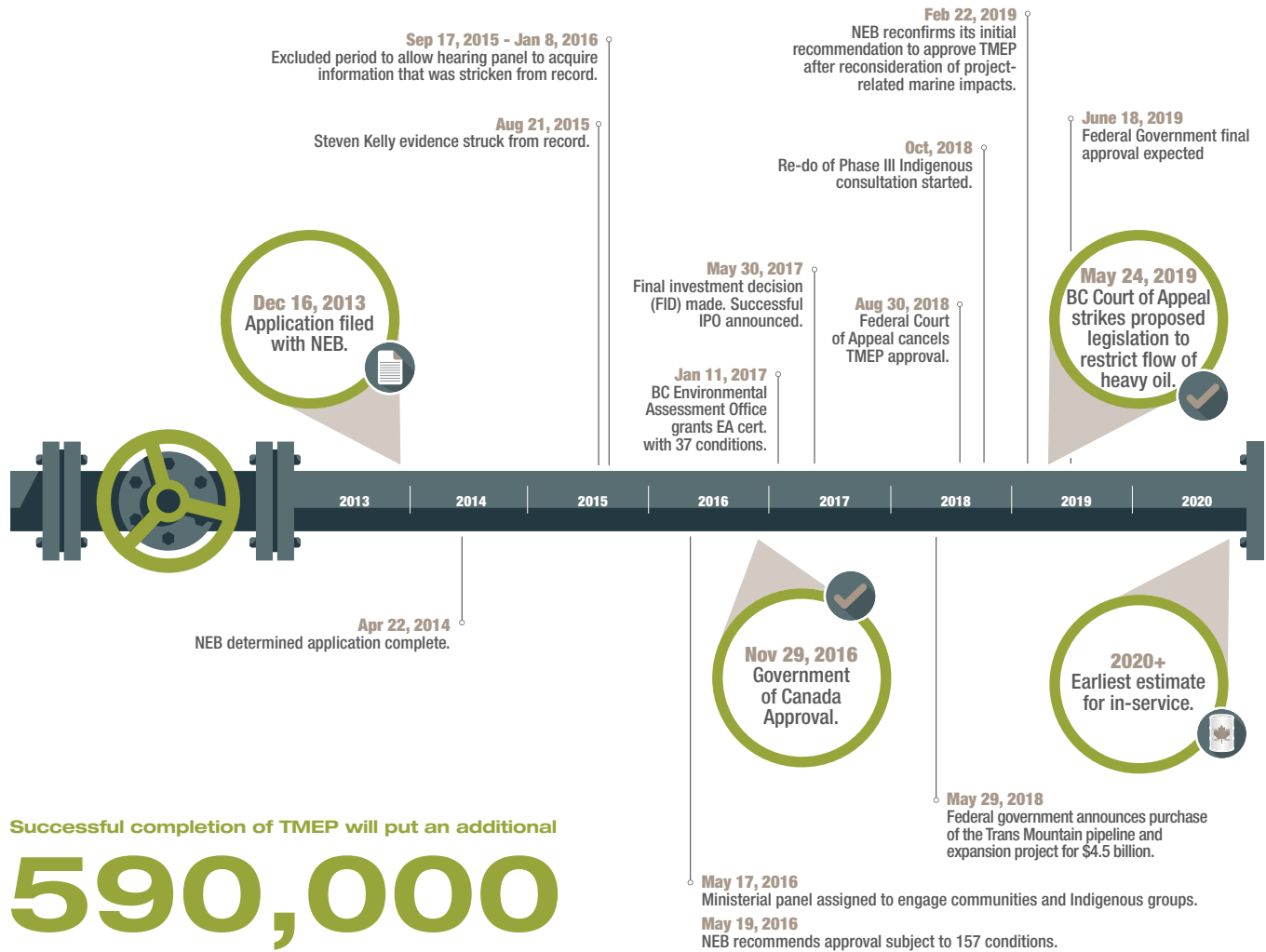
With improved market access, the Alberta government expects an incremental \$10 billion in oil sands investment is possible in the short term, leading to incremental production of 190,000 barrels per day of bitumen. This would increase the size of Alberta's economy alone by 1.5 to two per cent by 2023.⁹ That investment in oil sand facilities would also create and sustain an average of 12,300 direct, indirect, and induced jobs across Canada through 2023 in addition to jobs associated with pipeline construction.¹⁰



Delays in the
construction
of TMEP cost
Canadians
\$693 million
every year.⁸

TRANS MOUNTAIN (TMEP) EXPANSION PROJECT

Figure 4.3



Successful completion of TMEP will put an additional

590,000

b/d of Canadian oil on the global market.

TRANS MOUNTAIN EXPANSION

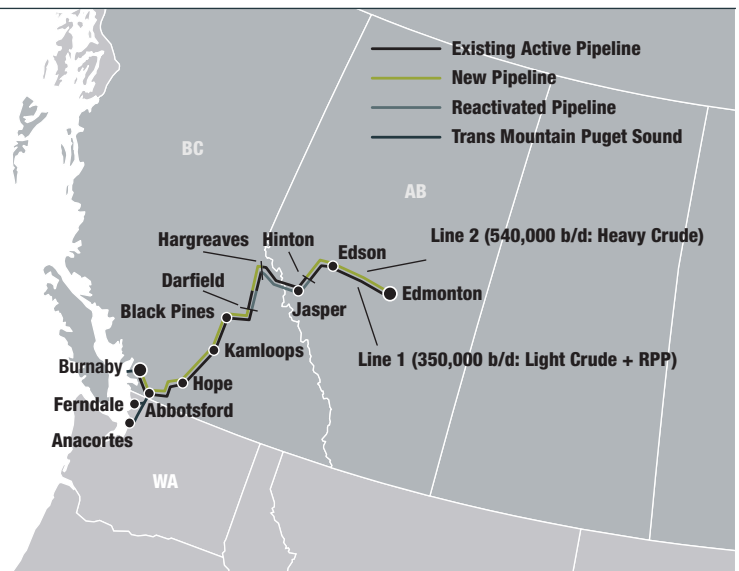
COST: C\$7.4 billion (March 2017 estimate)

CAPACITY: 890,000 b/d
(300,000 b/d existing + 590,000 b/d additional)

LENGTH: 1,183 kilometres
(987 new + 193 reactivated + 2 x 3.6 km)

DIAMETER: 36 inches

CONTRACTS: 707,500 b/d
(13 shippers: 15 and 20 year terms)



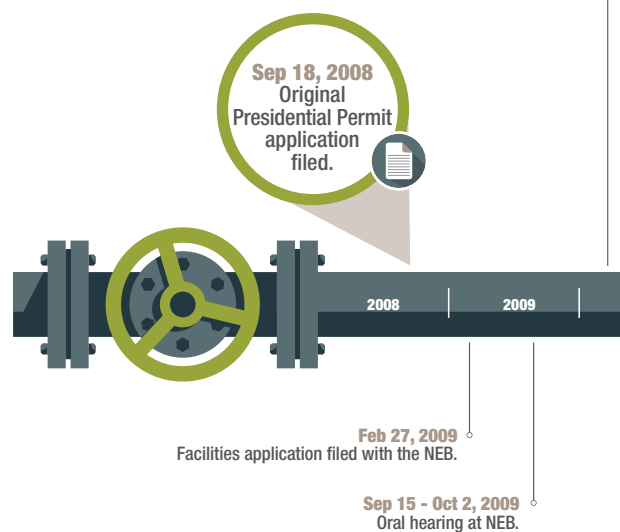
4.2.3 Keystone XL

The proposed 830,000 b/d TC Energy Keystone XL (KXL) pipeline will run from Hardisty, Alberta to Steele City, Nebraska. It can then connect to the existing Keystone system to transport Canadian crude to refineries on the U.S. Gulf Coast. The pipeline route passes through three U.S. states: Montana, South Dakota and Nebraska.

In November 2018, a federal district court in Montana ordered that TC Energy cease construction on the KXL project until the U.S. State Department completed a further environmental review. However, in March 2019 a new Presidential Permit was issued, which could render the Montana proceedings moot as this new permit does not reference or directly tie to any environmental review.

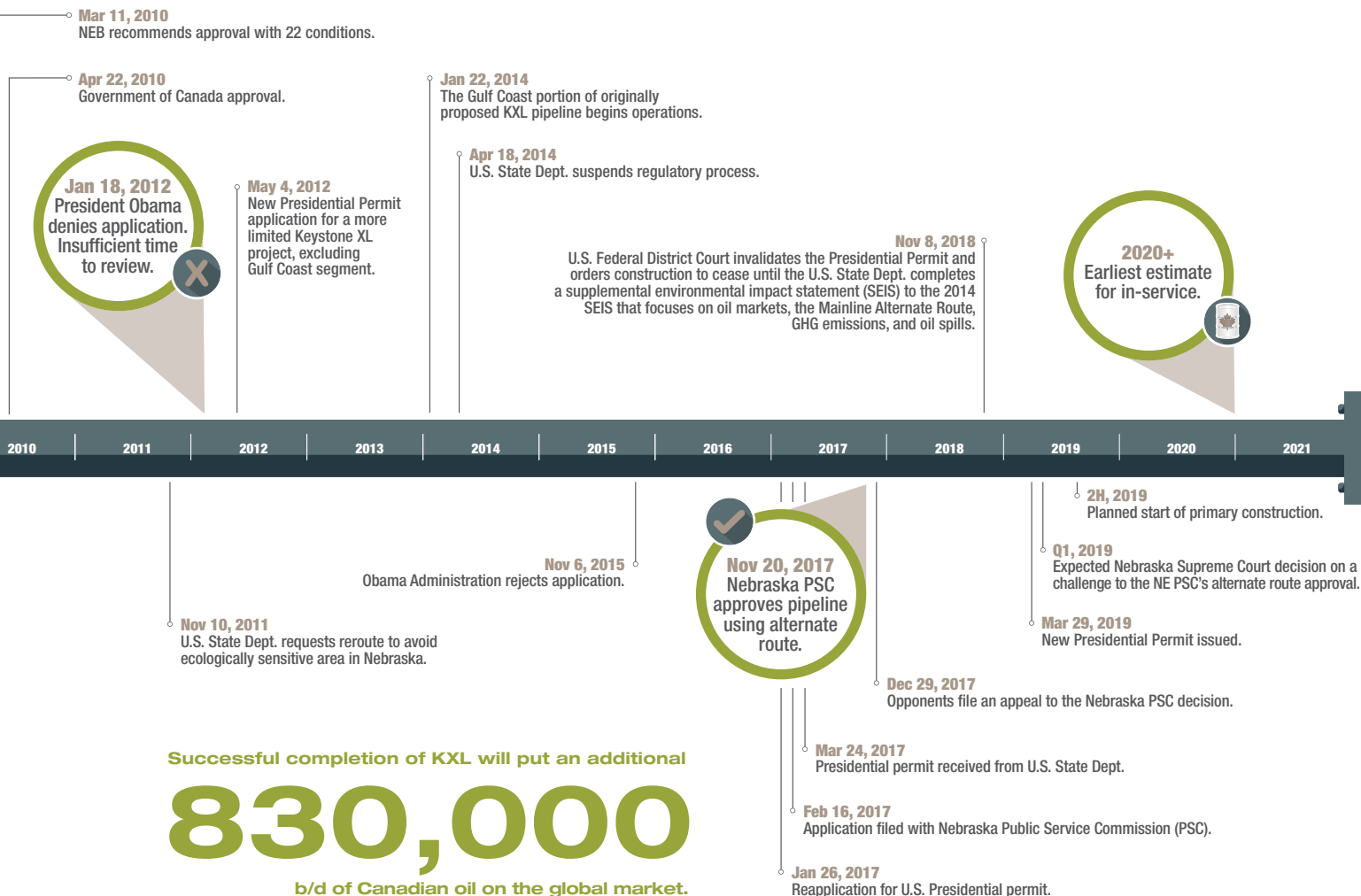
TC Energy has the primary state permits needed from South Dakota but is still awaiting some water use permits from the South Dakota Department of Environment and Natural Resources.

The Nebraska Supreme Court is expected to rule later in 2019 on KXL's proposed alternative route through the state.



TC ENERGY

KEYSTONE XL (KXL) Figure 4.4



TC ENERGY KEYSTONE XL

COST: C\$10.85 billion (2014 estimate)

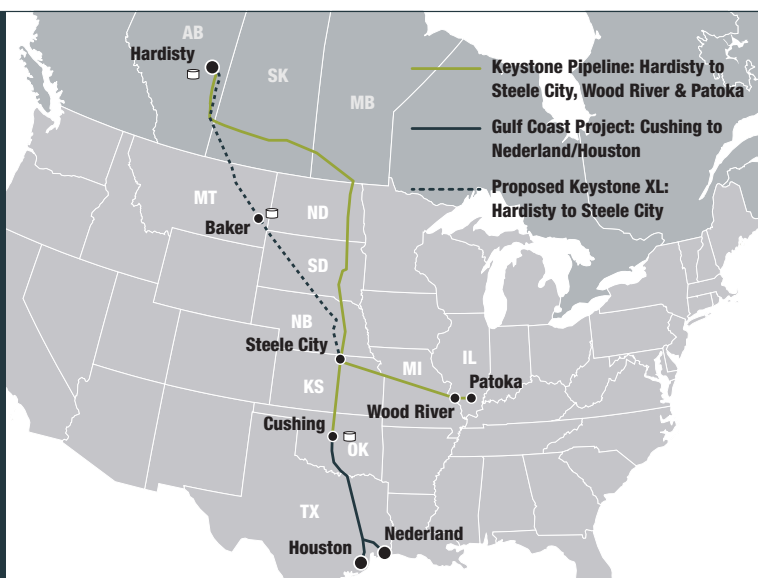
CAPACITY: 890,000 b/d
(700,000 b/d initial + 830,000 b/d additional)

LENGTH: 526 kilometres
(987 new + 193 reactivated + 2 x 3.6 km)

DIAMETER: 36 inches

CONTRACTS: 500,000 b/d*

* TC Energy announced in January 2018 that 500,000 b/d of firm 20-year commitments have been secured, including 50,000 b/d from the Govt. of Alberta. TC will continue to secure long-term contracts.



4.3 Crude by Rail

Rail transport of crude oil is expected to increase as railways add capacity, but ramping up rail capacity is not a comprehensive solution. Rail offers an alternative mode of transportation that industry will increasingly rely upon to transport crude oil as new pipeline projects continue to face challenges and delays. Industry data shows that approximately 233,000 b/d was transported to market by rail in 2018. The highest reported average volume moved in a month in 2018 was 354,000 b/d, compared to 156,000 b/d in 2017. The greatest number of rail cars moving crude in 2018 was 25,404 in November, compared to a previous historical peak of 17,371 in January 2014 (Figure 4.5).

Figure 4.5 Canadian Fuel Oil and Crude Petroleum Moved by Rail

Source: Statistics Canada, Table 23-10-0210-01



In 2014, Transport Canada, with the U.S. Department of Transportation Pipeline and Hazardous Material Safety Administration, announced new rail tank car requirements including puncture resistance and thicker walls. Retrofits of existing tank cars must be completed by 2020, and all newly built cars must meet even more stringent standards. As a result, both retrofitted and new tank cars are in short supply. While CAPP supports stringent safety standards for tank cars, the switch to cars that meet the safety standards will take time, further enforcing the need for pipelines.

The rail-loading capacity originating in Western Canada is 1.1 million b/d. However, the current ability to move significant increased volumes of crude oil by rail is limited and cannot accommodate sudden increases in demand caused by pipeline maintenance or circumstances affecting pipeline operations. Some capacity that was available to oil producers in 2014 has since been lost to shippers of other commodities that have made long-term commitments. In order to significantly increase rail capacity, rail companies will need time to invest in additional tank cars and locomotives, and hire or train qualified staff. The Alberta Crude Oil Curtailment Program has had a dampening effect on rail export volumes.



Table 4.3 **Rail Uploading Terminals in Western Canada**

Operator	Location	Capacity* (b/d)	Scheduled Start up
	Alberta	712,500	Operating since April 2015
Kinder Morgan/Imperial	Sherwood Park	210,000	Operating since Jul 2014
Gibson/ USD Group	Hardisty	225,000	Expansion operating since Sept 2014
Cenovus	Bruderheim	100,000	Operating since April 2015
Keyera/ Kinder Morgan	Edmonton	40,000	Operating since Sept 2014
Altex	Lynton	27,000	Operating
Savage	Reno	25,000	Operating since Q2 2014
Keyera/ Enbridge	Cheecham	24,000	Operating since Oct 2013
Gibson	Edmonton	42,500	Operating since Q3 2015
Secure/Predator	High Prairie	19,000	Operating since Q3 2015
	Saskatchewan	335,500	
Plains	Kerrobert	70,000	Startup Nov 2015 but suspended since May 2016 as facilities were underutilized. Re-started in 2018.
Altex	Lashburn	88,000	Expanded capacity op. since 2015
Crescent Point	Stoughton	-45,000	Suspended facility account to Gov't of SK
TORQ Transloading	Unity	79,000	Operating since Mar 2012
Altex	Unity	29,000	Operating since Jul 2012
TORQ Transloading	Lloydminster	24,200	Operating since March 2012
TORQ Transloading	Bromhead	45,300	Operating since Jul 2013
	Manitoba	60,000	
Tundra	Cromer	60,000	Expansion operating since Q4 2014
Total (b/d)		1,108,000	

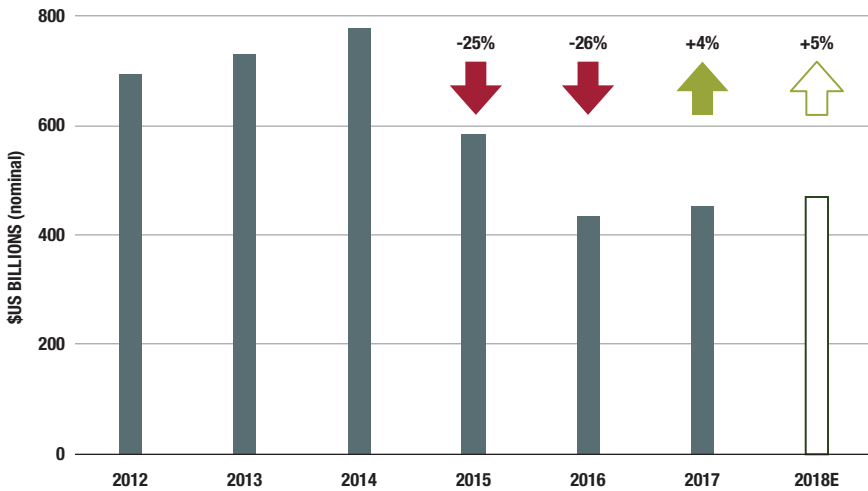
Note: Facilities with less than 15,000 b/d are not shown. *Estimated capacities based on assumptions for operating hours, available car spots, type of crude oil transported, and contracts in place (if known).

4.4 Industry Growth Outside of Canada

Global investment in 2018 increased, particularly in Egypt, the U.S. Gulf of Mexico, Guyana and Brazil. In sharp contrast, Canadian oil sands investment is down over 60 per cent from 2014 levels.

Outside of Canada, the crude oil industry has been recovering from the oil price crash of mid-2014 and numerous countries have sanctioned significant projects. Other oil producing regions have recognized that developing market access in a timely fashion is imperative if the full potential of crude oil production is to be realized. For example, Saudi Arabia producers have moved projects worth some US\$65 billion from final investment decision to fully sanctioned status. During the same time frame, the U.S. sanctioned projects worth US\$31.3 billion, Kazakhstan US\$34 billion, and Iraq US\$33.7 billion.¹¹ Unlike Canada, where producers adhere to some of the world's highest environmental regulations, many of these countries have little to no environmental regulations. The top three countries by spending for projects awaiting final investment decision are Brazil, Kazakhstan, and Russia, totaling more than US\$214 billion;¹² none of these countries follow the strict environmental standards Canadian producers do.

Figure 4.6 Global Investment in Upstream Crude Oil and Natural Gas
Source: IEA



Globally, the industry is projected to increase capital spending, reaching more than US\$500 billion by the early 2020s.¹³ Much of this increase is expected to be driven by investment in the lower 48 states of the U.S. as operators continue to exceed typical historical experience. The International Energy Agency (IEA) estimates in its World Energy Investment Report 2018 that global upstream investment in oil and gas was set to rise by five per cent to US\$472 billion (in nominal terms) in 2018, after increasing by four per cent in 2017 (see Figure 4.6). Growth was driven by U.S. capital spending in the sector increasing by about 10 per cent in 2018. The IEA highlights that oil companies have tripled their investments in shale and tight oil plays in the last two years. The Canadian experience is in marked contrast as numerous large oil companies have exited Canada after continual pipeline delays and increasingly inefficient and duplicative regulations, taking investment with them and moving jobs to the U.S.

Numerous large oil companies have exited Canada after continual pipeline delays and increasingly inefficient and duplicative regulations.

Figure 4.7 Recently Constructed and Under Construction Permian Basin Pipelines

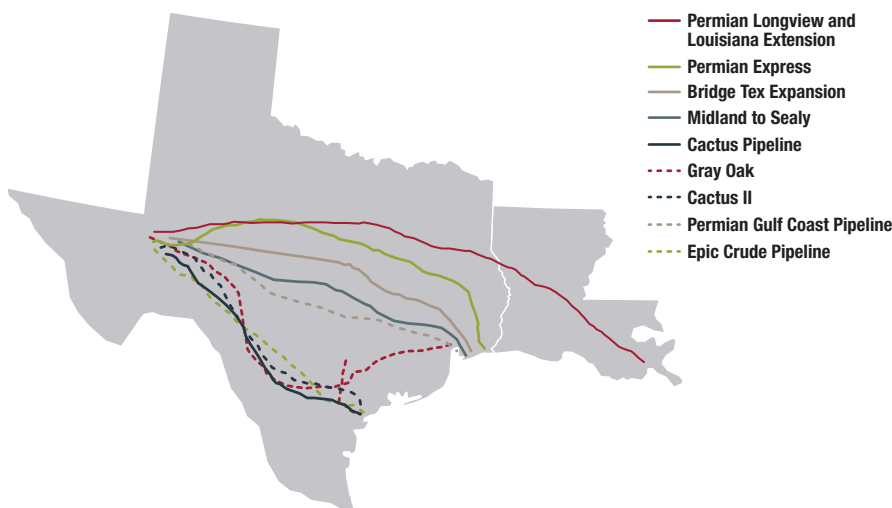


Table 4.4 **Recently Constructed and Under Construction Crude Oil Pipelines Exiting the Permian Basin**

Pipeline	Owner	Capacity	Status
Permian Longview & Louisiana Extension	Sunoco	100,000 bpd	Operational since 2016
Permian Express II	Sunoco	200,000 bpd	Operational since 2015
Bridge Tex Expansion	Magellan Midstream	400,000 bpd	Operational; expansion since 2017
Midland to Sealy	Enterprise Product Partners	575,000 bpd	Operational since 2018
Cactus Pipeline	Plains All American	300,000 bpd	Operational since 2015
Gray Oak	Philipps 66	800,000 bpd	Under Construction; in-service 4Q19
Cactus II	Plains All American	670,000 bpd	Under Construction; in-service 3Q19
Epic Crude Pipeline	Epic Midstream Holdings	900,000 bpd	Under Construction; in-service 4Q19
TOTAL		3,945,000 bpd	

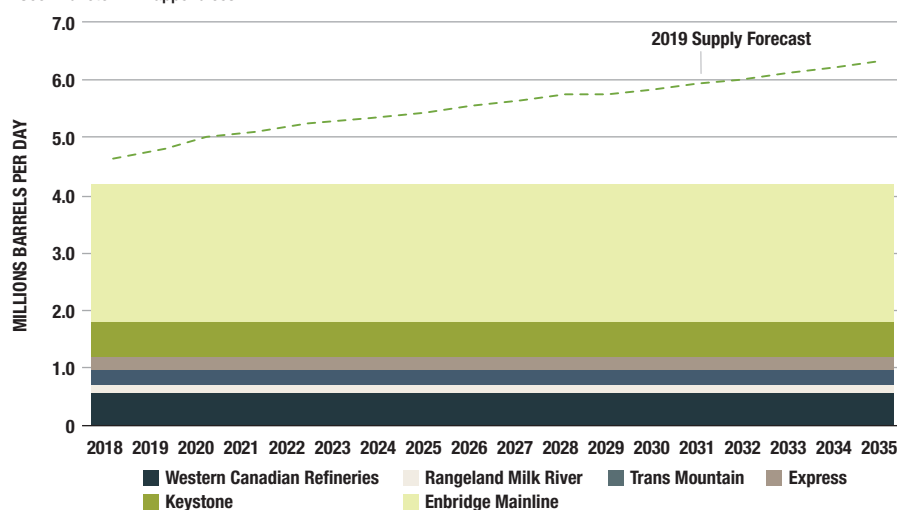
The U.S. administration has aggressively streamlined regulations and re-adjusted tax rates. In sharp contrast to the experience in Western Canada, the growth in production in the U.S. has been facilitated by a significant increase in pipeline capacity with a number of pipeline projects recently completed and several more projects currently under construction to move crude oil to Gulf Coast refiners. In recent years the production of crude oil in the Permian basin has increased from less than one million b/d in 2010 to more than 4.1 million b/d in 2019 (Table 4.4 and Figure 4.7). In addition to pipelines currently under construction, a number of other proposals are in early stages of development.

Canada has an opportunity to displace less sustainable oil; however, the current regulatory environment and policies are inefficient and duplicative, and are combining to create unintended consequences such as driving investment away from Canada into other countries that have less robust emissions reduction policies. A strong tradition of innovation and collaboration can position responsibly produced Canadian oil to meet global energy demand.

4.5 Transportation Summary

Figure 4.8 **Existing Takeaway Capacity from Western Canada vs. Supply**

*See Endnote 14 in appendices



Existing pipeline infrastructure to transport crude oil production is at capacity and it is uncertain when additional pipeline capacity will become available. Rail is struggling to meet the increased demand from oil producers. This in turn limits Canada's ability to serve existing domestic and U.S. markets, and prevents Canada from accessing emerging overseas markets. Even more urgently, lack of infrastructure has caused discounted prices for Canadian crude oil exports to the U.S. The lack of market access is leading firms to curtail their investment, and limiting Canada's potential economic growth. The anticipated Trans Mountain decision in June 2019 has the potential to alleviate some of the market access constraints the industry faces and allow Canadians to receive the best value for resources.

Global demand for oil, including heavy oil such as WCS, is growing – especially in India, China and Southeast Asia. Canadian producers have an opportunity to export oil to emerging global markets but there is not enough pipeline capacity to allow producers to capitalize on this growing demand. By 2035, the supply of crude oil is expected to increase by 1.7 million b/d and even this constrained outlook of supply growth is contingent on Canada significantly increasing its egress capacity from the WCSB.

CRUDE OIL MARKETS

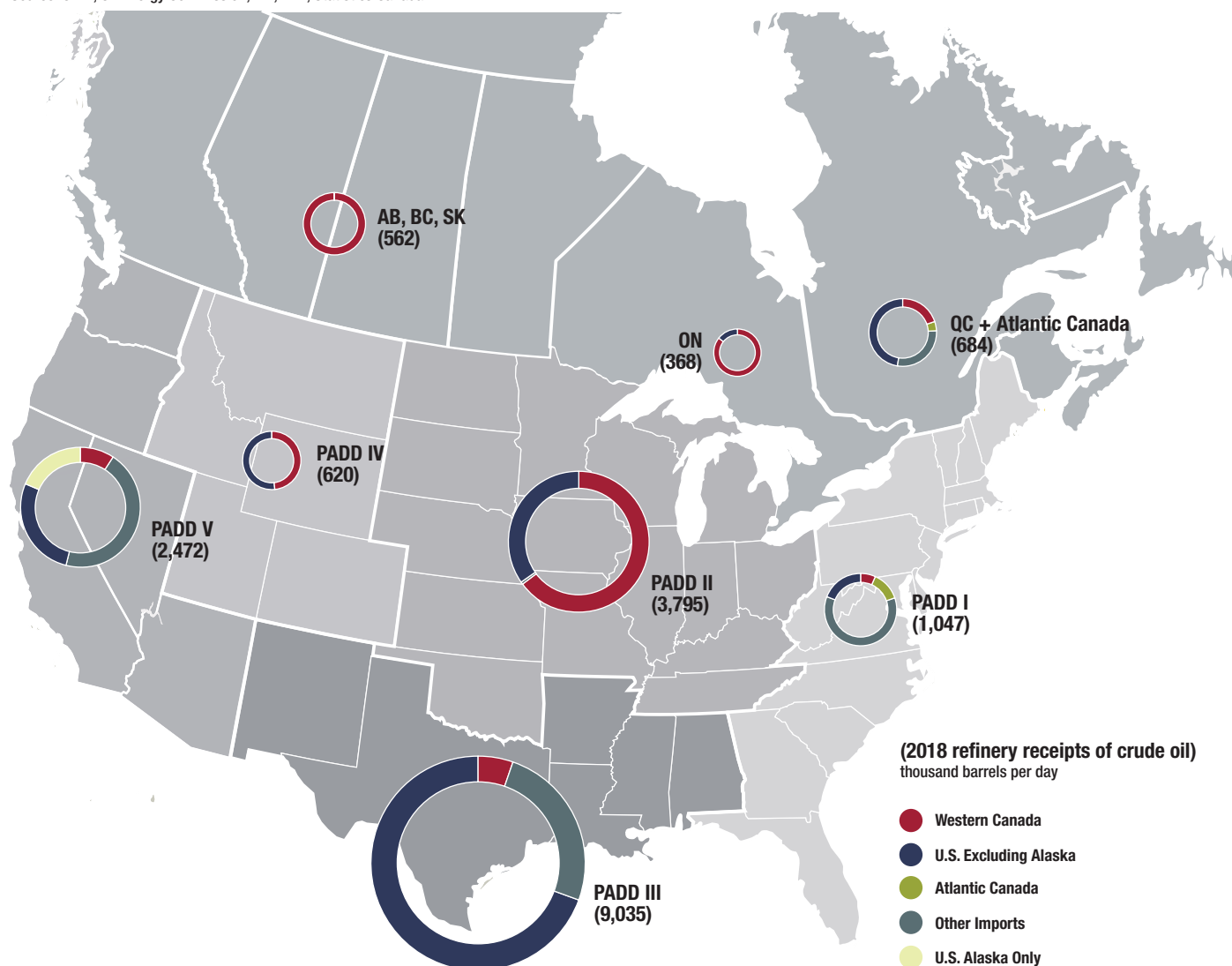
Today nearly all of Canada's oil exports are delivered to U.S. refineries. In 2018, Canada exported more than 3.6 million b/d to the U.S. – less than one per cent of exports were delivered to other markets. Domestic Canadian refinery markets account for about one million b/d, or 24 per cent of total demand for Canadian production.

Figure 3.1 shows the relative sizes of the regional refinery markets in the U.S. and their respective sources for crude oil supplies. Refineries receive crude oil feedstock and process it into a variety of petroleum products such as transportation fuels such as gasoline, diesel, jet fuel, and even some heating

fuels. The volume of total crude oil supply delivered to pipelines and markets is greater than total production because imported diluent, in addition to domestic supplies, is needed to meet the blending requirements that enable heavy oil to be transportable by pipeline.

Figure 3.1 Canada and U.S. 2018 Crude Oil Receipts by Source

Source: CAPP, CA Energy Commission, EIA, NEB, Statistics Canada



3.1 Canada

There are 17 refineries in Canada that have a collective crude oil refining capacity of 2.0 million b/d. In 2018, crude oil feedstock actually processed by Canadian refineries totaled more than 1.7 million b/d, including 593,000 b/d of imported oil.

3.1.1 Western Canada

The nine refineries located in Western Canada (Table 3.1) comprise approximately 40 per cent of Canada's total crude oil refining capacity. Alberta and Saskatchewan refineries receive crude oil supplies exclusively from Western Canada, primarily by pipeline although some volumes are transported short distances by truck. Refineries in B.C. obtain some crude oil from within the province but most of B.C.'s supply comes from Alberta through the existing Trans Mountain pipeline, as well as some smaller volumes by rail. According to the NEB, less than 10 per cent of B.C.'s refined petroleum products are imported from the U.S.



Table 3.1 Refineries in Western Canada by Province

Owner	Location	Crude oil processing capacity (b/d)
Alberta		
Imperial	Strathcona	191,000
Husky (asphalt plant)	Lloydminster	290,00
Suncor	Edmonton	142,000
Shell	Scotford	92,000
North West Redwater Partnership	Sturgeon County	79,000 (dilbit)
Alberta subtotal (5 refineries)		533,000
British Columbia		
Parkland Fuel	Burnaby	55,000
Husky	Prince George	12,000
British Columbia subtotal (2 refineries)		67,000
Saskatchewan		
Federated Co-operatives	Regina	130,000
Gibson (asphalt plant)	Moose Jaw	18,000
Saskatchewan subtotal (2 refineries)		148,000
Total (9 refineries)		748,000

Western Canada refinery demand increased to 562,000 b/d in 2018 from 545,000 b/d in 2017 due to the start-up of Phase One of the North West Redwater Partnership's Sturgeon Refinery, which commenced operations in late 2018. Since start-up, the refinery has processed synthetic crude oil to produce diesel. The refinery is working toward eventually processing heavier feedstocks; once construction of its gasifier is complete, the refinery will be able to use up to 50,000 b/d of bitumen or 79,000 b/d of dilbit as feedstock. This is the first refinery built in Canada since 1984 and has three potential expansion phases. Future expansions have received regulatory approvals but timing of the remaining phases is uncertain.

3.1.2 Eastern Canada

There are eight refineries in Eastern Canada with a combined crude oil refining capacity of 1.2 million b/d (Table 3.2). The capacity of these refineries exceeds the combined capacity of Canada's western refineries by 464,000 b/d. Because eastern refineries are not as well connected to domestic crude oil production supplies, these refineries are currently more reliant on imported crude to meet their needs. Refineries in Eastern Canada process primarily light crude oil and in 2018 received approximately half of their 1.1 million b/d of feedstock from foreign sources.

Eastern refineries' access to western Canadian supplies and U.S. Bakken production significantly improved after Enbridge reversed its Line 9 pipeline to flow west to east from Sarnia, Ontario to Montréal, Québec. This reversal occurred in December 2015.

Refineries in Québec and Atlantic Canada have tidewater access and consequently have access to crude oil supplies from a number of global alternatives. Irving Oil's refinery in Saint John, N.B. can receive some western Canadian crude oil by rail, but Atlantic Canada refineries primarily rely on foreign imports by tanker, supplemented by some Atlantic Canada production. The U.S. has been a large supplier of crude oil to Canada since 2013, and supplied about 65 per cent of the total import demand in 2018. Saudi Arabia is also a major exporter of crude oil to eastern Canadian refineries, supplying 21 per cent of total import demand in 2018. Other countries supplying crude oil to these refineries include Nigeria, Azerbaijan and Norway.



Table 3.2 Refineries in Eastern Canada by Province

Owner	Location	Crude oil processing capacity (b/d)
Ontario		
Imperial	Nanticoke	113,000
Imperial	Sarnia	119,000
Shell	Sarnia	73,000
Suncor	Sarnia	85,000
Ontario subtotal (4 refineries)		390,000
Quebec		
Suncor	Montreal	137,000
Ultramar	Quebec City	23,5000
Quebec subtotal (2 refineries)		372,000
Atlantic Canada		
Irving	Saint John, NB	320,000
Silverpeak (North Atlantic Refining LP)	Come by Chance, NL	130,000
Atlantic subtotal (2 refineries)		450,000
Total (8 refineries)		1,212,000

3.2 United States Key Refining Hubs

Canada is the largest foreign supplier of crude oil to the U.S., delivering 3.7 million b/d in 2018, which accounted for almost all of Canada's exports. Given its tremendous resource base, Canada has the potential to supply even larger volumes to the U.S. However, the ability to increase exports to this market is currently hampered by a lack of transportation capacity.

The U.S. Department of Energy divides the 50 states into five market regions called Petroleum Administration of Defense Districts (PADDs). These PADDs were originally created in the Second World War to help allocate fuels derived from petroleum products. Today, this delineation continues to be used when reporting data to describe U.S. crude oil markets, which have different characteristics attributable to their distinct regional locations.

3.2.1 PADD II – Midwest

Currently the largest regional market in the U.S. for Canadian crude oil exports is the Midwest. In 2018, this 3.8 million b/d refining market imported 2.5 million b/d, or 65 per cent of its crude oil feedstock needs (Figure 3.2) with almost all these imports originating in Western Canada.

This heavy reliance on crude supplies from Western Canada is not surprising, as a number of refineries in PADD II have made significant investments in recent years to increase their ability to process heavy crude oil. Consequently, these refineries are expected to continue to rely almost exclusively on Western Canada for their heavy feedstock requirements, as they are well connected via pipeline to access crude oil from Western Canada.

PADD II also encompasses the largest commercial storage hub in the U.S. at Cushing, Oklahoma. Cushing is the main trading hub for U.S. crude oil and is also the delivery point for New York Mercantile Exchange (NYMEX) traded futures contracts. The Energy Information Agency reports there are approximately 77 million barrels of working storage capacity at this hub. Crude oil that is initially delivered to this hub can ultimately be delivered to markets outside PADD II when taken out of storage. In recent years, additional pipeline capacity has been developed that connects this hub to refineries on the U.S. Gulf Coast, which are located in PADD III. Other primary market hubs within PADD II are located at Clearbrook, Minnesota and Wood River-Patoka, Illinois.

See Appendix C refinery map for locations.

3.2.2 PADD III - U.S. Gulf Coast

The U.S. Gulf Coast is home to a vast refinery complex that comprises 49 refineries with a combined capacity of 9.8 million b/d. The majority of this capacity is located in two coastal states, Louisiana and Texas.

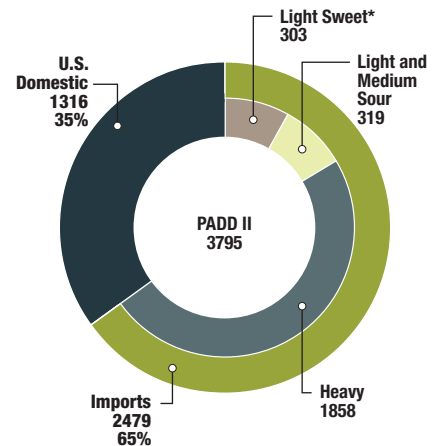
Since 2010, U.S. consumption of domestic crude oil feedstock in the U.S. Gulf Coast has grown dramatically, as the U.S. has seen a significant increase in production from its own tight shale oil resources. For example, since 2007 the Permian basin has seen a fourfold increase in production, from less than one million b/d in to more than four million b/d in early 2019. In 2018, domestic crude oil supplied 6.3 million b/d, or

Figure 3.2 PADD II

**CRUDE OIL REFINING CAPACITY = 4089
(THOUSANDS OF BARRELS PER DAY)**

Source: EIA

*Includes small volumes of medium sweet



69 per cent, of PADD III's nine million b/d feedstock demand (Figure 3.3). In contrast, U.S. domestic supplies accounted for only 28 per cent of regional demand in 2010.

Even though light sweet crude oil imports have now been largely displaced by domestic production as result of the U.S. shale boom, significant demand for heavy oil supplies still remains. The U.S. Gulf Coast refinery complex has around two million b/d of heavy crude oil refining capacity.

While Venezuela and Mexico have traditionally been the dominant sources of heavy crude oil to the region, supplying 489,000 b/d (Venezuela) and 592,000 b/d (Mexico) in 2018, Canada has an opportunity to expand its share of this market. Today Canada is in third place, having supplied 483,000 b/d of heavy crude in 2018, but sharp declines in crude oil production in both Venezuela and Mexico mean refineries in PADD III are seeking other sources of feedstock supply. In November 2018, Mexican crude oil production was 1.86 million b/d, a decline of 22 per cent from production of 2.30 million b/d in January 2015. Production declines have been even more dramatic in Venezuela, with November 2018 production of 1.32 million b/d representing a decline of 47 per cent from 2.50 million b/d in January 2015.

Until the Keystone XL pipeline is available, the ability to replace supplies from Venezuela and Mexico will be challenging for Canadian producers. This is because Canadian producers must rely increasingly on rail, which incurs higher transportation costs and potentially requires crude oil to be sold at a substantial discount in order to capture market share.

3.3 International

World demand for crude oil is expected to grow in the coming decades and Canada's ability to provide additional supplies to meet this higher demand will depend on its ability to build the required market access infrastructure. According to the International Energy Agency's World Energy Outlook 2018 (New Policies Scenario), global oil demand is projected to increase 12 per cent from 94.8 million b/d to 106.3 million b/d by 2040. Overall, energy demand will decrease in mature economies, but this will be more than offset by increases that reflect developing economies catching up with mature economies. Per capita energy consumption in developing economies is expected to increase rapidly toward OECD levels as prosperity rises. The combined demand growth from China and India of 8.2 million b/d is equal to 70 per cent of the projected world demand increase from 2017 to 2040 (Table 3.3).

Table 3.3 Total Oil Demand in Major Asian Countries

Source: IEA World Energy Outlook 2018, New Policies Scenario

Million b/d	2017	2025	2030	2035	2040	2017 - 2040 Growth
China	12.3	14.9	15.7	15.7	15.8	3.5
India	4.4	6.2	7.4	8.4	9.1	4.7
Japan	3.6	3.1	2.7	2.4	2.1	-1.5
Southeast Asia	4.7	6	6.4	6.7	6.8	2.1
World	94.8	102.4	104.3	104.9	106.3	11.5

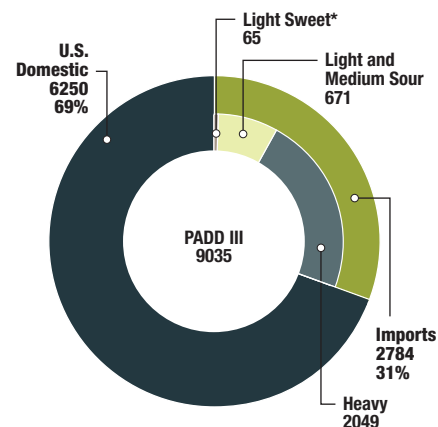
*Totals may not add up due to rounding

Figure 3.3 PADD III

CRUDE OIL REFINING CAPACITY = 9754
(THOUSANDS OF BARRELS PER DAY)

Source: EIA

*Includes small volumes of medium sweet



Global oil demand is projected to increase 12 per cent by 2040.

Oil Market Highlights

Crude Oil Price Movements

The OPEC Reference Basket (ORB) eased in May, dropping m-o-m by 81¢, or 1.1%, to average \$69.97/b. Crude oil futures prices ended May sharply lower, reaching their lowest levels since February, registering high volatility, particularly late in the month, fuelled by uncertainty about world economic and global oil demand outlooks amid intensifying trade tensions between the US and China. Oil prices dropped further after the US announced plans to impose tariffs on imports from Mexico. In May, ICE Brent averaged \$1.33, or 1.9%, lower m-o-m at \$70.30/b, while NYMEX WTI dropped m-o-m by \$3.01, or 4.7%, to average \$60.87/b. Year-to-date (y-t-d), ICE Brent was \$3.47, or 4.9%, lower at \$66.75/b, while NYMEX WTI dropped by \$7.11, or 10.9%, to \$57.97/b, compared to the same month last year. The Brent and Dubai market structure moved deeper into backwardation in May, while the NYMEX WTI price structure remained in contango. Hedge funds and other money managers decreased their bullish positions in both ICE Brent and NYMEX WTI.

World Economy

Following growth of 3.6% in 2018, the global economic growth forecast remains at 3.2% in 2019, unchanged from the previous month's assessment. The most recent escalation in trade disputes, among numerous other challenges to world economic development, may lead to lower growth in the near term. In the OECD economies, US growth remains at 2.6% for 2019, compared to 2.9% for 2018. GDP growth in Japan is revised slightly up by 0.1 pp to 0.5% for 2019, following growth of 0.8% in 2018. Euro-zone growth for 2019 remains unchanged at 1.2%, albeit down from 1.8% for 2018. In the non-OECD economies, China's 2019 growth forecast is unchanged to stand at 6.2%, after reaching 6.6% in 2018. India's 2019 growth forecast is revised downward by 0.3 pp to 6.8%, following 7.3% in 2018. Growth in Brazil for 2019 is revised lower to 1.4% from 1.7%, after seeing 1.1% in 2018, while Russia's 2019 GDP growth forecast is revised down to 1.4% from 1.6%, following growth of 2.3% for 2018.

World Oil Demand

In 2019, world oil demand is anticipated to rise by 1.14 mb/d, lower than last month's assessment by 0.07 mb/d. The downward revision was mainly to account for sluggish oil demand data in the OECD region during 1Q19. The majority of oil demand growth is projected to originate from Other Asia, led by India, followed by China and OECD Americas. OECD countries are projected to rise by 0.14 mb/d, while non-OECD countries will drive oil demand growth by adding an estimated 1.00 mb/d in 2019. In 2018, world oil demand grew by 1.41 mb/d, unchanged from last month's assessment. OECD Americas led oil demand growth in the OECD region, on the back of strong gains for light and middle distillates throughout 2018. Other Asia led demand growth in the non-OECD region and globally, after strong product demand growth in India, Indonesia, Singapore and Thailand.

World Oil Supply

Non-OPEC oil supply in 2019 is expected to grow at a pace of 2.14 mb/d, y-o-y, following a robust increase of 2.91 mb/d in 2018. The 2019 non-OPEC supply assessment is unchanged from last month, despite some downward revisions for the US, due to lower-than-expected output in 1Q19, and for Norway and Brazil due to lower-than-expected production in 3Q19 and 4Q19. These revisions are offset by upward revisions to China, and the UK. The US is projected to remain the main driver for non-OPEC supply growth in 2019 adding 1.83 mb/d y-o-y, followed by Brazil, Russia, China, Australia and the UK. At the same time Mexico, Norway, Kazakhstan, Indonesia and Vietnam are projected to see the largest declines. OPEC NGLs and non-conventional liquids y-o-y are expected to grow by 0.08 mb/d to average 4.84 mb/d in 2019, following growth of 0.13 mb/d in 2018. In May 2019, OPEC crude oil production is estimated to have decreased by 236 tb/d, m-o-m to average 29.88 mb/d, according to secondary sources.

Product Markets and Refining Operations

In May, global product markets saw a mixed performance, affected by a downward correction from the spike in gasoline cracks that had been sustained during previous months. In the US, product markets were supported by the middle of the barrel, as firm jet/kerosene demand, amid supply side pressure caused by excessive rain in the central US regions, affected middle distillate markets. This came despite a downturn in the gasoline complex. In Europe, product markets gained some ground, supported by middle distillate inventory drawdowns, which kept prices sustained, despite a weakening at the top and bottom of the barrels. In Asia, product markets suffered considerable losses, pressured by bearish sentiment triggered by the release of the second batch of export quotas in China. In addition, weaker inter-regional product exports, despite considerable offline capacity on heavy refinery turnarounds within the region, contributed to the downturn.

Tanker Market

Average dirty tanker spot freight rates rose marginally in May following five months of steady declines, but remained lower y-o-y. Tonnage lists remained in excess due to limited scrapping and steady deliveries. Ship owners have been looking to 2H19 when increased refinery throughput in order to produce sufficient low-sulphur fuel ahead of implementation of IMO 2020 regulations are expected to boost demand for shipping across both the dirty and clean tanker markets. Meanwhile, the clean segment of the tanker market saw m-o-m declines across all routes except Middle East-to-East, which picked up from the weak performance seen the month before.

Stock Movements

Preliminary data for April showed that total OECD commercial oil stocks rose by 25.0 mb m-o-m to stand at 2,874 mb. This was 54.4 mb higher y-o-y and 7.6 mb above the latest five-year average. Within the components, crude stocks indicated a slight deficit of 0.2 mb, while product stocks showed a surplus of 7.9 mb above the latest five-year average. In terms of days of forward cover, OECD commercial stocks m-o-m remained unchanged in April at 60.1 days, which was 1.1 days above the same period in 2018, but 1.4 days below the latest five-year average.

Balance of Supply and Demand

Demand for OPEC crude in 2018 is estimated at 31.6 mb/d, 1.6 mb/d lower than the 2017 level. In 2019, demand for OPEC crude is forecast at 30.5 mb/d, around 1.1 mb/d lower than the estimated 2018 level.

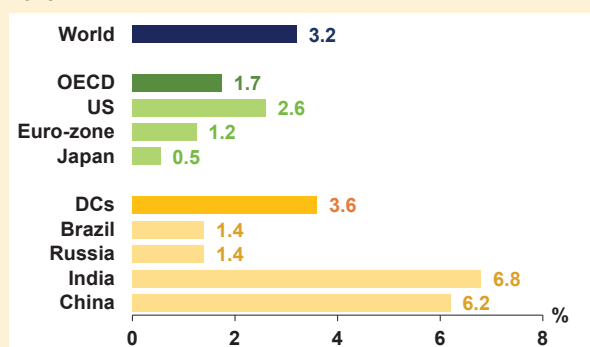
Feature Article

World oil market prospects for the second half of 2019

Throughout the first half of this year, ongoing global trade tensions have escalated, threatening to spill over, and geo-political risks remained in many key regions. This has resulted in a slowdown in global economic activities, and weaker growth in global oil demand, both compared to a year earlier. Meanwhile, non-OPEC supply continues to increase at a high pace, while the voluntary production adjustments as per the Declaration of Cooperation (DoC) have again risen to record-high conformity levels.

Since the beginning of the year, offsetting trends in major economies have stabilised global economic growth at the current 2019 forecast of 3.2%, compared to 3.6% estimated for 2018. Despite recent trade-related developments, the 1Q19 growth rate was better than initially expected for major OECD economies and China. Meanwhile, other economies, such as Brazil, Russia and India, have underperformed. On a yearly basis, world business and consumer sentiments have fallen, but yet remained at healthy levels. However, recent escalations in trade disputes are expected to lead to lower economic growth rates, despite the counterbalancing efforts in affected economies. Several emerging and developing economies continue to face challenges, including high debt levels. Moreover, Brexit, fiscal issues in some EU Member Countries, Japan's slowdown, and the fading impact of US fiscal stimulus pose additional risks (**Graph 1**).

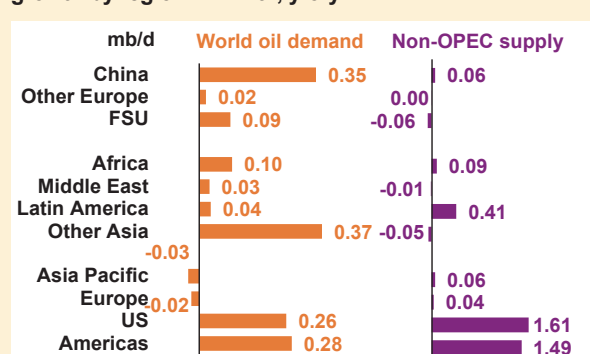
Graph 1: GDP growth in selected countries/regions, 2019*



Note: * Forecast.
Source: OPEC Secretariat.

Global oil demand growth is projected to improve seasonally, from the sluggish performance seen in 1H19, with growth in 2H19 forecast at 1.2 mb/d y-o-y. The OECD region is forecast to increase by 0.2 mb/d y-o-y in 2H19, on the back of growth in OECD Americas, driven by solid light distillate demand. In contrast, OECD Europe is forecast to contract due to slower economic momentum, while OECD Asia Pacific will decline on lower petrochemical feedstock demand. In the non-OECD region, oil demand is projected to increase by 1.0 mb/d y-o-y in 2H19 supported mainly by Other Asia, particularly India. Oil demand in China is expected to continue growing despite economic concerns and sharply lower vehicle sales. Growth in transportation fuels, particularly aviation fuels, as well as in petrochemical feedstock should outweigh declines elsewhere in 2H19 (**Graph 2**). However, significant downside risks from escalating trade disputes spilling over to global demand growth remain.

Graph 2: World oil demand and non-OPEC supply growth by region in 2H19*, y-o-y



Note: * Forecast.
Source: OPEC Secretariat.

Non-OPEC oil supply in 2H19 is forecast to increase by 1.8 mb/d, compared to 1H19 and to increase by 2.1 mb/d y-o-y, which is less than growth seen over the same period a year earlier. Indeed, the non-OPEC supply growth slowed slightly in 1H19 due to take-away capacity restrictions in the Permian Basin in the US, mandatory production limitations in Canada, and heavy maintenance operations elsewhere. For 2H19, non-OPEC supply growth is anticipated to show further upside potential, with higher production expected in the US, as well as production ramp-ups in Brazil and possibly the start-up of Norway's Johan Sverdrup field in the North Sea, leading to a growth forecast of 2.14 mb/d for 2019.

In summary, the observed slowdown in the global economy in 1H19 will further be challenged in 2H19, mainly by mounting trade disputes, with the impact on oil demand growth remaining uncertain. While growth in non-OPEC supply continues, the extent of additional production in key regions in 2H19 will mainly depend on volumes of start- and ramp-ups. The upcoming OPEC and non-OPEC Ministerial Meetings will carefully consider these developments, in order to ensure continued market stability.

World Oil Demand

World oil demand in 2019 is now projected to increase by 1.14 mb/d, 0.07 mb/d lower from the previous month's report. Total global oil consumption is expected to average 99.86 mb/d.

To account for the latest available data, 2019 oil demand projections were adjusted lower in the **OECD** region due to poor 1Q19 data in all sub-regions. OECD Americas and OECD Asia Pacific were both adjusted lower by 0.15 mb/d and 0.13 mb/d in 1Q19, respectively. Oil demand growth in OECD Americas posted lower-than-anticipated gains, largely affected by sluggish oil demand data from the US and Canada in March. This slowdown was led by weakening gasoline requirements in the US and softening light distillate demand in Canada. In OECD Asia Pacific, oil demand performance slowed significantly, largely impacted by planned and unplanned petrochemical shutdowns during the quarter. Additionally, OECD Europe oil demand growth for 1Q19 was adjusted lower, amid slower-than-expected oil demand from Germany, Italy, and Turkey.

In the **non-OECD** region, oil demand growth was relatively similar to last month's expectations, with a minor upward adjustment to Other Asia for 1Q19. On the other hand, demand in Latin America and the Middle East continued to show signs of weakening, though remaining within the previous projections.

World oil demand in 2018 was kept relatively unchanged from last month, indicating growth of 1.41 mb/d, for total global product demand to average 98.73 mb/d. In the **OECD** region, oil demand grew by 0.39 mb/d, solely led by OECD Americas. In the **non-OECD** region, growth was at around 1.02 mb/d, with lower Chinese oil demand growth compared with 2017. Nevertheless, Other Asia led oil demand growth in 2018, with 0.42 mb/d, followed by China with 0.39 mb/d.

World oil demand in 2018 and 2019

Table 4 - 1: World oil demand in 2018, mb/d

	2017	1Q18	2Q18	3Q18	4Q18	2018	Change 2018/17 Growth	%
Americas	25.06	25.20	25.40	25.78	25.74	25.53	0.48	1.90
of which US	20.27	20.57	20.64	20.93	20.78	20.73	0.46	2.26
Europe	14.33	13.98	14.23	14.71	14.34	14.32	-0.01	-0.10
Asia Pacific	8.06	8.54	7.65	7.70	8.08	7.99	-0.07	-0.89
Total OECD	47.45	47.72	47.28	48.19	48.16	47.84	0.39	0.82
Other Asia	13.22	13.52	13.84	13.35	13.84	13.64	0.42	3.14
of which India	4.53	4.83	4.74	4.40	4.96	4.73	0.20	4.43
Latin America	6.51	6.35	6.48	6.81	6.47	6.53	0.02	0.31
Middle East	8.20	8.22	7.98	8.43	7.85	8.12	-0.08	-0.98
Africa	4.20	4.35	4.32	4.27	4.40	4.33	0.13	3.13
Total DCs	32.13	32.43	32.62	32.86	32.56	32.62	0.49	1.52
FSU	4.70	4.66	4.65	4.94	5.01	4.82	0.12	2.45
Other Europe	0.72	0.73	0.69	0.73	0.82	0.74	0.03	3.48
China	12.32	12.28	12.84	12.65	13.07	12.71	0.39	3.18
Total "Other regions"	17.74	17.68	18.18	18.32	18.90	18.27	0.53	2.99
Total world	97.32	97.83	98.08	99.38	99.62	98.73	1.41	1.45
Previous estimate	97.32	97.83	98.05	99.38	99.63	98.73	1.41	1.45
Revision	0.01	0.00	0.04	0.00	-0.02	0.00	0.00	0.00

Note: Totals may not add up due to independent rounding.

Source: OPEC Secretariat.

Table 4 - 2: World oil demand in 2019*, mb/d

	2018	1Q19	2Q19	3Q19	4Q19	2019	Change 2019/18	
							Growth	%
Americas	25.53	25.29	25.65	26.07	26.01	25.76	0.23	0.88
of which US	20.73	20.69	20.86	21.21	21.03	20.95	0.22	1.05
Europe	14.32	13.97	14.19	14.69	14.31	14.29	-0.02	-0.15
Asia Pacific	7.99	8.40	7.60	7.67	8.04	7.93	-0.06	-0.81
Total OECD	47.84	47.66	47.44	48.43	48.36	47.98	0.14	0.29
Other Asia	13.64	13.91	14.21	13.72	14.22	14.01	0.38	2.77
of which India	4.73	5.03	4.93	4.58	5.15	4.92	0.19	4.05
Latin America	6.53	6.36	6.51	6.85	6.50	6.56	0.03	0.47
Middle East	8.12	8.25	8.01	8.47	7.88	8.15	0.03	0.37
Africa	4.33	4.45	4.42	4.36	4.50	4.43	0.10	2.31
Total DCs	32.62	32.97	33.16	33.40	33.10	33.16	0.54	1.65
FSU	4.82	4.75	4.74	5.03	5.11	4.91	0.09	1.87
Other Europe	0.74	0.75	0.71	0.75	0.84	0.76	0.02	2.69
China	12.71	12.63	13.19	13.00	13.43	13.06	0.35	2.77
Total "Other regions"	18.27	18.13	18.64	18.78	19.38	18.74	0.46	2.53
Total world	98.73	98.76	99.24	100.61	100.84	99.87	1.14	1.15
Previous estimate	98.73	99.05	99.20	100.61	100.86	99.94	1.21	1.22
Revision	0.00	-0.29	0.04	0.00	-0.02	-0.07	-0.07	-0.07

Note: * 2019 = Forecast.

Totals may not add up due to independent rounding.

Source: OPEC Secretariat.

OECD

OECD Americas

US

US oil demand came up weak for March, mainly impacted by sluggish gasoline requirements, to record the largest monthly y-o-y decline since February 2017, at 0.37 mb/d, or 1.8%.

Table 4 - 3: US oil demand, tb/d

	Mar 19	Mar 18	Change 2018/17	
			tb/d	%
LPG	3,030	2,977	53	1.8
Naphtha	208	213	-5	-2.3
Gasoline	9,174	9,446	-272	-2.9
Jet/kerosene	1,713	1,719	-6	-0.3
Diesel oil	4,155	4,169	-14	-0.3
Fuel oil	217	223	-6	-2.7
Other products	1,998	2,117	-119	-5.6
Total	20,495	20,864	-369	-1.8

Sources: US EIA and OPEC Secretariat.

The recorded decline originated to a large extent in the road transportation sector, particularly gasoline, despite growth in new car registrations and roughly unchanged mileage levels. Some gains have been observed in demand for light products – propane/propylene, as well as industrial diesel – yet they only slightly offset losses in overall oil demand.

Fuel oil demand also declined y-o-y, while diesel fuel requirements declined y-o-y compared with March 2018 as a result of warmer weather and lower utilization volumes in the transportation sector.

Graph 4 - 1: US gasoline demand, y-o-y change

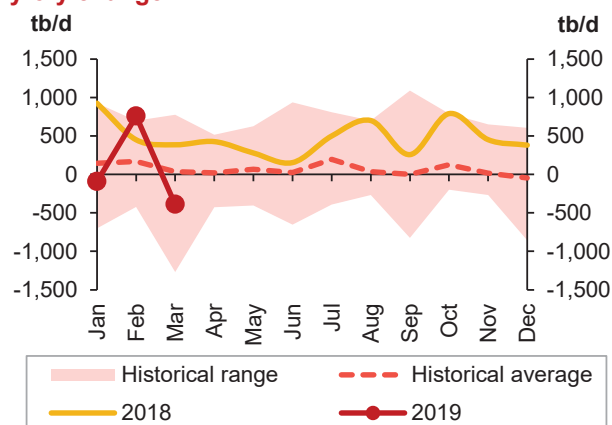


Sources: US EIA and OPEC Secretariat.

Despite weak oil demand performance during January and March 2019, US oil demand remained in positive territory during 1Q19, with overall growth of 0.1 mb/d, compared with the same quarter last year. Strongly rising petrochemical feedstock and diesel fuel requirements accounted for the lion's share of that growth, which was partly offset by falling demand for gasoline and fuel oil.

Based on weekly data, preliminary April and May volumes imply a return to a positive trend, with industrial fuels accounting for the bulk of this increase.

Graph 4 - 2: OECD Americas oil demand, y-o-y change



Sources: Joint Organisations Data Initiative and OPEC Secretariat.

Mexico

In **Mexico**, oil demand fell in April, dominated by substantial decreases in demand for LPG and diesel fuel, partly offset by slight increases in naphtha requirements, y-o-y. Mexican oil demand was in negative territory for the first four months of the year, y-o-y, with demand for the majority of petroleum categories falling, notably for gasoline and diesel fuel.

Canada

The latest available **Canadian** data for March showed overall declines in oil demand; losses for naphtha and heavier oil products dominated over increasing requirements for all other petroleum product categories, notably LPG, gasoline, jet kerosene and diesel fuel. Canadian 2019 projections for oil demand remain unchanged from those reported last month, with forecast risks balanced toward the upside and the downside.

OECD Americas 2019 oil demand growth depends on several factors, such as the overall economy, the degree of substitution with other commodities, fuel efficiencies, technological advancements, the share of alternative vehicles in the overall vehicle pool and the oil price environment. Despite recent sluggish data for March, risks remain skewed to the upside compared with last month's publication, as a result of healthy projected economic growth and a flourishing industrial sector in the country.

World Oil Demand

In 2018, OECD Americas oil demand grew by 0.48 mb/d compared with 2017. OECD Americas 2019 oil demand is projected to grow once more by 0.23 mb/d compared with 2018.

OECD Europe

The latest and partly preliminary April data for the **European Big 4** oil consuming countries, Germany, France, Italy and the UK, implied rising oil demand requirements, y-o-y.

Table 4 - 4: Europe Big 4* oil demand, tb/d

	<u>Apr 19</u>	<u>Apr 18</u>	<u>Change 2019/18</u> <u>tb/d</u>	<u>%</u>
LPG	498	487	11	2.3
Naphtha	579	582	-3	-0.5
Gasoline	1,196	1,174	22	1.9
Jet/kerosene	861	849	12	1.4
Diesel oil	3,294	3,216	78	2.4
Fuel oil	248	241	7	2.9
Other products	641	642	-1	-0.2
Total	7,317	7,191	126	1.8

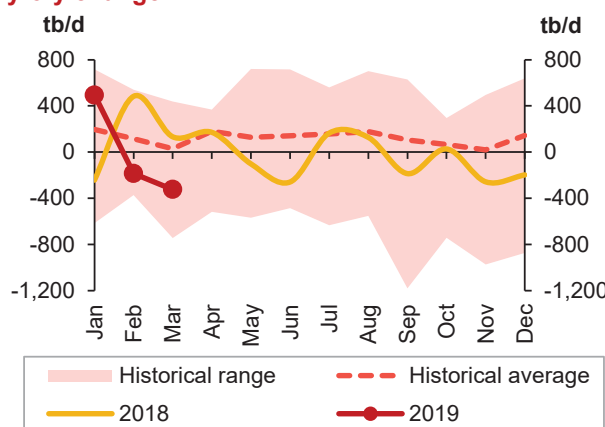
Note: * Germany, France, Italy and the UK.

Sources: JODI, UK Department for Business, Energy & Industrial Strategy, Unione Petrolifera and OPEC Secretariat.

Substantially colder weather, in combination with historical baseline effects, implied gains in requirements for the majority of petroleum product categories, particularly diesel fuel, gasoline and LPG. 2018 closed slightly decreasing for the whole region, while demand for 1Q19 was sluggish, y-o-y. This follows solid gains in demand for 2015-2017.

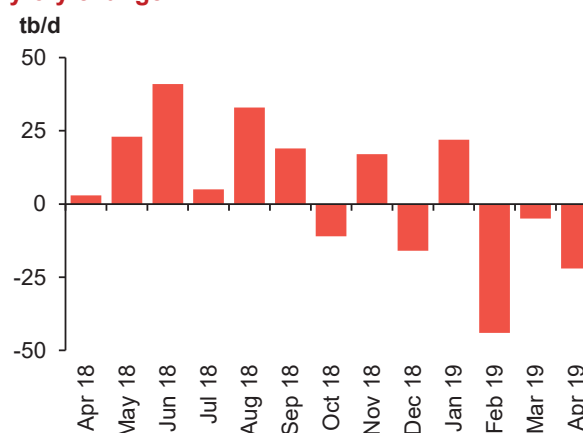
During the first four months of 2019, European Big 4 oil demand saw slight y-o-y growth, with jet/kerosene and diesel fuel requirements increasing, but being to large extent offset by losses in demand for LPG, gasoline and fuel oil. January to April cumulative auto sales decreased by roughly 2.5%; losses were substantial in Italy, Spain and the UK. There is considerable uncertainty for 2019 oil demand in the region, as there are a number of factors pointing in opposite directions.

Graph 4 - 3: OECD Europe's oil demand, y-o-y change



Sources: Joint Organisations Data Initiative and OPEC Secretariat.

Graph 4 - 4: UK diesel fuel demand, y-o-y change



Sources: Joint Organisations Data Initiative, UK Department for Business, Energy & Industrial Strategy and OPEC Secretariat.

Expected improvements in the economy could support oil demand, particularly in road transportation. However, unsolved budget deficits in some countries, fuel taxation, efficiencies and geopolitical issues pose considerable downside risks. Consequently, expectations for 2019 oil demand in the region have been lowered since last month, with risks skewed to the downside.

In 2018, **OECD Europe oil demand** declined by 0.01 mb/d y-o-y, while 2019 oil demand will be 0.02 mb/d higher compared with 2018.

OECD Asia Pacific

Japan

Preliminary April 2019 data shows **Japanese oil demand** increasing by 1.5% y-o-y for the first month since October 2018.

Table 4 - 5: Japan's domestic sales, tb/d

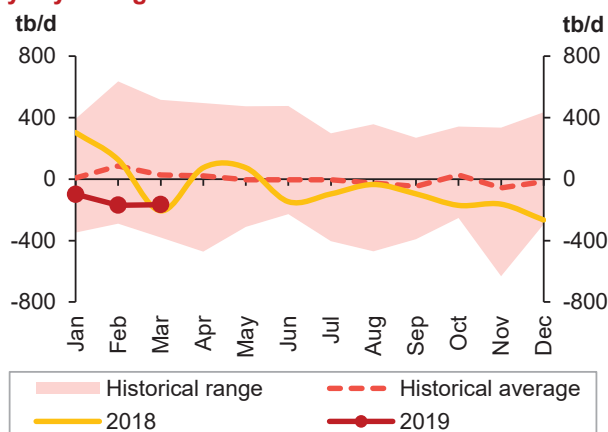
	Apr 19	Apr 18	Change 2019/18	
			tb/d	%
LPG	362	396	-34	-8.6
Naphtha	729	764	-35	-4.6
Gasoline	856	853	3	0.3
Jet/kerosene	511	399	112	28.2
Diesel oil	776	753	23	3.0
Fuel oil	226	234	-8	-3.3
Other products	352	356	-4	-1.2
Total	3,811	3,755	56	1.5

Sources: JODI, Ministry of Energy and Trade and Industry of Japan and OPEC Secretariat.

Strongly rising jet/kerosene requirements, in line with increasing airline activities and colder weather compared with April 2018 and the historical norm, dominated gains and have been partly offset by shrinking demand for LPG, naphtha and fuel oil.

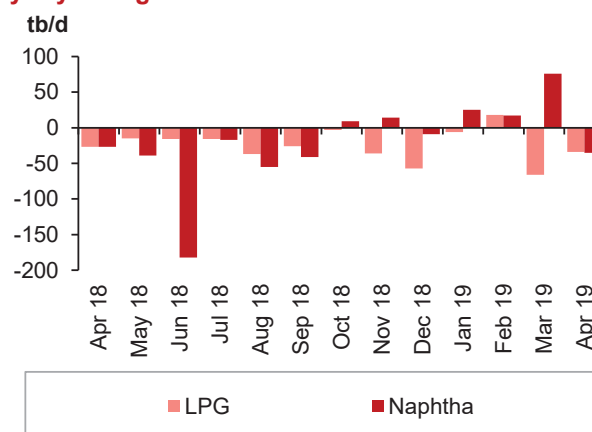
Gasoline demand remained flat y-o-y, after seeing consecutive declines for the last 14 months. Falling requirements were also seen for fuels used for direct crude burning and electricity generation as a result of substitution by other energy commodities, including natural gas.

Graph 4 - 5: OECD Asia Pacific oil demand, y-o-y change



Sources: Joint Organisations Data Initiative and OPEC Secretariat.

Graph 4 - 6: Japan's LPG and naphtha demand, y-o-y change



Sources: Ministry of Economy Trade and Industry of Japan, Joint Organisations Data Initiative and OPEC Secretariat.

Despite a positive April, Japanese oil demand growth was deeply in negative territory during the first four months of the year, with declines largely dominated by LPG, gasoline and diesel fuel, as well as electricity generating fuels.

South Korea

In **South Korea**, March 2019 oil demand came up sluggish for the second month in a row. Stalling petrochemical activities, which were in line with decreasing LPG and naphtha requirements, have been accompanied by increasing demand for petroleum products in the transportation and industrial sectors, notably gasoline and diesel fuel.

Going forward, the outlook draws diverse pictures in the **Asia Pacific** region. In Japan, risks for 2019 remain skewed to the downside as a result of rather gloomy economic forecasts and continuous fuel substitution, in combination with efficiency gains. However, in South Korea the risk for the overall 2019 outlook slightly tilted to the upside and dependent on the speed of recovery of the country's petrochemical sector.

OECD Asia Pacific oil demand for 2018 shrank by 0.07 mb/d and is expected to drop by 0.06 mb/d 2019 outlook

Non-OECD

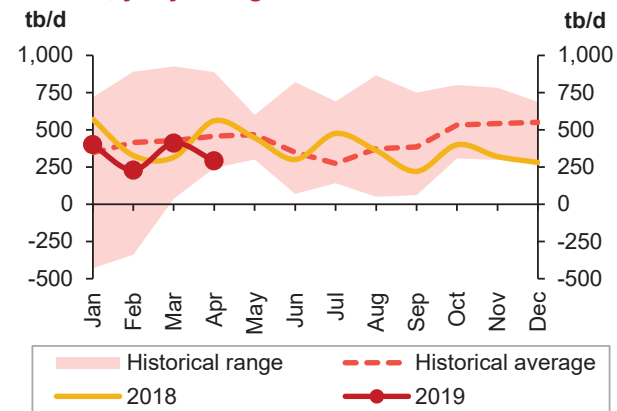
China

Chinese oil consumption increased through April by around 0.21 mb/d y-o-y, led by steady gains in transportation fuels, namely jet fuel and gasoline.

Diesel fuel, on the other hand, remained in negative territory for yet another month. Total product demand was pegged at 12.5 mb/d in April 2019. Jet/kerosene increased in April by as much as 0.17 mb/d, which equates to a 21% increase y-o-y. This rise in jet kerosene requirements is in line with increased travel activities during the Qingming Festival. In April, air passenger traffic was higher by around 5% compared with same month in 2018, indicating a healthy aviation sector.

Gasoline demand was higher by around 0.04 mb/d, which equates to around 1% y-o-y, supported by additional driving during the Qingming Festival in early April and retailers stocking gasoline prior of the Labour Day holiday.

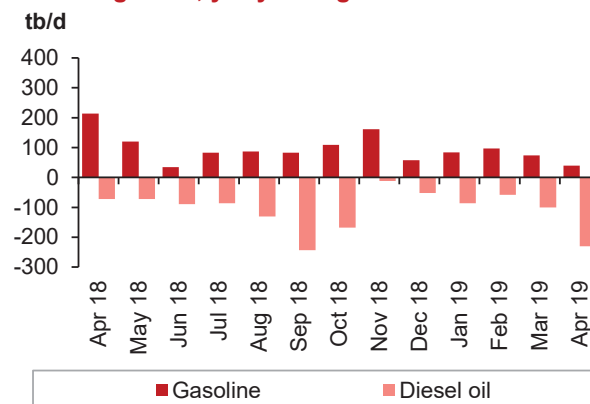
Graph 4 - 7: Changes in China's apparent oil demand, y-o-y change



Sources: Argus Global Markets, China OGP (Xinhua News Agency), Facts Global Energy, JODI, National Bureau of Statistics of China and OPEC Secretariat.

Vehicle sales, on the other hand, continued to slide during April. According to China's passenger car association, vehicle sales dropped by around 18% in April, with both sport utility vehicles (SUV) and multi-purpose vehicles (MPV) dropping by around 19% and 22%, respectively. Year-to-date data sales of passenger cars reached 6.8 million units, down by around 15% from the 8.0 million units recorded over the same period in 2018. LPG demand rose by around 0.03 mb/d y-o-y, which equates to more than 2% y-o-y, supported by increasing propane demand after two propane dehydrogenation (PDH) plants returned from maintenance. PDH utilisation rates averaged 93.6% in April, 27% higher y-o-y; heavy maintenance slowed utilisation rates in April 2019.

Graph 4 - 8: China's diesel oil and gasoline demand growth, y-o-y change



Sources: Facts Global Energy, China OGP (Xinhua News Agency), Argus Global Markets, JODI, National Bureau of Statistics, China and OPEC Secretariat.

Diesel fuel dipped by almost 0.23 mb/d or around 7% from the level recorded in April 2018 due to slower-than-expected demand in the industrial and transportation sectors. China's manufacturing PMI, as reported by IHS Markit and Caixin, was at 50.1 in April this year, down from the 51.3 recorded in April 2018, but still remaining in expansionary territory.

Projections for 2019 oil demand development are unchanged from last month. The outlook is based on transportation and industrial fuels leading the product mix, lower GDP growth compared with 2018, a continuation of fuel quality programmes targeting fewer emissions and fuel substitution by natural gas and coal.

For 2018, **China's oil demand** grew by around 0.39 mb/d, while expectations for 2019 oil demand growth are in the range of 0.35 mb/d.

Other Asia

India

In April, **India's oil consumption** demonstrated a marginal increase compared with April 2018, as demand registered modest growth of 0.02 mb/d, coming off a high baseline in April 2018. Total consumption remains hovering around record consumption of 5 mb/d at 4.96 mb/d.

Table 4 - 6: India's oil demand, tb/d

	Apr 19	Apr 18	Change 2019/18 tb/d	%
LPG	773	755	18	2.4
Naphtha	337	367	-30	-8.1
Gasoline	698	648	49	7.6
Jet/kerosene	258	284	-26	-9.1
Diesel oil	1,817	1,785	32	1.8
Fuel oil	218	225	-7	-3.1
Other products	860	882	-22	-2.5
Total	4,962	4,947	15	0.3

Sources: JODI, Petroleum Planning and Analysis Cell of India and OPEC Secretariat.

Mixed performance was observed in the product pool, while gasoline, diesel fuel and LPG recorded steady gains. This was offset by declines in naphtha, jet/kerosene, fuel oil and other product requirements.

World Oil Demand

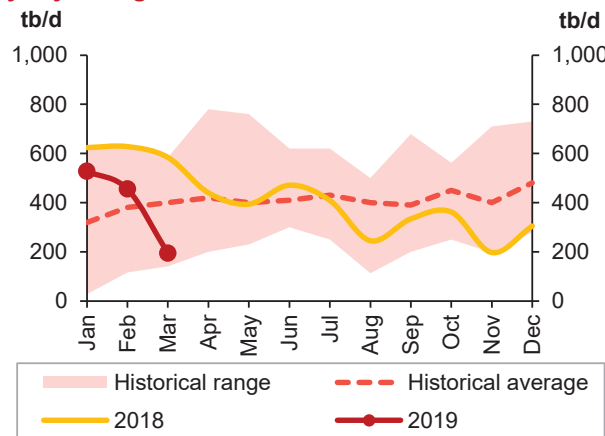
Gasoline consumption remained on an increasing trajectory which started back in September 2017, with growth levels of 0.05 mb/d y-o-y despite declining vehicle sales. Passenger vehicle sales data showed a y-o-y decrease of around 2%, with motorcycles sales also declining by as much as 9% y-o-y as consumers decreased their buying appetite ahead of the general election, in addition to higher insurance costs slowing sales considerably.

Diesel fuel demand also increased to reach 1.8 mb/d, 0.03 mb/d higher than April 2018, supported by steady momentum in manufacturing activities in the country ahead of the general election and despite commercial vehicle sales dropping by 16% y-o-y as reported by the Federation of Automobile Dealers Association.

LPG demand picked up compared with last year, registering an increase of around 0.02 mb/d, as subdued LPG demand continued to provide support.

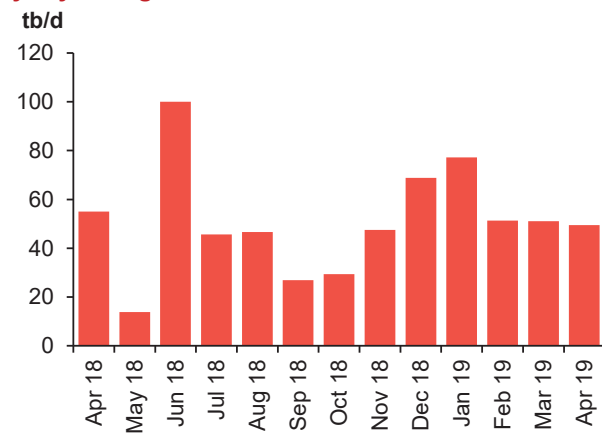
Fuel oil demand declined, shedding off around 0.01mb/d amid lower-than-anticipated consumption in the power sector, despite increasing bunkering activities in the country.

Graph 4 - 9: Other Asia's oil demand, y-o-y change



Sources: Joint Organisations Data Initiative and OPEC Secretariat.

Graph 4 - 10: India's gasoline demand, y-o-y change



Sources: OPEC Secretariat, and Petroleum Planning and Analysis Cell of India.

Indonesia

In **Indonesia**, the latest available March data indicates a rise of 0.01 mb/d y-o-y. All product categories were positive, with the exception to fuel oil, which fell marginally. Jet/kerosene and LPG led oil demand increases during the month, with growth of 5%, 3%, 2% y-o-y, respectively.

Malaysia

In **Malaysia**, oil demand for March came up positive, y-o-y, with demand increasing slightly in the majority of petroleum product categories, apart from diesel fuel requirements, which fell marginally.

Thailand

In **Thailand**, the latest available data implies an increase of 0.01 mb/d y-o-y in March. Gasoline, diesel fuel, and jet kerosene demand grew, but were offset by declining naphtha and fuel oil requirements.

Steady oil demand development in India, along with various other countries in **Other Asia** such as Indonesia, Thailand and the Philippines, indicate stable projections for regional consumption going forward. Demand is expected to be supported by overall economic development. However, the impact of various other factors –such as the monsoon season, the baseline effect and current oil prices – are to be closely monitored.

Other Asia's oil demand increased by 0.42 mb/d in 2015. For 2019, oil demand is anticipated to increase by 0.38 mb/d.

Latin America

Brazil

In **Brazil**, oil demand data returned to an increasing trend in April, rising by 0.08 mb/d, or 3% y-o-y, with total consumption pegged at around 2.8 mb/d.

Table 4 - 7: Brazil's oil demand*, tb/d

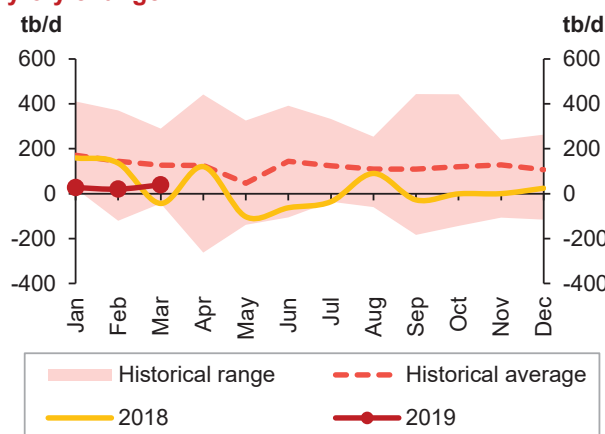
	Apr 19	Apr 18	Change 2019/18	
			tb/d	%
LPG	228	229	-1	-0.4
Naphtha	147	146	1	0.7
Gasoline	671	708	-38	-5.3
Jet/kerosene	116	119	-3	-2.5
Diesel oil	976	968	7	0.8
Fuel oil	99	98	0	0.3
Other products	513	402	111	27.7
Total	2,749	2,671	78	2.9

Note: * = Inland deliveries.

Sources: JODI, Agencia Nacional do Petroleo, Gas Natural e Biocombustiveis and OPEC Secretariat.

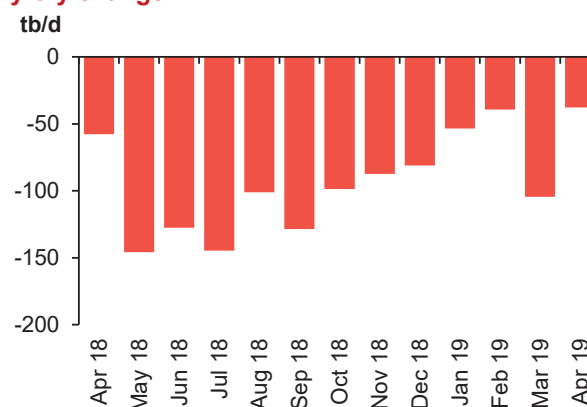
However, most product categories were in the negative zone; these were outweighed by strong increases for ethanol and to much a lesser extent diesel fuel. Ethanol demand was boosted to reach 0.11 mb/d, which marked the 19th consecutive monthly increase, a positive trend that started back in October 2017. Ethanol prices have been and continue to be more competitive than gasoline, promoting ethanol usage in lieu of gasoline. Ethanol retail prices during April were at 3.0 reais per litre as reported by Brazil's National Agency of Petroleum, Natural Gas and Biofuels, while gasoline retail prices were at 4.4 reais per litre during the same month. As such, gasoline demand dipped by 0.04 mb/d compared with the same month in 2018. Diesel fuel regained a rising trend, but only modestly.

Graph 4 - 11: Latin America oil demand, y-o-y change



Sources: Joint Organisations Data Initiative and OPEC Secretariat.

Graph 4 - 12: Brazil's gasoline demand, y-o-y change



Sources: Agencia Nacional do Petroleo, Gas e Biocombustiveis of Brazil, Joint Organisations Data Initiative and OPEC Secretariat.

Following a sharp y-o-y dip in March, demand increased by 0.01 mb/d in April. Brazil's manufacturing PMI for April was at 51.8, remaining in expansion territory and providing some support for diesel fuel requirements. In a year-to-date basis, oil demand in Brazil showed steady momentum, with 1Q19 data indicating a healthy rise of 0.05 mb/d, equating to around 2% y-o-y.

This performance is mainly driven by solid growth in ethanol, increasing by around 22% y-o-y, and middle distillate consumption, as both jet/kerosene and diesel fuel posted gains of around 3% and 2% y-o-y, respectively.

Argentina

Argentina's oil demand remained in negative territory, a trend exhibited since May 2018, excluding August 2018, when moderated positive growth in oil requirements was registered. In March 2019, oil demand decreased by 0.04 mb/d y-o-y. Gains were only seen in naphtha and jet/kerosene, which increased by around 9% each. However, those gains were completely outweighed by strong declines in diesel fuel, gasoline, fuel oil and LPG.

Ecuador

The latest **Ecuadorian oil demand** data for April showed some y-o-y gains of around 0.01 mb/d. Increases are dominated by rising gasoline and diesel fuel demand. Requirements for naphtha and fuel oil offset some of those gains.

Looking forward, for the rest of 2019, expectations for oil demand growth in **Latin America** are similar to last month's projections, with a somewhat better outlook for the economy compared with 2018, with Brazil expected to lead oil demand growth in the region.

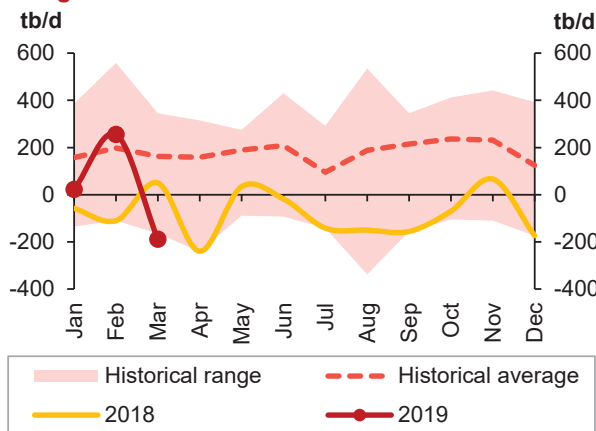
Latin American oil demand fell by 0.08 mb/d in 2018. During 2019, it is projected to increase by 0.03 mb/d.

Middle East

Saudi Arabia

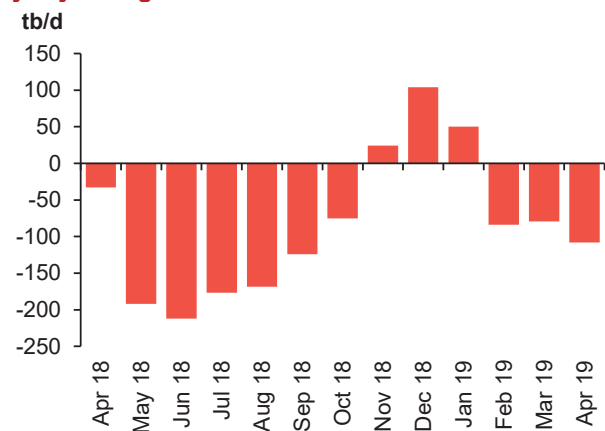
In **Saudi Arabia**, the first four months of 2019 indicated flat oil demand growth as declines registered in March and April oil demand data counterbalanced positive growth exhibited during the first two months of the year. April oil demand figures indicated a decline in oil requirements of 0.03 mb/d or 2% y-o-y.

Graph 4 - 13: Middle East oil demand, y-o-y change



Sources: Joint Organisations Data Initiative, direct communication and OPEC Secretariat.

Graph 4 - 14: Saudi Arabia's direct crude burning, y-o-y change



Sources: Joint Organisations Data Initiative, direct communication and OPEC Secretariat.

Crude oil used for the purposes of burning in the power generation sector, gasoline and diesel fuel all recorded negative performance, despite improving fuel oil demand during the month of April. Crude oil for direct use in power generation eased by as much as 0.11 mb/d in light of substitution by fuel oil and natural gas. On the other hand, fuel oil demand recorded gains of 0.15 mb/d due to higher-than-anticipated demand for power generation, as well as substitution with crude for burning. Total crude oil demand for the purpose of burning was at 0.28 mb/d in April, while total fuel oil demand was at 0.45 mb/d during the same month. Diesel fuel continued its downward trend, which started in 1Q16, as government infrastructure project activities showed signs of slowing down. Cement deliveries during the month of April dropped by more than 9% y-o-y, an indication of slower construction activity in the country. Diesel fuel requirements shed some 0.03 mb/d or around 5% y-o-y.

Total diesel fuel demand is now at 0.52 mb/d. Transportation fuels in general were also declining, with gasoline dropping by around 7% y-o-y. A reduction in subsidies and general slowdown in consumer spending are cumulatively negatively influencing product performance.

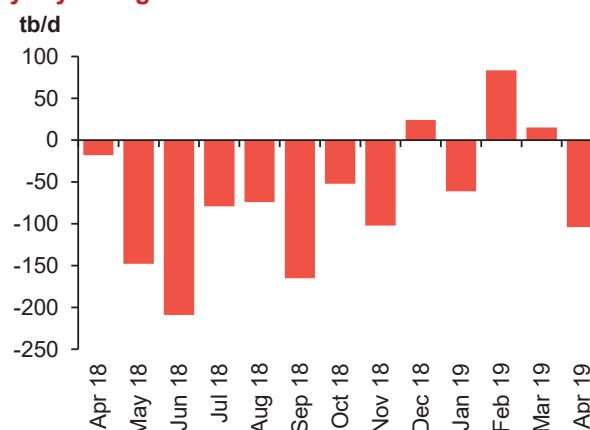
Iraq

In **Iraq**, the positive momentum in oil demand performance during the first three months of 2019 flipped into negative territory, with oil demand dipping by 0.10 mb/d y-o-y during the month of April.

The decline was primarily linked to slower performance from heavy fuels, mainly direct crude oil for power generation and fuel oil. Conversely, light and middle distillate products recorded some gains. Substitution by natural gas is apparently the main cause of declines in power generation fuels during April.

Total product demand in April reached 0.64 mb/d.

Graph 4 - 15: Iraq's direct crude burning, y-o-y change



Sources: Joint Organisations Data Initiative, direct communication and OPEC Secretariat.

Looking forward, **Middle East oil demand** growth is foreseen to be balanced for the remainder of 2019, with some negative uncertainties, including geopolitical concerns, substitution programmes with other fuels, as well as subsidy reduction policies. On the other hand, improvements in the oil price environment should translate to a positive overall outcome for economic activities, hence lending some kind of support to oil demand in 2019. Transportation fuels – gasoline and diesel fuel – are anticipated to be the products leading oil demand growth.

In 2018, Middle East oil demand declined by 0.08 tb/d, while oil demand in 2019 is projected to increase by 0.03 mb/d.

World Oil Supply

Following the robust growth of 2.91 mb/d in 2018, **non-OPEC oil supply in 2019** is expected to grow at a slower pace of 2.14 mb/d, y-o-y to average 64.51 mb/d. The 2019 supply forecast has remained unchanged in this month's assessment, despite some downward revisions to the supply forecasts of the US, Norway and Brazil, which were offset by upward revisions in China and the UK. Downward revisions in US 1Q19 y-o-y growth was due to lower-than-expected output by -52 tb/d compared with the previous assessment, and due to lower-than-expected production in 3Q19 and 4Q19 in Norway and Brazil. At the same time, production in China is expected to recover with higher y-o-y growth, partially offsetting these declines. The US is expected to continue to be the main driver for non-OPEC supply growth in 2019 with 1.83 mb/d y-o-y, followed by Brazil, Russia, China, Australia, the UK, Ghana and the Sudans. Meanwhile, Mexico, Norway, Kazakhstan, Indonesia and Vietnam are projected to see the largest declines.

OPEC NGLs and non-conventional liquids are expected to grow by 0.08 mb/d y-o-y in 2019 to average 4.84 mb/d, while production in 2018 grew by 0.13 mb/d and averaged 4.76 mb/d. In May 2019, OPEC crude oil production is estimated to decline by 236 tb/d m-o-m to average 29.88 mb/d, according to secondary sources.

According to preliminary May data, **non-OPEC supply, including OPEC NGLs**, is estimated to have increased by 0.27 mb/d m-o-m to average 68.39 mb/d, up by 2.10 mb/d y-o-y. As a result, **global oil supply** is estimated to have slightly increased by 0.04 mb/d m-o-m to average 98.26 mb/d in May 2019.

Table 5 - 1: Non-OPEC supply forecast comparison in 2018-2019*, mb/d

Region	2018	Change 2018/17	2019	Change 2019/18
OECD Americas	23.99	2.51	25.65	1.66
OECD Europe	3.83	0.01	3.79	-0.04
OECD Asia Pacific	0.41	0.02	0.47	0.06
Total OECD	28.23	2.54	29.91	1.68
Other Asia	3.55	-0.07	3.47	-0.08
Latin America	5.19	0.04	5.46	0.26
Middle East	3.21	0.07	3.22	0.02
Africa	1.51	0.03	1.58	0.07
Total DCs	13.47	0.08	13.73	0.27
FSU	14.29	0.24	14.38	0.10
Other Europe	0.12	-0.01	0.12	0.00
China	4.02	0.04	4.09	0.08
Non-OPEC production	60.12	2.88	62.23	2.11
Processing gains	2.25	0.04	2.28	0.03
Non-OPEC supply	62.37	2.91	64.51	2.14

Note: * 2019 = Forecast.

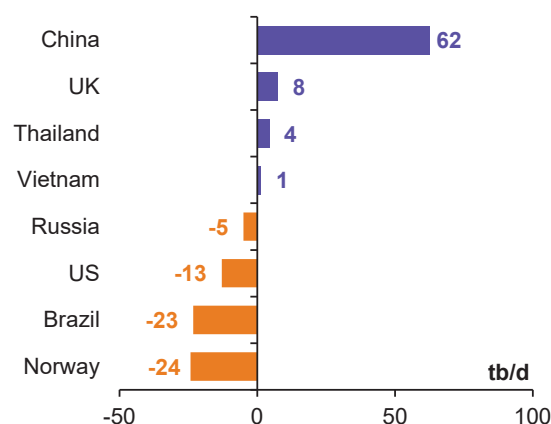
Source: OPEC Secretariat.

Monthly revisions to non-OPEC supply growth forecast

Non-OPEC supply in 2019 is forecast to grow by 2.14 mb/d, unchanged from the previous assessment and is expected to average 64.51 mb/d for the year.

On a country-by-country basis, the US supply growth forecast was revised down by 13 tb/d compared to last month's assessment due to a downward revision of 52 tb/d in 1Q19, as actual data came in lower than forecast. At the same time, Norway's and Brazil's production were revised down by 24 tb/d and 23 tb/d, respectively, as maintenance is expected to impact output in 3Q19 and 4Q19 more deeply than anticipated. On the other hand, higher y-o-y growth is forecast for China due to its good production performance in 1Q19 and higher spending by Chinese oil companies compared with a year earlier, leading to an upward revision to growth by 62 tb/d, (**Graph 5 - 1**).

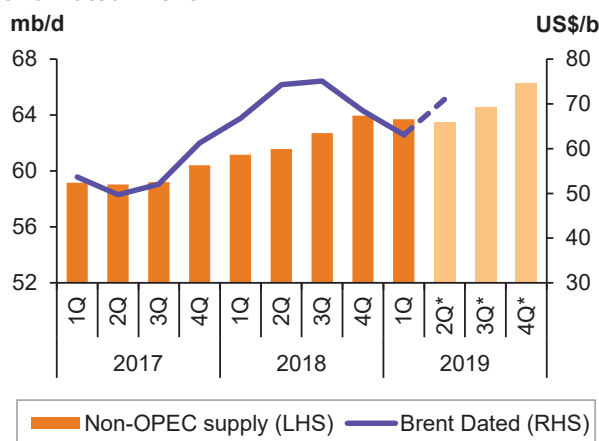
**Graph 5 - 1: Monthly oil market report
Jun 19/May 19 revisions in 2019* annual supply changes**



Note: * 2019 = Forecast.
Source: OPEC Secretariat.

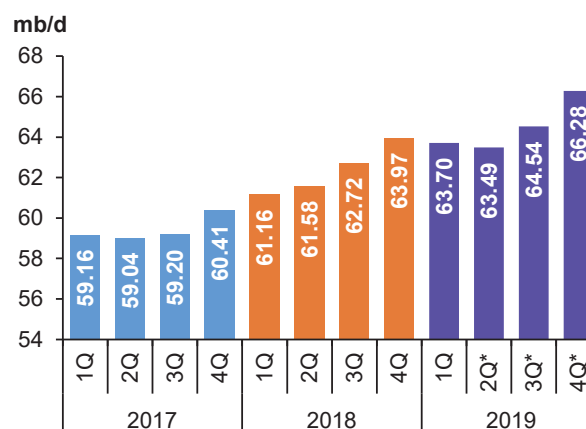
According to the non-OPEC supply forecast for 2H19, oil production is forecast around 1.8 mb/d higher than in 1H19, following the return from maintenance in some countries, the opening of new pipelines in the Permian Basin, production ramp ups of new projects in Brazil and the possible start-up of the giant Johan Sverdrup field in Norway.

Graph 5 - 2: Non-OPEC quarterly liquids supply and Dated Brent



Note: * 2Q19-4Q19 = Forecast.
Source: OPEC Secretariat.

Graph 5 - 3: Non-OPEC quarterly oil supply



Note: * 2Q19-4Q19 = Forecast.
Source: OPEC Secretariat.

Non-OPEC oil supply in 2018 and 2019

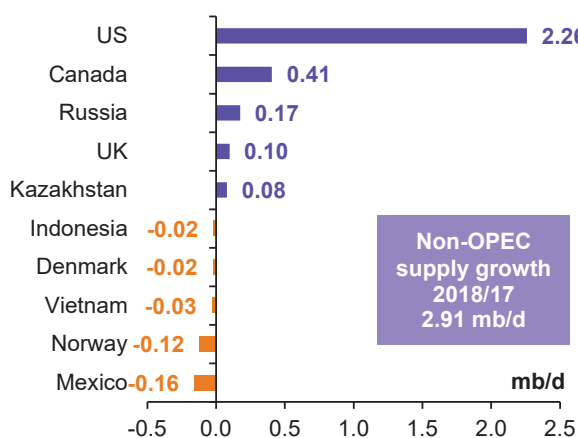
Table 5 - 2: Non-OPEC oil supply in 2018, mb/d

	2017	1Q18	2Q18	3Q18	4Q18	2018	Change 2018/17	
							Growth	%
Americas	21.48	22.89	23.35	24.53	25.15	23.99	2.51	11.69
of which US	14.40	15.53	16.22	17.17	17.70	16.66	2.26	15.69
Europe	3.82	3.94	3.79	3.70	3.89	3.83	0.01	0.16
Asia Pacific	0.39	0.40	0.38	0.42	0.44	0.41	0.02	4.49
Total OECD	25.69	27.24	27.52	28.66	29.47	28.23	2.54	9.87
Other Asia	3.62	3.62	3.57	3.51	3.51	3.55	-0.07	-1.97
Latin America	5.15	5.17	5.22	5.12	5.26	5.19	0.04	0.82
Middle East	3.13	3.16	3.21	3.22	3.24	3.21	0.07	2.29
Africa	1.48	1.50	1.52	1.55	1.49	1.51	0.03	2.26
Total DCs	13.39	13.45	13.52	13.40	13.50	13.47	0.08	0.57
FSU	14.05	14.10	14.14	14.33	14.57	14.29	0.24	1.67
of which Russia	11.17	11.14	11.18	11.44	11.61	11.35	0.17	1.56
Other Europe	0.13	0.12	0.12	0.12	0.12	0.12	-0.01	-4.58
China	3.98	4.01	4.03	3.97	4.05	4.02	0.04	0.92
Total "Other regions"	18.16	18.23	18.29	18.42	18.74	18.42	0.27	1.46
Total non-OPEC production	57.24	58.92	59.33	60.47	61.72	60.12	2.88	5.03
Processing gains	2.21	2.25	2.25	2.25	2.25	2.25	0.04	1.67
Total non-OPEC supply	59.45	61.16	61.58	62.72	63.97	62.37	2.91	4.90
Previous estimate	59.47	61.20	61.59	62.71	63.97	62.37	2.91	4.89
Revision	-0.01	-0.03	-0.01	0.01	0.00	-0.01	0.01	0.01

Note: Totals may not add up due to independent rounding.

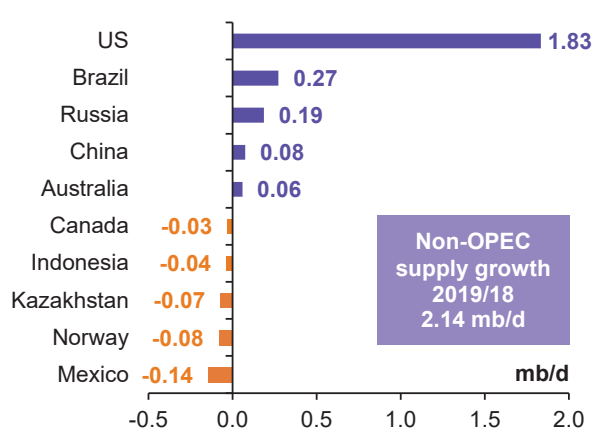
Source: OPEC Secretariat.

Graph 5 - 4: Annual supply changes for selected countries in 2018



Source: OPEC Secretariat.

Graph 5 - 5: Annual supply changes for selected countries in 2019*



Note: * 2019 = Forecast.

Source: OPEC Secretariat.

Table 5 - 3: Non-OPEC oil supply in 2019*, mb/d

	2018	1Q19	2Q19	3Q19	4Q19	2019	Change 2019/18 Growth	%
Americas	23.99	24.95	24.96	25.91	26.76	25.65	1.66	6.93
of which US	16.66	17.77	18.11	18.64	19.45	18.50	1.83	11.01
Europe	3.83	3.82	3.66	3.71	3.96	3.79	-0.04	-1.12
Asia Pacific	0.41	0.43	0.46	0.48	0.51	0.47	0.06	14.51
Total OECD	28.23	29.20	29.08	30.09	31.23	29.91	1.68	5.95
Other Asia	3.55	3.53	3.44	3.46	3.46	3.47	-0.08	-2.28
Latin America	5.19	5.18	5.44	5.54	5.67	5.46	0.26	5.09
Middle East	3.21	3.21	3.24	3.22	3.22	3.22	0.02	0.53
Africa	1.51	1.54	1.56	1.59	1.62	1.58	0.07	4.31
Total DCs	13.47	13.45	13.68	13.81	13.98	13.73	0.27	1.97
FSU	14.29	14.55	14.21	14.19	14.58	14.38	0.10	0.67
of which Russia	11.35	11.53	11.38	11.61	11.61	11.53	0.19	1.65
Other Europe	0.12	0.12	0.12	0.12	0.12	0.12	0.00	-1.08
China	4.02	4.10	4.12	4.05	4.10	4.09	0.08	1.88
Total "Other regions"	18.42	18.77	18.45	18.36	18.80	18.59	0.17	0.92
Total non-OPEC production	60.12	61.43	61.21	62.26	64.00	62.23	2.11	3.52
Processing gains	2.25	2.28	2.28	2.28	2.28	2.28	0.03	1.25
Total non-OPEC supply	62.37	63.70	63.49	64.54	66.28	64.51	2.14	3.43
Previous estimate	62.37	63.81	63.43	64.55	66.25	64.52	2.14	3.43
Revision	-0.01	-0.10	0.06	-0.01	0.03	-0.01	0.00	0.00

Note: * 2019 = Forecast.

Source: OPEC Secretariat.

OECD

Following robust growth of 2.54 mb/d in 2018, **OECD oil supply in 2019** is forecast to grow by 1.68 mb/d to average 29.91 mb/d, representing a downward revision of 38 tb/d compared with last month's assessment.

While OECD Americas and OECD Asia Pacific are projected to grow by 1.66 mb/d (revised down by 0.02 mb/d) and 0.06 mb/d to average 25.65 mb/d and 0.47 mb/d, respectively, oil production in OECD Europe is anticipated to decline by 0.04 mb/d (revised down by 0.02 mb/d) to average 3.79 mb/d.

OECD Americas

US

US crude oil output (including lease condensate) in March 2019 was up m-o-m by 241 tb/d to average 11.91 mb/d. Y-o-y, output was higher by 1.45 mb/d. While crude oil output increased in the Gulf Coast (PADD 3) and Midwest (PADD 2), mainly in North Dakota and Oklahoma, oil production in the other three PADDs declined.

The m-o-m increase in March came mainly from the Gulf of Mexico, where output recovered by 191 tb/d to average 1.91 mb/d, the same level as seen in January 2019. The monthly increase was primarily due to the Thunder Horse platform returning from maintenance. Total output on the Gulf Coast (PADD3) indicates growth of 207 tb/d to average 7.85 mb/d in March. New Mexico's crude oil output grew by 23 tb/d m-o-m to average 0.87 mb/d, mainly from Eagle Ford shale. Meanwhile oil production in Texas declined by a minor 6 tb/d m-o-m to average 4.87 mb/d, due to lower conventional crude production, but not from Permian tight oil output in Delaware and Midland. The US oil projects in the Permian Basin are beginning to show delays as producers are reportedly curbing spending and are not able to increase production due to limited pipeline

capacity. The implementation of nine pipeline projects in the Texas area is expected to gradually add new take-away capacity in the amount of 5.4 mb/d through the first half of 2021.

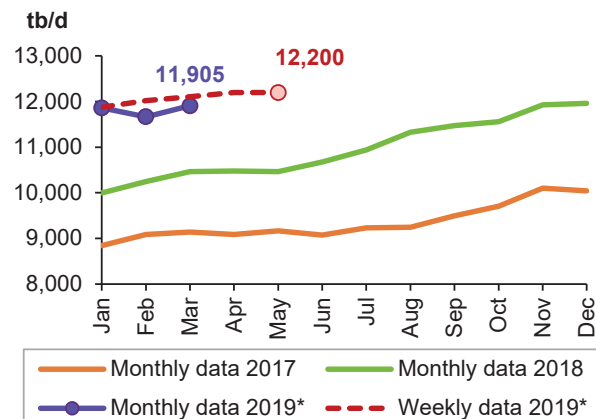
In March 2019, oil production in North Dakota showed a significant output recovery by 42 tb/d m-o-m to average 1.35 mb/d, mainly from the Bakken shale in the Williston Basin. The recovery was driven by a combination of the post-winter resolution of shut-ins, along with strong growth in fracking. Oil production in the states of Colorado, Oklahoma and Alaska also declined in March.

Table 5 - 4: US crude oil production by state, tb/d

State	Feb 19	Mar 19	Change Mar 19/Feb 19
Colorado	486	469	-17
Alaska	488	481	-7
Oklahoma	570	586	16
New Mexico	847	870	23
North Dakota	1,310	1,352	42
Federal Offshore -			
Gulf of Mexico (GoM)	1,716	1,907	191
Texas	4,879	4,873	-6
Total US crude oil production	11,664	11,905	241

Sources: US EIA and OPEC Secretariat.

Graph 5 - 6: US monthly crude oil production in 2017-2019 vs. weekly forecast in 2019

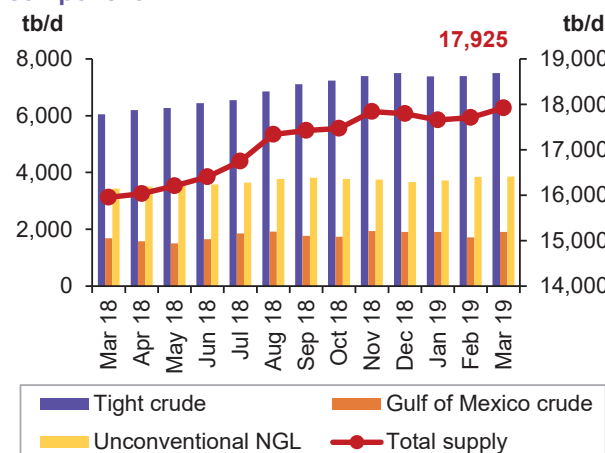


Note: * 2019 = Forecast.

Sources: US EIA and OPEC Secretariat.

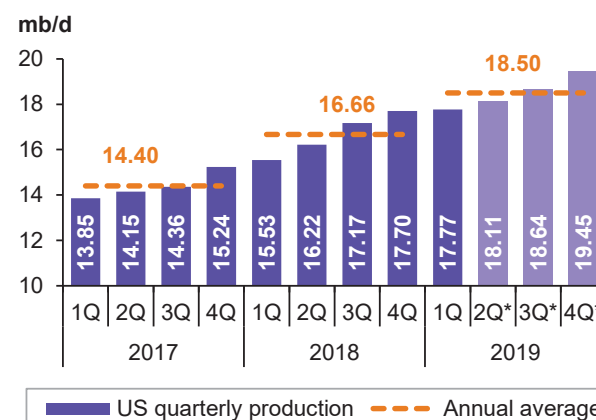
US crude oil production in 2019 is likely to grow by 1.37 mb/d y-o-y to average 12.33 mb/d. The highest incremental production is expected in the Gulf Coast, albeit at a slower pace compared with a year ago due to pipeline constraints in the Permian Basin. The share of tight crude out of the forecast growth of 1.37 mb/d in 2019 is projected at 1.30 mb/d, to average 7.90 mb/d, and for the Gulf of Mexico it is 0.15 mb/d, to average 1.89 mb/d, while conventional crude (non-shale) is projected to decline by 0.09 mb/d, to average 2.54 mb/d.

Graph 5 - 7: US monthly liquids supply by key component



Source: US EIA and OPEC Secretariat.

Graph 5 - 8: US total liquids supply quarterly

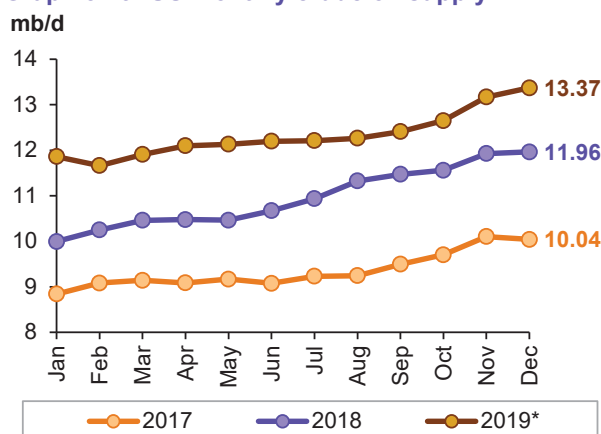


Note: * 2Q19-4Q19 = Forecast.

Sources: US EIA and OPEC Secretariat.

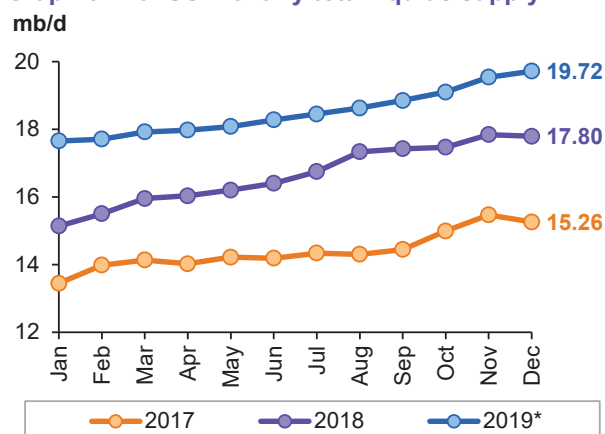
US liquids output in March (excluding processing gains) showed an increase of 0.22 mb/d m-o-m to average 17.93 mb/d, up by 1.97 mb/d y-o-y, including the aforementioned m-o-m growth in crude oil production by 241 tb/d. Production of NGLs in March was up by 22 tb/d m-o-m to average 4.73 mb/d, higher by 0.55 mb/d y-o-y. Preliminary data shows that the output of other liquids, mainly ethanol, declined in March by 47 tb/d m-o-m and was lower by 30 tb/d compared with a year ago.

Graph 5 - 9: US monthly crude oil supply



Note: * 2019 = Forecast.
Source: OPEC Secretariat.

Graph 5 - 10: US monthly total liquids supply



Note: * 2019 = Forecast.
Source: OPEC Secretariat.

US liquids supply in 2019 is forecast to average 18.50 mb/d, representing y-o-y growth of 1.83 mb/d, revised down by 0.02 mb/d due to lower-than-expected crude output in 1Q19 compared with the previous month's assessment. Following a disappointing 4Q18 when prices collapsed, many E&P companies who are active particularly in the US shale industry decided to lower their capex in 2019 compared with a year earlier in order to show capital discipline alongside healthy production growth.

Drilling activity shows that the total US rig count declined by 108 rigs, or 10%, mainly oil rigs, from the end of December 2018 to 975 rigs in the first week of June 2019. Completed wells have decreased by 231 wells in 1Q19 vs 4Q18 to average 2,234 wells in five key shale play regions. However, strong permitting activity in early 2019 supports the expectation of substantial growth in 2H19. While producers such as EP Energy and PDC Energy, among others, have deliberately delayed completions at the beginning of 2019 as they await an improved price environment to realize higher margins, others have allocated a larger share of capital to 1H19, which is already supported by a substantial recovery in fracking during 2Q19. With regard to NGL production, output in 1Q19 grew by 117 tb/d q-o-q to average 4.66 mb/d, and was higher by 653 tb/d y-o-y. US NGL production is forecast to grow by 0.44 mb/d to average 4.79 mb/d in 2019, of which 0.43 mb/d is likely to come from unconventional sources, mainly shale gas.

Table 5 - 5: US liquids production breakdown, mb/d

	2016	2017	Change 2017/16	2018	Change 2018/17	2019*	Change 2019/18
Tight crude	4.41	4.94	0.53	6.60	1.66	7.90	1.30
Gulf of Mexico crude	1.60	1.68	0.08	1.74	0.06	1.89	0.15
Conventional crude oil	2.82	2.74	-0.09	2.63	-0.11	2.54	-0.09
Unconventional NGLs	2.76	3.02	0.27	3.58	0.56	4.01	0.43
Conventional NGLs	0.75	0.76	0.01	0.77	0.01	0.78	0.01
Biofuels + Other liquids	1.27	1.27	0.00	1.35	0.08	1.38	0.03
US total supply	13.61	14.40	0.80	16.66	2.26	18.50	1.83

Note: * 2019 = Forecast.

Sources: US EIA, Rystad Energy and OPEC Secretariat.

US tight crude output in March 2019 is estimated to have increased by 86 tb/d m-o-m to average 7.48 mb/d, an increase of 1.43 mb/d y-o-y, according to preliminary shale and tight oil production estimates. The main m-o-m growth in US tight crude output from shale and tight formations through horizontal wells came from the Bakken shale in North Dakota. Tight crude output from the Bakken shale grew by 44 tb/d to average 1.36 mb/d. More than 203 thousand feet of laterals were drilled through 130 new wells, while only 91 wells were completed. In the Permian Basin, production from both the Midland and Delaware tight grew by a total of 37 tb/d m-o-m to average 3.44 mb/d. In the Permian, 408 out of 470 spudded wells were completed by drilling around 490,000 feet of lateral wells and 2,433 frac stages. Tight crude production in the Niobrara shale play declined by 11 tb/d to average 0.53 mb/d, while output in the Eagle Ford play in New

Mexico rose by 23 tb/d to average 1.23 mb/d. Production in other US shale plays showed a contraction of 7 tb/d to average 0.91 mb/d. On average, US producers saw a slowdown in tight oil production growth in 1Q19, which grew by 0.6% relative to 4Q18.

Table 5 - 6: US tight oil production growth, mb/d

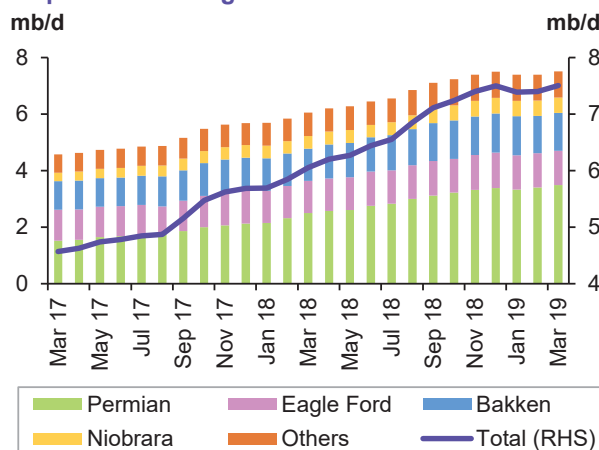
Shale play	2017		2018		2019*	
tb/d	Production	Y-o-y change	Production	Y-o-y change	Production	Y-o-y change
Permian tight	1.73	0.42	2.81	1.08	3.45	0.64
Bakken shale	1.06	0.04	1.25	0.20	1.48	0.23
Eagle Ford shale	1.09	-0.06	1.18	0.10	1.34	0.16
Niobrara shale	0.36	0.07	0.48	0.12	0.63	0.15
Other tight plays	0.70	0.06	0.86	0.17	1.00	0.14
Total	4.94	0.53	6.60	1.66	7.90	1.30

Note: * 2019 = Forecast.

Source: OPEC Secretariat.

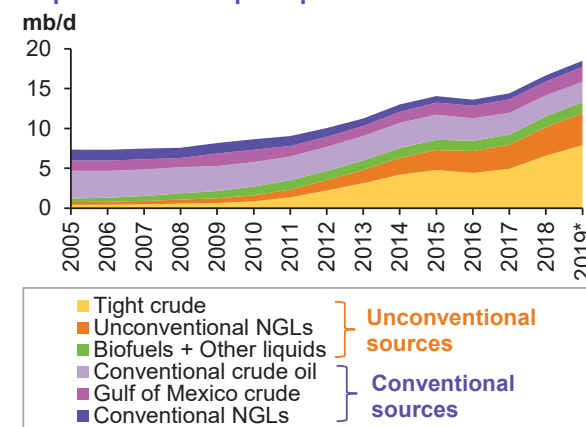
Y-o-y growth in US tight crude output for 2019 is forecast at a slower pace of 1.30 mb/d to average 7.90 mb/d, which is 0.36 mb/d less than estimated for 2018, due to fundamental constraints, mainly limited pipeline capacity to transfer oil from the Permian to the US Gulf Coast (USGC) as well as lower drilling and completion activity in other main shale plays.

Graph 5 - 11: US tight crude breakdown



Sources: US EIA and OPEC Secretariat.

Graph 5 - 12: US liquids production breakdown



Note: * 2019 = Forecast.

Sources: US EIA, Rystad Energy and OPEC Secretariat.

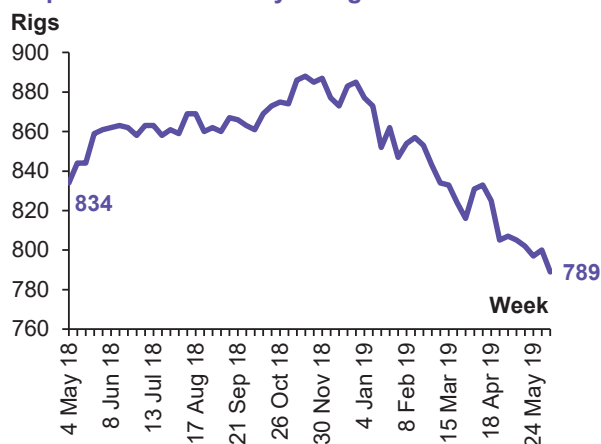
US rig, well and drilled but uncompleted wells (DUCs)

Overall, the **US rig count** decreased by 9 land rigs in the week ending 7 June 2019 to 975 rigs, according to the weekly report by Baker Hughes. US onshore active rigs have now reached 948 rigs.

The US oil rig count also decreased by 11 units w-o-w and dropped by 73 rigs y-o-y to 789 oil rigs. The oil rig count in the Permian Basin was down by 6 units to stand at 446 rigs, lower by 33 units y-o-y. Since October 2018, drilling and well completion in the Permian region due to pipeline constraints has changed. Lower well completion compared to the number of spudded wells has led to increasing **DUCs** in this prolific region to average 2,655 uncompleted wells in May 2019, which is likely to continue into 2H19 until new pipelines come online.

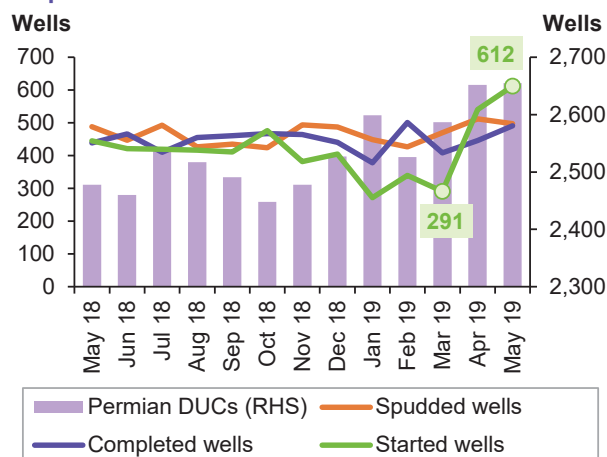
For the other basins, on a yearly basis, the DJ-Niobrara added 2 oil rigs to stand at 28 rigs, the Eagle Ford Basin showed a decline by 3 to 66 rigs, and the Williston Basin added only one rig, reaching 56 units.

Graph 5 - 13: US weekly oil rig count



Sources: Baker Hughes and OPEC Secretariat.

Graph 5 - 14: Permian well activities vs DUCs



Sources: Rystad Energy and OPEC Secretariat.

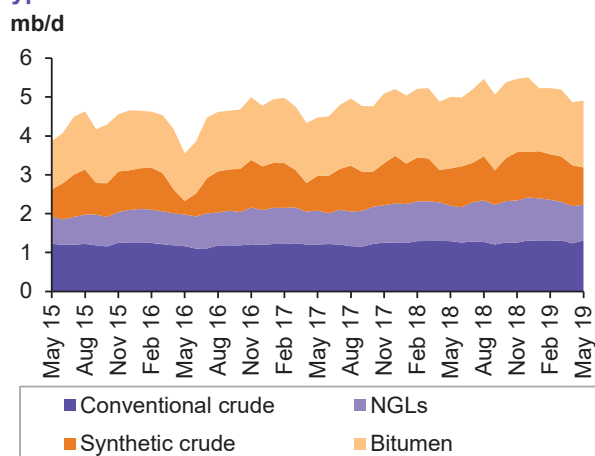
At the same time, a total of 2,952 **horizontal (oil and gas) wells** were spudded in 1Q19, representing a decline of 77 wells q-o-q, while in comparison, the number of total completed wells declined by 253 units to 2,612 wells in the same quarter. Wells starting to produce oil decreased by 733 units to 2,046 over the quarter. Hence, averaged crude oil production in 1Q19 showed a decline of 0.15 mb/d compared with December 2018.

The preliminary **total number of DUCs** in all US shale and tight formations increased by 61 wells m-o-m to average 5,961 wells in May 2019.

Canada

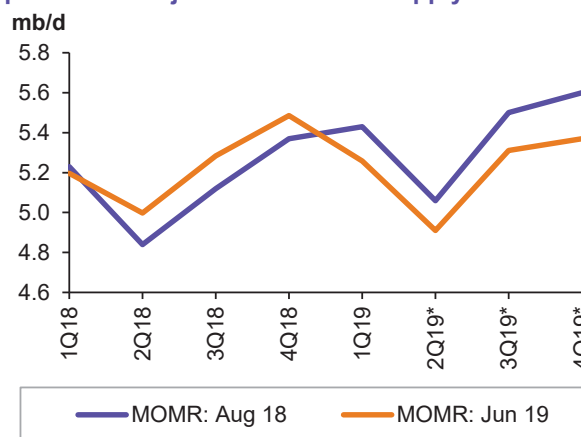
Canada's liquids supply in February 2019 remained unchanged m-o-m from the previous assessment to average 5.27 mb/d, according to official data, more or less in line with the Alberta government's mandate to adjust down production levels due to pipeline constraints in transferring Western Canadian crude.

Graph 5 - 15: Canada's production by product type



Source: OPEC Secretariat.

Graph 5 - 16: Impact of Alberta mandate for production adjustment on 2019 supply forecast



Note: * 2Q19-4Q19 = Forecast.
Source: OPEC Secretariat.

The main change in February came from raw bitumen, where output was up by 102 tb/d to average 1.70 mb/d, partially offset by a decline in synthetic crude oil (SCO) by 42 tb/d, m-o-m to average 1.17 mb/d. As a result, oil sands output in February increased by 60 tb/d m-o-m after the mandated production cuts were eased in Alberta by 75 tb/d for February and March, and will be reduced by another 25 tb/d each month in April, May and June.

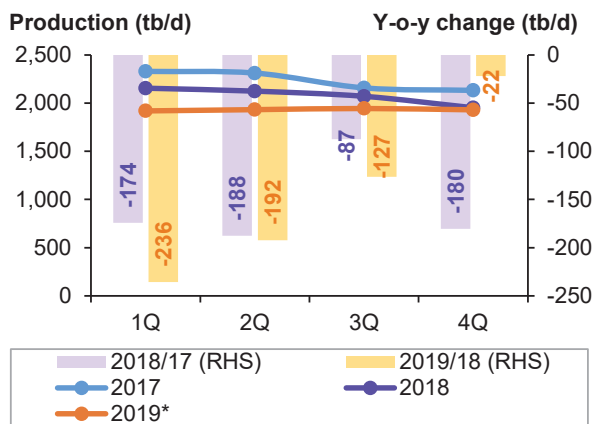
Total oil sands output in February dropped by 216 tb/d vs December 2018, while this decline was 256 tb/d in January. Conventional crude oil was almost steady at 1.30 mb/d, while NGL output in February declined by 35 tb/d m-o-m to average 1.06 mb/d. More outages in 2Q19 due to heavy maintenance and the turnaround of different projects indicate that production is expected to continue to decline, mainly in Alberta. Maintenance in April and May at several mines including Kearl, Jackfish and Fort Hills, along with maintenance at several synthetic upgraders, including Scotford and Syncrude, will impact production in 2Q19.

A recent announcement of a delay in permission for Enbridge's 370 tb/d Line 3 replacement project and further delays for the 830 tb/d Keystone XL pipeline have resulted in oil sands producers pulling back on the completion of new projects. Therefore, several new projects have been delayed but remain flexible on start-up, such as Cenovus's Christina Lake Phase G. However, some projects such as Kirby North, Primrose and Dee Valley projects are expected to start up in 2Q19, 3Q19 and 4Q19, respectively. Following robust growth of 0.41 mb/d y-o-y in 2018 to average 5.24 mb/d, Canada's liquids supply in 2019 is now forecast to see a contraction of 0.03 mb/d y-o-y to average 5.21 mb/d due to the production limitation mandate.

Mexico

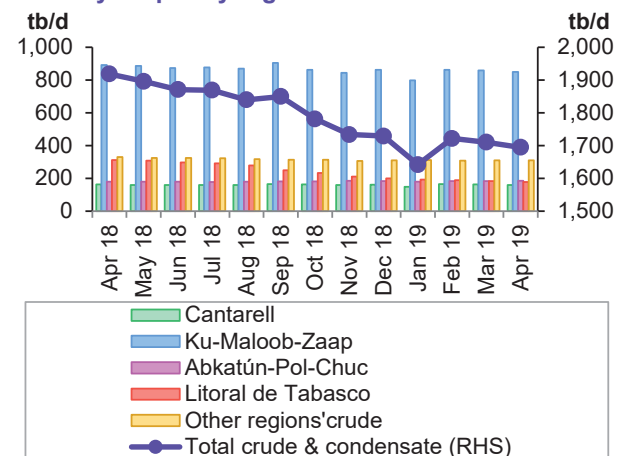
Mexico's average liquids output in April 2019 decreased by 0.02 mb/d m-o-m to average 1.92 mb/d, down by a massive 0.23 mb/d y-o-y.

Graph 5 - 17: Mexico's quarterly liquids supply



Note: * 2019 = Forecast.
Source: OPEC Secretariat.

Graph 5 - 18: Mexico's crude and condensate monthly output by region



Sources: Pemex and OPEC Secretariat.

Crude oil output in April was down by 16 tb/d m-o-m to average 1.68 mb/d. Crude oil production by type shows that the largest y-o-y decline was seen by light crude, falling by 0.16 mb/d, or around 21%, y-o-y to average 0.62 mb/d. The annual decline rate in 2018 for Mexico's light crude is estimated at 17.7%, while heavy crude production in 2018, following the developments in the Ku-Maloob-Zaap complex oil fields, grew by 24 tb/d to average 1.07 mb/d. This growth in heavy oil came despite a 5% decline in 2017 and in 2016. For 2019, heavy crude is projected to see the same declines as light oil, as heavy oil declined by 0.03 mb/d in April m-o-m to average 1.06 mb/d.

NGL output in April inched down by a minor 3 tb/d m-o-m to average 0.24 mb/d. As a result, with preliminary indications of crude oil output declines of more than 200 tb/d y-t-d, liquids supply is forecast to decline by at least 0.14 mb/d to average 1.93 mb/d in 2019.

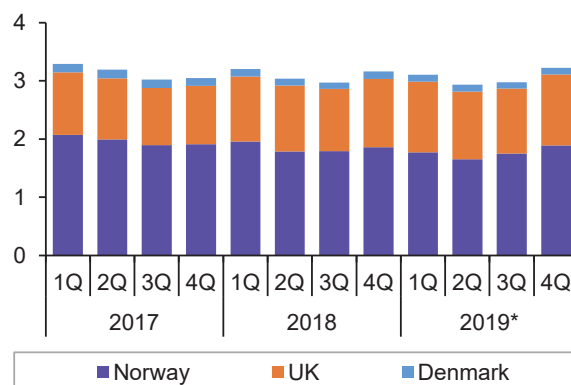
Oil production in Mexico is not projected to grow at least to the end of 2020 despite efforts by PEMEX to attract private investment in mature fields. Previously, PEMEX also revised down its 2019 crude oil production forecast by 0.05 mb/d m-o-m to average 1.72 mb/d by year-end.

OECD Europe

OECD Europe's preliminary oil supply in **April** declined by 0.07 mb/d m-o-m to average 3.73 mb/d, down by 0.22 mb/d y-o-y, mainly due to lower oil output in Norway.

According to preliminary reports from secondary sources North Sea production is returning to normal levels in May, with Equinor announcing that production of 110 tb/d of Oseberg in Norway came back on stream in the third week of May, along with a return of 140 tb/d of production from the Statfjord field after completion of maintenance. Ekofisk crude loading also resumed following planned work on the fields. North Sea production is expected to fall further in June due to maintenance at Ekofisk and Statfjord.

Graph 5 - 19: North Sea quarterly liquids supply
mb/d



Note: * 2019 = Forecast.
Source: OPEC Secretariat.

For **2019**, **OECD Europe's oil supply** is forecast to see a contraction of 0.04 mb/d to average 3.79 mb/d, following yearly growth of 0.01 mb/d in 2018. The projected increase of 0.05 mb/d for the UK is expected to be offset by production declines in other countries of the region, particularly Norway. North Sea oil production is anticipated to see a gradual ramp-up from 4Q19 onward, owing to the start-up of the giant Norwegian Johan Sverdrup field.

Norway

Norway's preliminary liquids production for **April 2019**, according to the NPD, showed average daily production of 1.73 mb/d of crude, NGLs and condensate, indicating a decrease of 24 tb/d m-o-m. This includes a m-o-m drop of 7 tb/d in crude oil production to average 1.38 mb/d and a decline of 17 tb/d of NGL output to average 0.35 mb/d. In 2018, crude oil production declined by 0.1 mb/d, or 6.5%, y-o-y, to average 1.49 mb/d. In the first four months of the year, crude oil output declined by around 151 tb/d, or 10%, y-o-y.

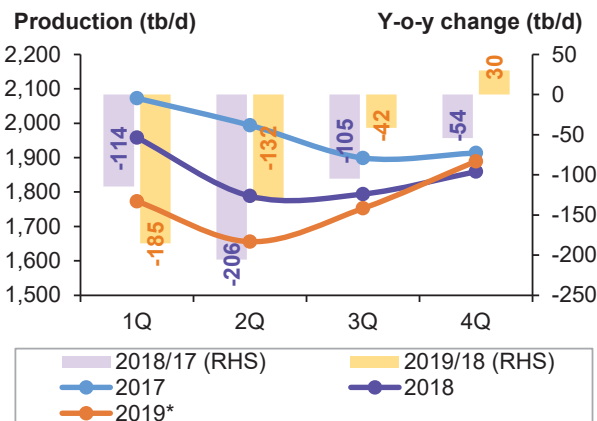
For **2019**, **total liquids output** is forecast to decline by 0.08 mb/d, to average 1.77 mb/d, revised down by 0.02 mb/d compared with the previous month's assessment. The annual decline rate for crude oil is expected to rise to around 10% in 2019. However, production is expected to increase and parts of the declines to be compensated by the Johan Sverdrup field, which will start-up in November 2019.

In general, Norwegian oil production has dropped in the last two years due to field declines and technical outages.

UK

UK crude oil output in April 2019 decreased by 40 tb/d to average 1.03 mb/d, and was lower by 36 tb/d y-o-y. NGL output was also down by 8 tb/d m-o-m to average 94 tb/d. Consequently, liquids output in April decreased by 0.04 mb/d to average 1.17 mb/d.

Graph 5 - 20: Norway's quarterly liquids supply

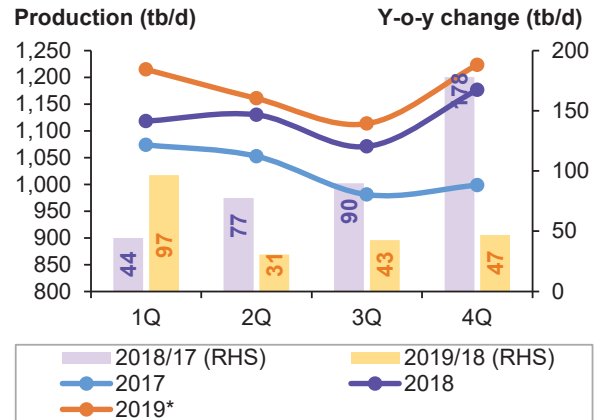


Note: * 2019 = Forecast.
Source: OPEC Secretariat.

Preliminary data for May considers the unplanned outages as operation was shut-down in Flotta on 16 May owing to unplanned maintenance. Following higher liquids supply in 1Q19 by 0.03 mb/d q-o-q to average 1.21 mb/d, the UK's disappointing output performance in April and May shows that 2Q19 is likely to decline to average 1.16 mb/d. With regard to 3Q19, the typical maintenance season, production is forecast to be affected by a reduction of 30 tb/d in the Buzzard stream in July.

Moreover, further work in fields such as Kraken, Scolty-Crathes and Heather-Broom will impact the rest of 3Q19. In 4Q19, a q-o-q recovery of production by 0.11 mb/d is anticipated, with production for the year forecast at 1.22 mb/d.

Graph 5 - 21: UK quarterly liquids supply



Note: * 2019 = Forecast.
Source: OPEC Secretariat.

For **2019**, the **UK's liquids supply growth** is forecast at a slower pace compared with a year ago at 0.05 mb/d, reaching 1.18 mb/d.

OECD Asia Pacific

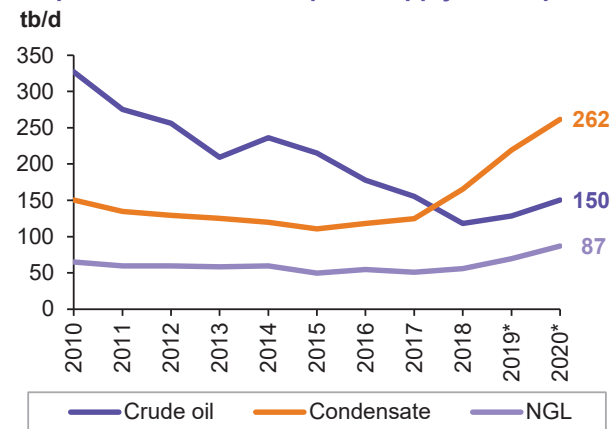
Following consecutive years of declines, **OECD Asia Pacific's oil supply** showed y-o-y growth of 0.02 mb/d in 2018, and liquids supply in 2019 is forecast to grow by 0.06 mb/d, to average 0.47 mb/d with Australia being the only driver for this growth.

Australia

Australia's oil supply in 2019 is forecast to be supported by new project startups in 2018, such as Great Gorgon, Ichthys, Kipper, Tuna Turum, North West Shelf Venture and Greater Western, Prelude, Wheatstone and other small fields. However, ramp-ups from some of these projects have been delayed and postponed to 2019. Therefore, through the development of gas/condensate fields, liquids production in Australia is expected to reach 0.40 mb/d in 2019, showing growth of 0.06 mb/d.

The Australian Department of the Environment and Energy released March production figures that included record-high condensate production of 215 tb/d. This marks the sixth month in twelve, where condensate production reached a new record high as new greenfield LNG projects start and ramp-up, producing both LNG and associated liquids.

Graph 5 - 22: Australia liquids supply development



Note: * 2019 and 2020 = Forecast.
Sources: Rystad Energy and OPEC Secretariat.

Preliminary production of crude and condensate for **April** in the country stood at 330 tb/d, a marginal increase of 58 tb/d y-o-y, of which 105 tb/d is attributed to crude production and the rest to condensates. **NGL** output in April recovered by 27 tb/d to average 0.06 mb/d, the same level as September 2018.

Developing Countries (DCs)

Total developing countries' (DCs) oil supply for 2019 is expected to grow by 0.27 mb/d to average 13.73 mb/d, revised down by 0.02 mb/d, mainly due to downward revisions in Latin America's supply forecast compared with the previous monthly assessment. This is subject to anticipated y-o-y growth of 0.26 mb/d in Latin America, owing to planned new project start-ups and ramp-ups at recently installed FPSOs in Brazil.

Moreover, oil production in Africa and the Middle East is forecast to grow by 0.07 mb/d and 0.02 mb/d y-o-y to average 1.58 mb/d and 3.22 mb/d, respectively. In Africa, growth will come mainly from Ghana and the Sudans, and in the Middle East, from Qatar. Oil production in the other Asia region will decline by 0.08 mb/d y-o-y as was seen in the last three years (2016-2018), to average 3.47 mb/d, mainly in Indonesia (-0.04 mb/d), Vietnam (-0.03 mb/d) and Thailand (-0.02 mb/d).

Table 5 - 7: Developing countries' liquids supply, mb/d

	1Q	2Q	3Q	4Q	Yearly	Change Y-o-y
2017	13.26	13.37	13.46	13.47	13.39	-0.14
2018	13.45	13.52	13.40	13.50	13.47	0.08
2019*	13.45	13.68	13.81	13.98	13.73	0.27

Note: * 2019 = Forecast.

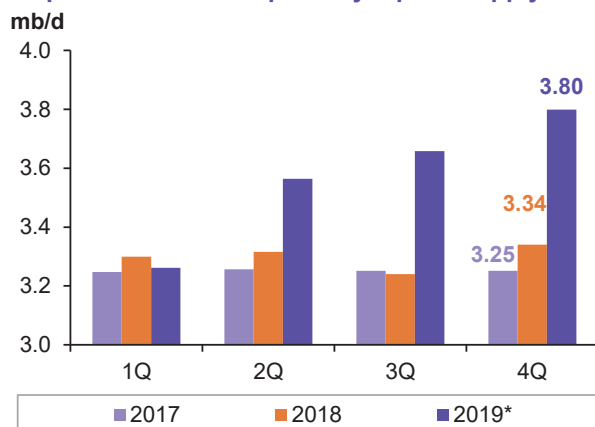
Source: OPEC Secretariat.

Latin America

Brazil

Brazil's crude oil output in April 2019 rose by 0.11 mb/d m-o-m to average 2.67 mb/d, up by 0.07 mb/d y-o-y, supported by the start-up of new production units mainly in the Lula and Búzios fields in the Santos Basin. Within eleven months, four FPSOs started up production in the Búzios field – the latest was started up on 19 March – according to Petrobras. The P-68 FPSO is also projected to start production from the Berbgao/Sururu oil field by the end of this year. Output of NGLs and biofuels was more or less stagnant in April at 95 tb/d and 609 tb/d, respectively. Petrobras announced planned heavy maintenance to start in 2019, but projected lower levels for March-June. Therefore, with reduced maintenance in 2Q19, following m-o-m growth of 0.11 mb/d in April, crude oil production is forecast to ramp up to 2.8 mb/d in May, a significant increase from 1Q19. Strong production growth is forecast for 2019 based on the six 150 tb/d capacity FPSOs that started in 2018 and which have continued to ramp up so far this year. Brazil's liquids production in April is estimated to increase by 0.11 mb/d m-o-m to average 3.37 mb/d and is expected to remain steady in May, according to preliminary data.

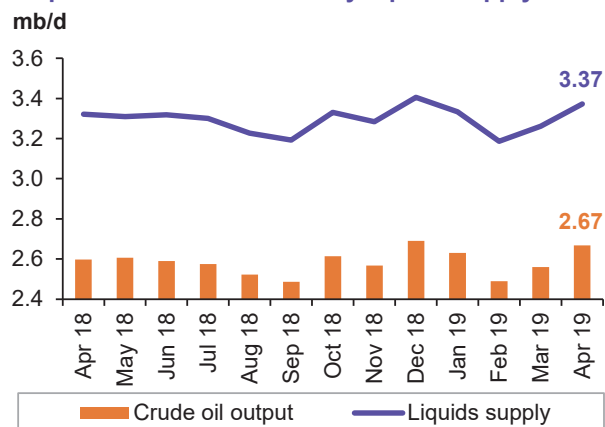
Graph 5 - 23: Brazil's quarterly liquids supply



Note: * 2019 = Forecast.

Source: OPEC Secretariat.

Graph 5 - 24: Brazil's monthly liquids supply



Source: OPEC Secretariat.

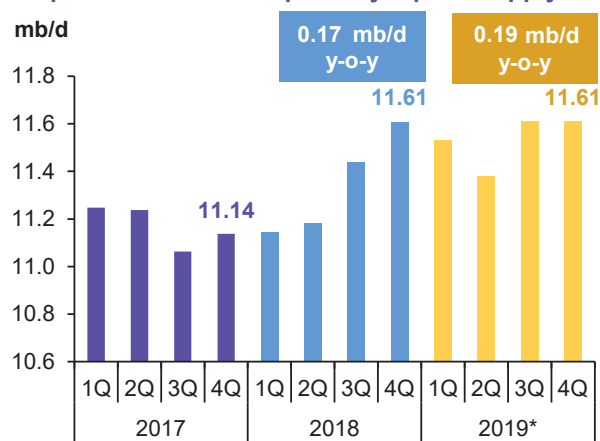
FSU

FSU oil supply is forecast to increase by 0.27 mb/d to average 13.73 mb/d in 2019. Oil supply in Russia, based on the current levels in 1H19, ongoing project ramp ups and assuming production at 11.61 mb/d in 2H19, is expected to increase by 0.19 mb/d y-o-y, while Kazakhstan and FSU others supply is likely to see a contraction of 0.07 mb/d and 0.02 mb/d, respectively, in 2019. At the same time, Azerbaijan's oil production is expected to remain stagnant at 0.8 mb/d for the current year.

Russia

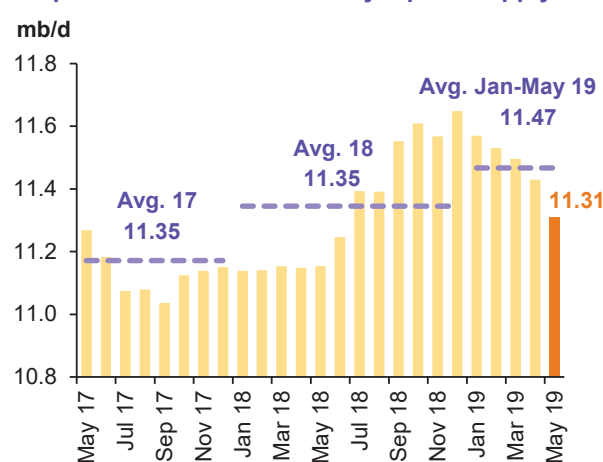
Preliminary data for Russian liquids supply in **May 2019** shows a drop of 0.12 mb/d m-o-m to average 11.31 mb/d, up by 0.16 mb/d y-o-y. Liquids output is forecast to grow by 0.19 mb/d in 2019 to average 11.53 mb/d.

Graph 5 - 25: Russia's quarterly liquids supply



Note: * 2019 = Forecast.
Source: OPEC Secretariat.

Graph 5 - 26: Russia's monthly liquids supply



Sources: Nefta Compass and OPEC Secretariat.

Oil supply in 2Q19 is projected to continue to decline by 0.15 mb/d to average 11.38 mb/d, revised down by 0.02 mb/d compared to the previous assessment. Monthly oil production was less than expected due to the Druzhba pipeline shut-in since early April.

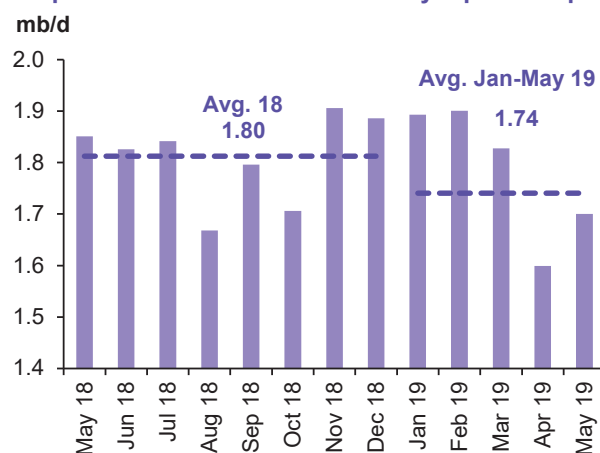
Caspian

Kazakhstan

Kazakhstan's liquids output in **April 2019** was down by 0.23 mb/d m-o-m to average 1.60 mb/d, in line with the production shut-in due to maintenance in the Kashagan field.

Crude oil production declined by 228 tb/d m-o-m to average 1.33 mb/d, following a drop of 74 tb/d in March compared with production in February. The field was shut down on 14 April and the initial plan envisaged the maintenance work continuing through 29 May, while production of light sweet crude at the giant Kashagan oil field in the Caspian Sea restarted on 19 May. The outage was completed within 35 days, instead of the planned 45 days.

Graph 5 - 27: Kazakhstan's monthly liquids output



Source: OPEC Secretariat.

Hence, Kazakhstan's energy ministry expects crude output at the giant Kashagan field in the Caspian Sea to reach 370 tb/d-400 tb/d in early June, with the project producing an additional 3 mb above the initial plan in 2019, due to an early restart after major maintenance work.

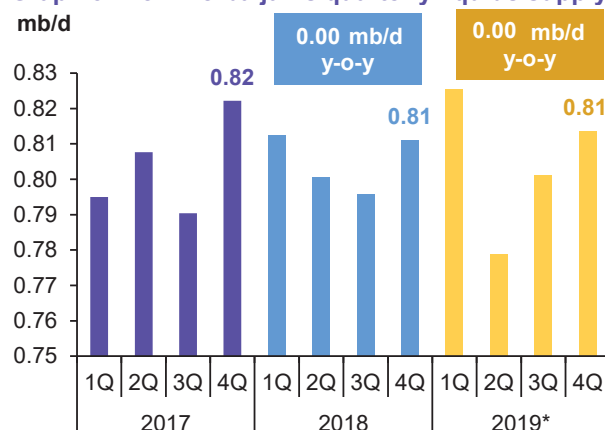
For this year, oil supply in Kazakhstan, in contrast to 2018, is expected to decline by 0.07 mb/d to average 1.74 mb/d, due to maintenance in the Kashagan and further planned maintenance in 2H19 in the Tengiz and Karachaganak fields.

Azerbaijan

Azerbaijan's liquids output in April was down by 0.11 mb/d m-o-m to average 0.71 mb/d. Crude oil production declined by 0.1 mb/d m-o-m to average 605 tb/d, down by 0.14 mb/d y-o-y. This crude production outage was caused by planned maintenance at the Central Azeri platform. Maintenance is also planned for another BP platform in Western Chirag in October.

For 2019, oil supply in Azerbaijan is expected to be stagnant at 0.80 mb/d, unchanged from the last month's assessment.

Graph 5 - 28: Azerbaijan's quarterly liquids supply



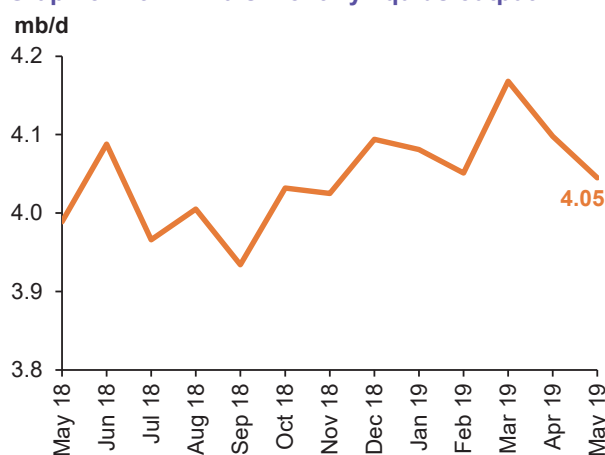
Note: * 2019 = Forecast.
Source: OPEC Secretariat.

China

China's liquids production in April 2019 decreased by 0.07 mb/d m-o-m to average 4.10 mb/d, according to official data, but was up by 0.07 mb/d y-o-y. Crude oil output in April declined by 72 tb/d to average 3.82 mb/d, which was 23 tb/d higher than a year earlier in the same month.

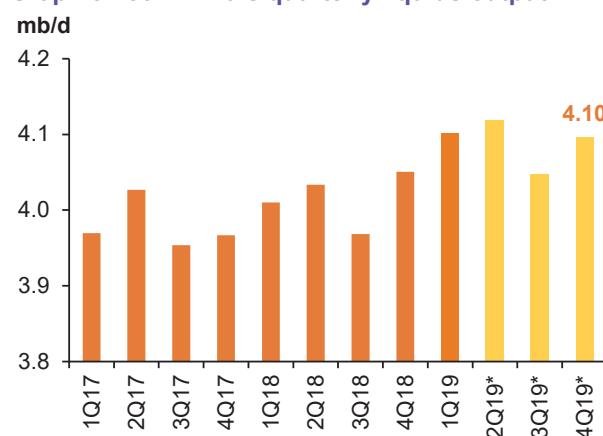
Crude oil production in 2019 is expected to grow by 0.08 mb/d to average 4.09 mb/d, revised up by 62 tb/d from the previous month's assessment, due to higher-than-expected oil production in 1Q19 at 4.1 mb/d, up by 0.05 mb/d, q-o-q. In addition, higher capex from the majors has led to a pickup in upstream activities.

Graph 5 - 29: China's monthly liquids output



Source: OPEC Secretariat.

Graph 5 - 30: China's quarterly liquids output



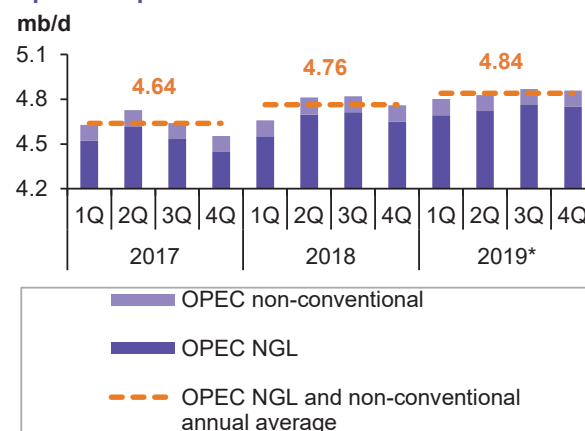
Note: * 2Q19-4Q19 = Forecast.
Source: OPEC Secretariat.

OPEC NGLs and non-conventional oils

OPEC NGLs and non-conventional liquids in 2019 are forecast to grow by 0.08 mb/d to average 4.84 mb/d, following growth of 0.13 mb/d in 2018.

Preliminary production data in May 2019 shows minor growth of 0.01 mb/d to average 4.83 mb/d compared with a month earlier and is down by 0.08 mb/d y-o-y.

Graph 5 - 31: OPEC NGL and non-conventional liquids output



Note: * 2019 = Forecast.

Sources: OPEC Secretariat.

Table 5 - 8: OPEC NGL + non-conventional oils, mb/d

	<u>2017</u>	<u>2018</u>	<i>Change</i> <u>18/17</u>	<u>1Q19</u>	<u>2Q19</u>	<u>3Q19</u>	<u>4Q19</u>	<u>2019</u>	<i>Change</i> <u>19/18</u>
Total OPEC	4.64	4.76	0.13	4.80	4.83	4.87	4.86	4.84	0.08

Note: 2019 = Forecast.

Source: OPEC Secretariat.

OPEC crude oil production

According to secondary sources, total **OPEC-14 preliminary crude oil production** averaged 29.88 mb/d in May, lower by 236 tb/d m-o-m. Crude oil output decreased mostly in Iran, I.R., Nigeria, Saudi Arabia and Venezuela, while production increased in Iraq, Angola and Gabon.

Table 5 - 9: OPEC crude oil production based on secondary sources, tb/d

	<u>2017</u>	<u>2018</u>	<u>3Q18</u>	<u>4Q18</u>	<u>1Q19</u>	<u>Mar 19</u>	<u>Apr 19</u>	<u>May 19</u>	<u>May/Apr</u>
Algeria	1,047	1,042	1,059	1,055	1,026	1,027	1,023	1,029	6
Angola	1,634	1,505	1,470	1,496	1,445	1,447	1,397	1,471	74
Congo	252	317	320	318	328	345	337	320	-17
Ecuador	530	519	527	517	526	530	530	529	-1
Equatorial Guinea	133	125	124	114	115	120	112	114	2
Gabon	200	186	184	185	205	213	188	211	23
Iran, I.R.	3,813	3,553	3,603	2,982	2,725	2,718	2,597	2,370	-227
Iraq	4,446	4,550	4,607	4,669	4,631	4,520	4,630	4,724	94
Kuwait	2,708	2,745	2,794	2,774	2,715	2,709	2,697	2,710	13
Libya	811	951	891	1,056	965	1,102	1,177	1,174	-3
Nigeria	1,658	1,719	1,704	1,740	1,734	1,736	1,825	1,733	-92
Saudi Arabia	9,954	10,311	10,422	10,749	10,019	9,785	9,766	9,690	-76
UAE	2,916	2,986	2,982	3,236	3,066	3,057	3,058	3,061	3
Venezuela	1,911	1,354	1,272	1,191	970	745	776	741	-35
Total OPEC	32,014	31,863	31,960	32,083	30,471	30,053	30,111	29,876	-236

Notes: Totals may not add up due to independent rounding.

Source: OPEC Secretariat.

Table 5 - 10: OPEC crude oil production based on direct communication, tb/d

	<u>2017</u>	<u>2018</u>	<u>3Q18</u>	<u>4Q18</u>	<u>1Q19</u>	<u>Mar 19</u>	<u>Apr 19</u>	<u>May 19</u>	<u>May/Apr</u>
Algeria	1,059	1,040	1,066	1,067	1,027	1,023	1,019	1,027	8
Angola	1,632	1,473	1,471	1,434	1,421	1,373	1,392	1,462	70
Congo	263	323	326	326	345	339	374	382	7
Ecuador	531	517	524	516	529	530	529	532	3
Equatorial Guinea	129	120	118	112	108	112	114	113	0
Gabon	210	193	190	206	213	214	213	..	..
Iran, I.R.	3,867	..	3,789	..	..	..	..	..	..
Iraq	4,469	4,410	4,460	4,460	4,540	4,500	4,500	4,595	95
Kuwait	2,704	2,737	2,784	2,755	2,712	2,713	2,690	2,709	19
Libya	..	..	..	..	..	..	..	..	..
Nigeria	1,536	1,602	1,641	1,631	1,689	1,732	1,713	1,754	41
Saudi Arabia	9,959	10,317	10,399	10,790	10,053	9,787	9,807	9,670	-136
UAE	2,967	3,008	2,998	3,285	3,055	3,045	3,050	3,055	5
Venezuela	2,035	1,510	1,449	1,470	1,289	960	1,037	1,050	13
Total OPEC	..	..	..	..	..	..	..	..	..

Notes: .. Not available.

Totals may not add up due to independent rounding.

Source: OPEC Secretariat.

Stock Movements

Preliminary data for April showed that total **OECD commercial oil stocks** rose m-o-m by 25.0 mb to stand at 2,874 mb. This was 54.4 mb higher than the same time one year ago and 7.6 mb above the latest five-year average. Within the components, crude stocks indicated a slight deficit of 0.2 mb, while product stocks were 7.9 mb above the latest five-year average. In terms of **days of forward cover**, OECD commercial stocks remained unchanged m-o-m in April to stand at 60.1 days, which was 1.1 days above the same period in 2018, but 1.4 days below the latest five-year average.

Preliminary data for May showed that **US total commercial oil stocks** rose by a massive 52.3 mb m-o-m to stand at 1,307.9 mb. This was 97.6 mb, above the same period a year ago, and 59.5 mb higher than the latest five-year average. Within the components, crude and product stocks rose m-o-m by 16.7 mb and 35.6 mb, respectively.

OECD

Preliminary data for April showed that **total OECD commercial oil stocks** rose by 25.0 mb m-o-m, reversing the stock draw of the previous month. At 2,874 mb, total OECD commercial oil stocks were 54.4 mb higher than the same time one year ago and 7.6 mb above the latest five-year average.

Within the components, crude and product stocks rose m-o-m by 2.7 mb and 22.3 mb, respectively. It should be noted that the overhang of total OECD commercial oil stocks has been reduced by around 293 mb since the 'Declaration of Cooperation' began at the end of December 2016.

In April, crude stocks indicated a slight deficit of 0.2 mb, while product stocks were 7.9 mb above the latest five-year average.

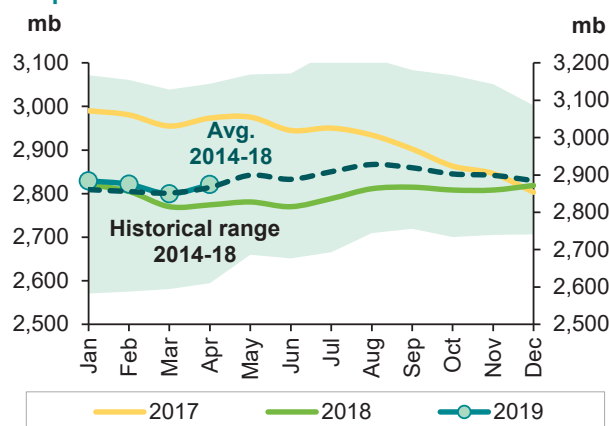
Within the regions, total commercial oil stocks in OECD Americas rose by 36.6 mb m-o-m, while OECD Europe and OECD Asia Pacific stocks fell by 8.5 mb and 3.2 mb, respectively.

Commercial crude stocks rose by 2.7 mb m-o-m in April, ending the month at 1,441 mb. This was 15.5 mb above the same time a year ago, but 0.2 mb lower than the latest five-year average. Compared with the previous month, OECD Americas registered a stock build, while OECD Europe and OECD Asia Pacific experienced stock draws.

OECD total product inventories rose by 22.3 mb m-o-m in April to stand at 1,434 mb. This was 38.9 mb above the same time a year ago and 7.9 mb above the seasonal norm. Within the OECD regions, OECD Americas stocks rose by 29.3 mb m-o-m, while product stocks in OECD Asia Pacific and OECD Europe fell by 0.3 mb and 6.4 mb, respectively.

In terms of **days of forward cover**, OECD commercial stocks remained unchanged in April m-o-m at 60.1 days, which was 1.1 days above the same period in 2018, but 1.4 days below the latest five-year average. Within the regions, OECD Americas was 0.8 days lower than the historical average to stand at 59.0 days. OECD Europe's stocks were 1.6 days below the latest five-year average to finish the month at 67.3 days. OECD Asia Pacific stocks were 2.9 days below the seasonal norm to stand at 50.1 days.

Graph 9 - 1: OECD commercial oil stocks



Sources: Argus Media, Euroilstock, IEA, METI, OPEC Secretariat and US EIA.

Table 9 - 1: OECD's commercial stocks, mb

	Feb 19	Mar 19	Apr 19	Change Apr 19/Mar 19	Apr 18
Crude oil	1,443	1,438	1,441	2.7	1,425
Products	1,432	1,411	1,434	22.3	1,395
Total	2,875	2,849	2,874	25.0	2,820
Days of forward cover	60.7	60.1	60.1	0.0	59.0

Note: Totals may not add up due to independent rounding.

Sources: Argus Media, Euroilstock, IEA, METI, OPEC Secretariat and US EIA.

OECD Americas

OECD Americas total commercial stocks rose by 36.6 mb m-o-m in April. This reversed the drop of the previous two months to settle at 1,533 mb, which was 71.1 mb above a year ago and 38.2 mb above the latest five-year average. Within the components, crude and products stocks rose m-o-m by 7.3 mb and 29.3 mb, respectively.

Commercial crude oil stocks in OECD Americas rose by 7.3 mb m-o-m in April to stand at 807 mb. This was 41.8 mb higher than the same time a year ago and 25.3 mb above the latest five-year average. This build came from higher US crude production and higher US crude imports.

Total product stocks in OECD Americas rose by 29.3 mb m-o-m in April to stand at 726 mb. This was 29.0 mb above the same time one year ago and 12.9 mb above the seasonal norm. Lower consumption, combined with higher refinery output in the region, were behind the product stock build.

OECD Europe

OECD Europe's total commercial stocks fell by 8.5 mb m-o-m in April, ending the month at 965 mb, which was 5.2 mb lower than the same time a year ago and 5.2 mb below the latest five-year average. Crude and product stocks fell m-o-m by 2.0 mb and 6.4 mb, respectively.

OECD Europe's **commercial crude stocks** fell by 2.0 mb m-o-m in April, ending the month at 420 mb. This was 17.3 mb below a year earlier, but 0.2 mb higher than the latest five-year average. The drop came on the back of higher refinery throughput in OECD Europe.

OECD Europe's **commercial product stocks** fell by 6.4 mb m-o-m to end April at 545 mb. This was 12.1 mb above the same time a year ago, but 5.4 mb below the seasonal norm. The drop can be attributed to higher refined product consumption in the region.

OECD Asia Pacific

OECD Asia Pacific's total commercial oil stocks fell by 3.2 mb m-o-m in April to stand at 377 mb. This was 11.5 mb lower than a year ago, and 25.3 mb below the latest five-year average. Within the components, crude and products stocks fell m-o-m by 2.5 mb and 0.6 mb, respectively.

OECD Asia Pacific's **crude inventories** fell by 2.5 mb m-o-m to end April at 215 mb. This was 9.0 mb below one year ago, and 25.7 mb down than the seasonal norm.

OECD Asia Pacific's **total product inventories** fell by 0.6 mb m-o-m to end April at 162 mb. This was 2.5 mb below the same time a year ago, but 0.4 mb above the seasonal norm.

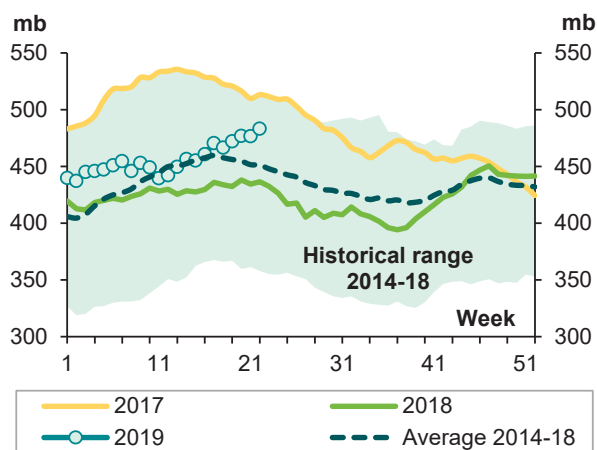
US

Preliminary data for May showed that **US total commercial oil stocks** rose m-o-m by a massive 52.3 mb to stand at 1,307.9 mb. This was 97.6 mb, or 8.1%, above the same period a year ago, and 59.5 mb, or 4.8%, higher than the latest five-year average. Within the components, crude and product stocks rose m-o-m by 16.7 mb and 35.6 mb, respectively.

US commercial crude stocks rose in May to stand at 483.3 mb. This was 50.0 mb, or 11.5%, above the same time last year and 28.0 mb, or 6.1%, above the latest five-year average. This build came from higher crude imports, combined with further increases in US output. However, higher crude oil refinery inputs have limited further builds. Inventories in Cushing, Oklahoma, also rose by nearly 5.0 mb to end May at 50.8 mb.

Total product stocks in May rose by 35.6 mb m-o-m to stand at 824.7 mb. This was 47.6 mb, or 6.1%, above the level seen at the same time in 2018, and 31.6 mb, or 4.0%, above the seasonal average. With the exception of jet fuel oil stocks, all other products witnessed stock builds.

Graph 9 - 2: US weekly commercial crude oil inventories

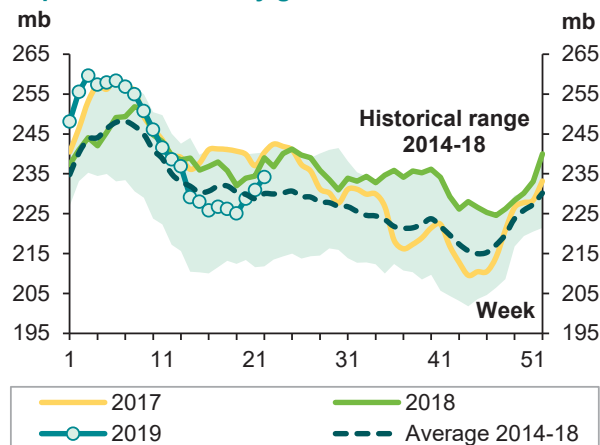


Sources: US EIA and OPEC Secretariat.

Gasoline stocks rose in May by 8.0 mb m-o-m, which reversed the draws of the last three months. At 234.1 mb, gasoline stocks were 8.0 mb, or 3.3%, lower than levels seen at the same time last year, and 0.4 mb, or 0.2%, lower than the seasonal norm. This monthly build came on the back of lower gasoline demand, which declined by around 130 tb/d to average 9.35 mb/d.

Distillate stocks also rose by 3.8 mb m-o-m in May to end the month at 129.4 mb. This was 14.2 mb, or 12.3%, above the same period a year ago, albeit 6.9 mb, or 5.1%, below the latest five-year average. The stock build could be attributed to higher distillate output, which increased by around 200 tb/d to average 5.3 mb/d. A slight increase in distillate demand limited further stock builds.

Graph 9 - 3: US weekly gasoline inventories



Sources: US EIA and OPEC Secretariat.

Residual fuel stocks rose by 0.8 mb m-o-m, at the end of May to 28.8 mb. This was 3.1 mb, or 9.8%, below the same time a year ago and 9.0 mb, or 23.8%, lower than the latest five-year average.

By contrast, **jet fuel oil stocks** were down by 1.0 mb m-o-m to stand at 38.7 mb in May. This was 2.7 mb, or 6.4%, lower than the same time a year ago, and 3.7 mb, or 8.6%, below the latest five-year average.

Table 9 - 2: US onland commercial petroleum stocks, mb

	Mar 19	Apr 19	May 19	Change May 19/Apr 19	May 18
Crude oil	459.3	466.6	483.3	16.7	433.3
Gasoline	236.1	226.1	234.1	8.0	242.2
Distillate fuel	132.4	125.6	129.4	3.8	115.2
Residual fuel oil	28.7	28.0	28.8	0.8	31.9
Jet fuel	41.6	39.7	38.7	-1.0	41.4
Total products	789.7	789.0	824.7	35.6	777.0
Total	1,249.0	1,255.6	1,307.9	52.3	1,210.3
SPR	649.1	647.7	644.8	-2.9	660.2

Sources: US EIA and OPEC Secretariat.

Japan

In **Japan**, **total commercial oil stocks** fell by 3.8 mb m-o-m in April to settle at 131.2 mb.. The level was 3.6 mb, or 2.7%, lower than one year ago, and 13.0 mb, or 9%, below the latest five-year average. Within the components, crude and product stocks fell m-o-m by 2.5 mb and 1.2 mb, respectively.

Japanese **commercial crude oil stocks** fell by 2.5 mb m-o-m in April to stand at 77.6 mb. This was 0.1 mb, or 0.1%, below the same period a year ago, and 8.1 mb, or 9.5%, below the seasonal norm. The drop was driven by lower crude imports, which fell by around 180 tb/d, or 5.5% m-o-m, to average 3.04 mb/d.

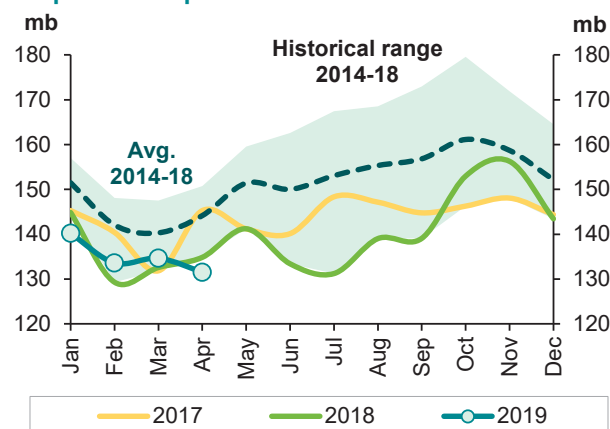
Japan's **total product inventories** fell m-o-m by 1.2 mb to end April at 53.6 mb. This was 3.6 mb, or 6.2%, lower than the same month last year and 4.8 mb, or 8.3%, below the seasonal norm. Within products, gasoline, distillate and residual fuel stocks witnessed stock draws, while naphtha saw a stock build.

Gasoline stocks fell by 0.6 mb m-o-m to stand at 9.8 mb in April. This was 1.0 mb, or 9.1%, lower than a year ago, and 1.7 mb, or 14.6%, lower than the latest five-year average. The fall was mainly driven by lower gasoline output, which decreased by 8.4% from the previous month. However, lower domestic sales, which fell by 0.5%, limited further draws.

Distillate stocks fell by 0.8 mb m-o-m to stand at 21.1 mb in April. This was 4.1 mb, or 16.4%, lower than the same time a year ago, and 3.2 mb, or 13.0%, lower than the seasonal average. Within the distillate components, jet fuel, kerosene and gasoil fell by 0.7%, 21.5% and 13.8% m-o-m, respectively. The drop in jet fuel stocks was driven by higher exports, while a decline in output was behind the fall in kerosene and gasoil stocks.

Total residual fuel oil stocks fell by 0.3 mb m-o-m in April to stand at 13.0 mb. This was 0.3 mb, or 2.5%, above the same period a year ago, and 0.6 mb, or 4.5%, lower than the latest five-year average. Within fuel oil components, fuel oil A and fuel B.C stocks fell m-o-m by 5.1% and 0.1%, respectively. The fall in both products was driven by lower output.

Graph 9 - 4: Japan's commercial oil stocks



Sources: Ministry of Economic, Trade and Industry of Japan and OPEC Secretariat.

Table 9 - 3: Japan's commercial oil stocks*, mb

	<u>Feb 19</u>	<u>Mar 19</u>	<u>Apr 19</u>	<u>Change</u> <u>Apr 19/Mar 19</u>	<u>Apr 18</u>
Crude oil	77.3	80.1	77.6	-2.5	77.7
Gasoline	10.2	10.4	9.8	-0.6	10.8
Naphtha	9.5	9.2	9.6	0.5	8.4
Middle distillates	23.2	21.9	21.1	-0.8	25.2
Residual fuel oil	13.4	13.3	13.0	-0.3	12.7
Total products	56.3	54.8	53.6	-1.2	57.1
Total**	133.6	134.9	131.2	-3.8	134.8

Note: * At the end of the month.

** Includes crude oil and main products only.

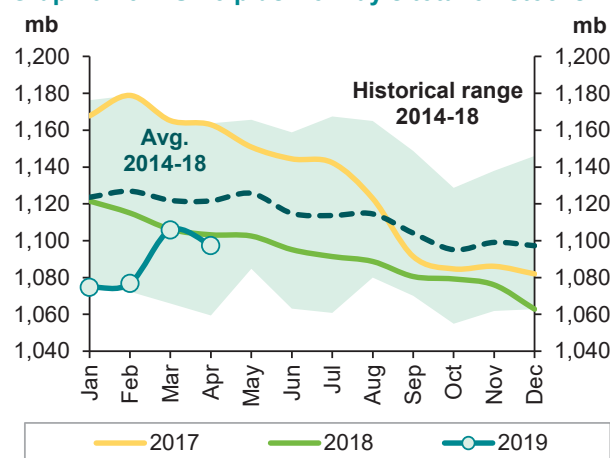
Sources: Ministry of Economy, Trade and Industry of Japan and OPEC Secretariat.

EU plus Norway

Preliminary data for April showed that **total European commercial oil stocks** fell by 8.5 mb m-o-m to stand at 1,097.3 mb. This was 5.9 mb, or 0.5%, below the same time a year ago, and 24.3 mb, or 2.2%, lower than the latest five-year average. Within the components, crude and product stocks fell m-o-m by 2.0 mb and 6.4 mb, respectively.

European **crude inventories** fell in April to stand at 480.3 mb. This was 12.8 mb, or 2.6%, lower than the same period a year ago, and 7.6 mb, or 1.6%, lower than the latest five-year average. The drop came on the back of higher refinery throughput in the EU-16 countries, which rose by around 350 tb/d, to stand at 10.5 mb/d.

Graph 9 - 5: EU-15 plus Norway's total oil stocks



Sources: Argus, Euroilstock and OPEC Secretariat.

European **total product stocks** fell by 6.4 mb m-o-m, ending April at 617.1 mb. This was 6.9 mb, or 1.1%, higher than the same time a year ago, but 16.7 mb, or 2.6%, lower than the latest five-year average. Within products, gasoline, distillates and naphtha witnessed stock draws, while residual fuel experienced a stock build.

Gasoline stocks fell by 3.7 mb m-o-m in April to stand at 120.3 mb. This was 1.6 mb, or 1.3 %, higher than the same time a year ago and 2.6 mb, or 2.2%, above the latest five-year average.

Distillate stocks fell by 2.9 mb m-o-m in April reversing the build of last three consecutive months to stand at 402.7 mb. This was 5.7 mb, or 1.4%, higher than the same time last year, albeit 15.1 mb, or 3.6%, below the latest five-year average.

Naphtha stocks dropped by 0.4 mb m-o-m to end April at 30.8 mb. This was 2.0 mb, or 7.1%, higher than last year's April level, and 4.9 mb, or 19%, higher than the latest five-year average.

In contrast, **residual fuel stocks** rose by 0.6 mb m-o-m to end April at 63.3 mb. This was 2.4 mb, or 3.6%, lower than the same time one year ago and 9.1 mb, or 12.6%, down on the seasonal norm.

Table 9 - 4: EU-15 plus Norway's total oil stocks, mb

	Feb 19	Mar 19	Apr 19	Change Apr 19/Mar 19	Apr 18
Crude oil	458.4	482.3	480.3	-2.0	493.0
Gasoline	125.4	123.9	120.3	-3.7	118.7
Naphtha	29.9	31.2	30.8	-0.4	28.8
Middle distillates	401.0	405.6	402.7	-2.9	397.0
Fuel oils	62.1	62.7	63.3	0.6	65.7
Total products	618.5	623.5	617.1	-6.4	610.2
Total	1,076.8	1,105.8	1,097.3	-8.5	1,103.2

Sources: Argus, Euroilstock and OPEC Secretariat.

Singapore and Amsterdam-Rotterdam-Antwerp (ARA)

Singapore

At the end of April, **total product stocks in Singapore** rose slightly by 0.2 mb m-o-m, reversing the drop witnessed in March. The April level stood at 47.8 mb, which was 9.4 mb, or 24%, above the same period a year ago. Within the products, light and middle distillates witnessed stock draws in April, while fuel oil stocks experienced a build.

Most of the declines came from **light distillate stocks**, which fell by 2.2 mb m-o-m to end April at 13.6 mb, which was 0.9 mb, or 7.1%, above the same period a year ago. This decline may have been driven by higher exports from the hub.

Middle distillates also fell in April by 0.6 mb to stand at 10.5 mb. This was 2.4 mb, or 29.6%, above the same time a year ago.

In contrast, **residual fuel oil** stocks rose by 3.0 mb to stand at 23.7 mb at the end of April, indicating a surplus of 6.1 mb, or 34.7%, compared with the same time a year ago.

ARA

Total product stocks in ARA fell slightly by 0.1 mb m-o-m in April, reversing the March build, to settle at 42.9 mb. This was 3.7 mb, or 9.4%, above the same time a year ago. Within products, the picture was mixed; gasoline and naphtha witnessed stock draws, while fuel oil, jet fuel and gasoil stocks experienced stock builds.

Both **gasoline and naphtha stocks** fell by 0.4 mb m-o-m each in April to stand at 8.5 mb and 2.0 mb, respectively. Gasoline remained 1.1 mb, or 11.5%, below last year's level, while naphtha stocks were 0.5 mb, or 20.0%, below the same time last year.

In contrast, both **gasoil and fuel oil stocks** in April rose by 0.2 mb m-o-m each, ending the month at 20.5 mb and 5.9 mb, respectively. Gasoil stocks stood at 4.9 mb, or 31.4%, above the same month last year, while fuel oil stocks stood at 1.1 mb, or 15.7 %, below the same time a year ago.

Jet fuel stocks rose by 0.3 mb m-o-m in April to stand at 6.0 mb, which was 1.5 mb, or 33%, above the same month last year.

Oil Market Report: 2020 vision

14 June 2019

World trade growth has fallen back to its slowest pace since the financial crisis ten years ago, and the consequences for oil demand are becoming apparent (Photograph: Shutterstock)

In this Report, we publish our first outlook for 2020. As we do so, volatility has returned to oil markets with a dramatic sell-off in late May seeing Brent prices fall from \$70/bbl to \$60/bbl. Until recently, the focus has been on the supply side with the familiar list of uncertainties – Iran, Venezuela, Libya, and the Vienna Agreement – lifting Brent prices above \$70/bbl in early April and keeping them there until late May. Not that supply concerns have gone away: yesterday oil prices initially increased by 4% on news of the attacks on two tankers in the Gulf of Oman, before easing back slightly.

Now, the main focus is on oil demand as economic sentiment weakens. In May, the OECD published an outlook for global GDP growth for 2019 of 3.2%, lower than our previous assumption. World trade growth has fallen back to its slowest pace since the financial crisis ten years ago, according to data from the Netherlands Bureau of Economic Policy Analysis and various purchasing managers' indices.

The consequences for oil demand are becoming apparent. In 1Q19, growth was only 0.3 mb/d versus a very strong 1Q18, the lowest for any quarter since 4Q11. The main weakness was in OECD countries where demand fell by a significant 0.6 mb/d, spread across all regions. There were various factors: a warm winter in Japan, a slowdown in the petrochemicals industry in Europe, and tepid gasoline and diesel demand in the United States, with the worsening trade outlook a common theme across all regions. In contrast, the non-OECD world saw demand rise by 0.9 mb/d, although recent data for China suggest that growth in April was a lacklustre 0.2 mb/d. In 2Q19, we see global demand growth 0.1 mb/d lower than in last month's Report. For now though, there is optimism that the latter part of this year and next year will see an improved economic picture. The OECD sees global GDP growth rebounding to 3.4% in 2020, assuming that trade disputes are resolved and confidence rebuilds. This suggests that global oil demand growth will have scope to recover from 1.2 mb/d in 2019 to 1.4 mb/d in 2020.

Meeting the expected demand growth is unlikely to be a problem. Plentiful supply will be available from non-OPEC countries. The US will contribute 90% of this year's 1.9 mb/d increase in supply and in 2020 non-OPEC growth will be significantly higher at 2.3 mb/d with US gains supported by important contributions from Brazil, Canada, and Norway.

Later this month, Vienna Agreement oil ministers, faced with short-term uncertainty over the strength of demand and relentless supply growth from their competitors, are due to discuss the fate of their output deal.

Ministers will note that OECD oil stocks remain at comfortable levels 16 mb above the five-year average. However, they will also note that although in 1Q19 weak demand helped create a surplus of 1.1 mb/d, in 2Q19 the market is in deficit by an estimated 0.4 mb/d, with the backwardated price structure reflecting tighter markets. This deficit is partly due to the fact that in May the Vienna Agreement countries cut output by 0.5 mb/d in excess of their committed 1.2 mb/d. In 3Q19, the market could receive further support from an expected pick-up in refining activity.

Recently, high levels of maintenance in the US and Europe, low runs in Japan and Korea, and fallout from the Druzhba pipeline contamination contributed to weak growth in global refining throughput. This could be about to change: according to our estimates, crude runs in August could be about 4 mb/d higher than in May. This might cause greater tightness in crude markets, particularly for sour barrels if the Vienna Agreement is extended and there is no change in the situations in Iran and Venezuela. Of course, much depends on the strength of oil demand later in the year.

A clear message from our first look at 2020 is that there is plenty of non-OPEC supply growth available to meet any likely level of demand, assuming no major geopolitical shock, and the OPEC countries are sitting on 3.2 mb/d of spare capacity. This is welcome news for consumers and the wider health of the currently vulnerable global economy, as it will limit significant upward pressure on oil prices. However, this must be viewed against the needs of producers particularly with regard to investment in the new capacity that will be needed in the medium term.

	4Q	3Q	2Q	1Q	4Q	3Q	2Q	1Q		
	2020	2020	2020	2020	2019	2019	2019	2019	2020	2019
	Demand									
Total Demand	102.7	102.9	101.6	99.8	101.2	101.4	100.0	98.7	101.7	100.3
Total OECD	48.8	49.1	48.1	47.6	48.3	48.5	47.4	47.3	48.4	47.9
Americas	26.3	26.6	26.1	25.3	25.9	26.2	25.6	25.1	26.1	25.7
Europe	14.4	14.9	14.5	14.0	14.3	14.8	14.4	13.9	14.4	14.4
Asia Oceania	8.1	7.6	7.5	8.3	8.0	7.5	7.4	8.2	7.9	7.8
Non-OECD countries	53.9	53.8	53.4	52.2	52.9	52.9	52.6	51.5	53.4	52.5
FSU	5.0	5.1	4.8	4.8	5.0	5.0	4.8	4.7	4.9	4.9
Europe	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
China	14.1	14.1	13.6	13.1	13.8	13.7	13.4	12.9	13.7	13.5
Other Asia	14.8	14.2	14.7	14.6	14.3	13.9	14.3	14.2	14.6	14.2
Americas	6.4	6.5	6.4	6.3	6.4	6.4	6.3	6.3	6.4	6.4
Middle East	8.3	8.9	8.6	8.2	8.3	8.9	8.6	8.2	8.5	8.5
Africa	4.4	4.3	4.4	4.5	4.4	4.2	4.4	4.4	4.4	4.4
	Supply									
Total Supply	n/a	n/a	n/a	n/a	n/a	n/a	0.0	99.8	n/a	n/a
Non-OPEC	67.4	67.2	66.5	66.1	65.7	65.0	64.0	63.6	66.8	64.6
Total OECD	30.6	30.1	29.5	29.6	29.0	28.3	27.7	27.7	29.9	28.2
Americas	26.1	25.9	25.5	25.4	25.1	24.5	24.1	23.8	25.7	24.4
Europe	3.9	3.7	3.5	3.7	3.4	3.3	3.2	3.5	3.7	3.4
Asia Oceania	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.5
Non-OECD	31.6	31.5	31.8	31.8	31.6	31.3	31.1	31.4	31.7	31.3
FSU	14.8	14.7	14.8	14.8	14.7	14.5	14.4	14.8	14.8	14.6
Europe	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
China	3.9	3.8	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
Other Asia	3.1	3.1	3.1	3.2	3.2	3.2	3.2	3.3	3.1	3.2
Americas	5.1	5.1	5.1	5.1	5.0	4.9	4.7	4.5	5.1	4.8
Middle East	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3
Africa	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Processing Gains	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.4	2.3
Total OPEC	n/a	n/a	n/a	n/a	n/a	n/a	0.0	36.2	n/a	n/a
Crude	n/a	n/a	n/a	0.0	0.0	0.0	0.0	30.6	n/a	0.0
Natural gas										
liquids NGLs	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
	Inventory Changes									
Total stock change	n/a	n/a	n/a	n/a	n/a	n/a	0.0	1.1	n/a	n/a
Total OECD	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.0	n/a	n/a
Industry	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.0	n/a	n/a
Government	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.0	n/a	n/a
Float storage/oil										
in transit	n/a	n/a	n/a	n/a	n/a	n/a	n/a	-0.3	n/a	n/a
Misc. to balance	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1.4	n/a	n/a
Call on OPEC crude										
and stock change *	29.7	30.1	29.4	28.1	29.9	30.8	30.5	29.5	29.3	30.2

	May	April	May
	2019	2019	MoM
Total OPEC11	25.58	25.58	0.00
Algeria	1.03	1.02	0.01
Angola	1.45	1.41	0.04
Ecuador	0.53	0.53	0.00
Congo	0.34	0.36	-0.02
Equatorial Guinea	0.10	0.11	-0.01
Gabon	0.20	0.20	0.00
Iraq	4.78	4.65	0.13
Kuwait	2.71	2.69	0.02
Nigeria	1.69	1.75	-0.06
Saudi Arabia	9.70	9.81	-0.11
UAE	3.05	3.05	0.00
Iran	2.40	2.61	-0.21
Libya	1.16	1.16	0.00
Venezuela	0.81	0.83	-0.02

IEA REPORT WRAP: OPEC Squeezed Even When Demand Recovers in 2020

2019-06-14 08:52:05.943 GMT

By Stephen Voss

(Bloomberg) -- Summary including stories from IEA's monthly Oil Market Report that was published at 10am Paris time Friday:

* Oil supply to swamp demand in 2020 and squeeze OPEC, IEA says

** World will need less from OPEC in 2020 even though demand growth will recover

** U.S. to dominate supply growth in 2020

** Demand growth y/y rates for 2019, 2020 seen at 1.2m b/d, 1.4m b/d

** IEA again revises down this year's 1Q, 2Q, FY global demand estimates

** Demand growth y/y rate for 1Q 2019 was a slim 100k b/d

* Click here for summary of key IEA supply/demand forecasts

** Report includes IEA's first estimates for 2020 demand

* OPEC group production fell 230k b/d m/m in May to 29.95m b/d

** See Table

* OPEC crude output fell in May to lowest level since 2014: IEA

** Saudi Arabia held output far below its supply target, reducing production to 9.7m b/d

** Biggest monthly b/d changes: Iran -210k, Saudi -110k, Iraq +130k

** OPEC-11 (excluding Iran, Libya, Venezuela) steady at 25.58m b/d

*** Which meant OPEC-11 compliance with agreed cuts was little changed at 133% in May: IEA

* Iran oil exports tumble in May after U.S. ends waivers

* U.S.-China trade war seen curbing oil demand growth by 2021

* Druzhba pipeline crisis bearish for oil market

* New petrochem projects to boost naphtha, LPG demand next year

* Gasoil demand to jump from 4Q, replacing HSFO on IMO rules

* India 2019 oil demand growth estimate cut for 2nd month

* Refining margins in NW Europe, U.S. Midwest rise on outages

* Refinery run growth to more than double in 2020

* Hydrogen is the fuel of the future. For real this time. (This is from a separate IEA report)

* IEA ready to act if necessary after tanker attacks, IEA's

Birol says

* Table: IEA world oil supply and demand forecasts by quarter

* NOTE: OPEC and its non-OPEC allies agreed in December to a combined supply cut of ~1.2m b/d that started in January, using for the most part an October baseline. OPEC's portion was ~800k b/d

* NOTE: Next formal OPEC conference slated for June 25 in Vienna, though might get postponed till early July

* NOTE: OPEC published its own monthly report on Thursday. U.S. EIA's monthly Short-Term Energy Outlook was published June 11, including U.S. crude production forecasts

--With assistance from Amanda Jordan, Grant Smith, Christopher Sell, Prejula Prem, Dhvani Pandya, Saket Sundria, Jack Wittels, Firat Kayakiran, Brian Wingfield, Sherry Su, Tsuyoshi Inajima, Kristian Siedenburger and Dan Murtaugh.

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Oil Supply to Swamp Demand in 2020 and Squeeze OPEC, IEA Says

2019-06-14 08:00:00.29 GMT

By Grant Smith

(Bloomberg) -- Global oil supplies will increase far more than demand next year with the start of a host of new projects, putting further pressure on the OPEC cartel, the International Energy Agency said.

Even though growth in world oil demand will accelerate to 1.4 million barrels a day in 2020, it will be eclipsed by a 2.3 million barrel-a-day surge in output, as the ongoing boom in U.S. shale is augmented by oil field start-ups in Brazil, Norway and Canada.

As a result, the world will need significantly less crude from the Organization of Petroleum Exporting Countries, the IEA predicted in its monthly report on Friday. Though Saudi Arabia

and its allies have been deliberately cutting supply this year, and political crises have crushed exports from Venezuela and Iran, OPEC is pumping much more oil than will be required in 2020.

"A clear message from our first look at 2020 is that there is plenty of non-OPEC supply growth available to meet any likely level of demand, assuming no major geopolitical shock," said the Paris-based IEA, which advises most of the world's major economies.

"This is welcome news for consumers and the wider health of the currently vulnerable global economy, as it will limit significant upward pressure on oil prices," the agency said. Oil in New York moved into a bear market last week and Brent sunk below \$60 a barrel in London for the first time since January on concern that a slowdown in the global economy -- exacerbated by the ongoing trade war between the U.S. and China -- will hurt fuel consumption around the world. OPEC will meet in the coming weeks to decide its response.

The IEA report showed that the fears about oil consumption are coming to fruition.

Global oil demand grew by just 300,000 barrels a day during the first quarter, the weakest since 2011, as developing nations only just offset a drop in developed economies. The agency lowered growth estimates for 2019 as a whole for a second consecutive month, by 100,000 barrels a day.

For the rest of this year and into 2020, however, the IEA expects that demand will pick up markedly, averaging 1.2% in 2019 as a whole and 1.4% next year. That rebound assumes some progress in the trade stand-off between the U.S. and China, it said.

Even with its optimistic outlook for the economy, the agency sees growth in oil demand being drowned by new supplies next year.

About half of the supply expansion will be provided by the U.S., which has been transformed by the fracking boom in Texas and North Dakota into the world's biggest crude producer. But unlike in previous years, U.S. growth is being supplemented by significant gains elsewhere, such as in Norway and Brazil.

That may make for painful reading for the Saudis and other OPEC nations, who together pump 40% of the world's oil.

The demand for their crude will slump for a third consecutive year, to 29.3 million barrels a day. That's about 650,000 barrels a day less than the 14 OPEC nations pumped last month, when their production was already significantly reduced as a result of a pact to restrain output, as well as by U.S. sanctions on Venezuela and Iran.

The organization and its allies are due to meet in the next few weeks to decide whether to keep going with their agreement to reduce output. Saudi Arabia, OPEC's biggest member, has

recommended persevering.

If OPEC reduces output next year to the levels the IEA considers necessary, production would be the lowest since 2003 - suggesting that its strategy to support oil markets has back-fired.

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OPEC Oil Output Fell in May to Lowest Level Since 2014, IEA Says
2019-06-14 08:00:00.22 GMT

By Amanda Jordan

(Bloomberg) -- OPEC crude output declined last month to the lowest level since 2014 as Iranian supply sank amid sanctions, Saudi production dropped and Nigerian flows were disrupted by pipeline outages, the International Energy Agency says in its monthly report.

* At 29.95m b/d, production was down 230k b/d vs April, and 1.5m b/d lower y/y

* Saudi output shrank by 110k b/d vs April to 9.7m b/d, lowest since 2015 and 610k b/d below its OPEC+ target

* Iranian production tumbled 210k b/d to 2.4m b/d, lowest since the late 1980s, after the U.S. ended waivers for eight of Iran's main customers

* Nigerian output fell 60k b/d to 1.69m b/d after pipeline disruptions hampered exports

* Iraq output rose 130k b/d to a record 4.78m b/d; that's 270k b/d above its OPEC+ quota

* Production in Venezuela slipped 20k b/d to 810k b/d amid power-supply problems and sanctions

* Supply in Libya held steady at 1.16m b/d; Angolan output rose 40k b/d to 1.45m b/d

* OPEC crude production has fallen 2.4m b/d since November, when Saudi Arabia, U.A.E. and Iraq were pumping at or near record highs

* During May, compliance from OPEC members participating in supply cuts held steady at 133%

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Amanda Jordan, John Deane

Iran Oil Exports Tumble in May After U.S. Ends Waivers: IEA
2019-06-14 08:00:00.21 GMT

By Christopher Sell

(Bloomberg) -- Iran's oil exports in May plunged by 480k

b/d from April to 810k b/d after the U.S. ended waivers for eight main customers, the IEA says in monthly report.

* China, Iran's biggest oil buyer, lifted just 70k b/d last month compared with 410k b/d in April

** China has so far this year "substantially increased liftings" of Saudi crude and raised purchases from Iraq, Russia and Brazil

* Iran was exporting 2.6m b/d on average in year to May 2018, when U.S. announced it would exit the nuclear agreement with the Islamic Republic

* Condensates accounted for about 240k b/d of exports

** Nation may also lower its condensate production after it fills up its onshore and floating storage

* Final destination of Iranian exports becoming more difficult to track after NIOC shut off satellite tracking systems on its ships

** Most barrels expected to end up in Asia and some probably moving into storage tanks

* Iran crude production fell 210k b/d in May to 2.4m b/d, the lowest since late 1980s

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Rakteem Katakey

U.S.-China Trade War Seen Curbing Oil Demand Growth by '21: IEA

2019-06-14 08:00:00.33 GMT

By Prejula Prem

(Bloomberg) -- Economic uncertainty arising from an escalation in trade war between U.S. and China could reduce global oil demand growth by 350k b/d by 2021, the International Energy Agency says in its monthly report.

* OECD economic baseline forecast based on tariffs announced in 2018; this would see oil demand shrink by 35k b/d by 2021; with new tariffs announced in May, the cumulative impact on oil demand would be ~70k b/d

* If the U.S. and China impose 25% tariffs on their remaining bilateral commerce, global trade reduction would be 1% below baseline in 2021, resulting in 120k b/d of oil demand loss

* Uncertainty about trade policies could raise cost of

investment capital, reducing global GDP and global trade; this would curb oil demand by ~350k b/d vs base case

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Brian Wingfield, John Deane

Gasoil Demand to Jump From 4Q, Replacing HSFO on IMO Rules: IEA
2019-06-14 08:00:00.30 GMT

By Firat Kayakiran

(Bloomberg) -- Gasoil demand will increase from the end of this year when consumption of high-sulfur fuel oil drops in preparation to IMO 2020 regulations, IEA says in its monthly report.

* In OECD, 30% of HSFO usage to switch to gasoil in 4Q this year, increasing to 40% in 2020

** In 4Q, HSFO consumption to be responsible for little under two-thirds of total bunker fuel demand globally

** "However, demand will likely fall precipitously in 2020, more so in the OECD due to gasoil and VLSFO fuel availability superior to that in non-OECD countries"

* Gasoil demand in marine industry to rise y/y by ~200k b/d in 2019 and by 900k b/d in 2020

** HSFO consumption to decline by 300k b/d y/y in 2019 and by 1.6m b/d in 2020

** Very low sulfur fuel oil demand to rise from about zero in 2018 to 150k b/d in 2019 and 1m b/d in 2020

* Overall diesel demand growth will jump to 1.2m b/d y/y in 2020 on IMO regulations

** About 1m b/d incremental supply will be available from new refinery output, yield switches, bio-diesel and other non-petroleum based supply

** Diesel market in 2020 may be in deficit of 200k b/d, but will take time to materialize through the year

** Lower sulfur specifications in fuels will also increase the demand for hydrogen from refiners

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Stephen Voss, Amanda Jordan

By Dhvani Pandya

(Bloomberg) -- The International Energy Agency trimmed its 2019 estimate for Indian oil demand growth to 210k b/d, according to a monthly report released Friday, reducing its forecast for a second straight month.

* Last month, the IEA cut its 2019 oil demand growth projection to 220k b/d from an April prediction of 240k b/d

* Oil demand growth dropped to 25k b/d in April after y/y growth of 225k b/d during 1Q, IEA says in June report

* Some rebound in demand expected during second half on lower oil prices and improving economic activity

** Oil demand growth should reach 230k b/d in 2020

* NOTE: India's GDP expansion slid to 5.8% in January-March from 6.6% in the previous quarter

* April gasoline demand growth slowed to 50k b/d as car and scooter sales fell sharply: IEA

** Passenger car sales contracted 17.1% in April, the worst in eight years; sales of scooters and motorcycles declined by 26% and 16%, respectively

* Dramatic slowdown in air transport due to rising airfares and collapse of a leading airline Jet Airways explain the sharp slowdown in jet kerosene demand

** Jet fuel and kerosene demand in April declined by 11k b/d and 14k b/d, respectively

* Naphtha demand declined by 30k b/d and LPG demand growth slowed to 15k b/d

* READ: India's Oil Demand Growth Seen Missing IEA's 245k B/D Estimate

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Ben Sharples, Andrew Janes

Global Refining Run Growth to More than Double in 2020: IEA

2019-06-14 08:00:00.24 GMT

By Jack Wittels

(Bloomberg) -- The rate of increase in global refining runs will more than double next year, bringing total throughput to 83.7m b/d, according to IEA's monthly Oil Market Report.

* Growth in refinery crude throughput forecast at 1.1m b/d in 2020 vs 0.5m b/d this year

** Surpasses 2020 forecast for refined product demand growth of 900k b/d

** 3.5m b/d new refining capacity to come online in 2019 and 2020

* May's global throughput lowest since March 2017 at 80.4m b/d

** Unplanned outages in Europe and the U.S. Midwest added to impact of strong maintenance season

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Rachel Graham, Stephen Voss

Druzhba Pipeline Crisis Bearish for Oil Market, IEA Says
2019-06-14 08:00:00.32 GMT

By Brian Wingfield

(Bloomberg) -- The net result of the Druzhba pipeline-contamination crisis has been bearish for the oil market, the IEA says in its monthly report.

* Global refinery crude demand effectively reduced by ~250k b/d, while crude output in Russia declined only marginally

* Crude supply increased due to emergency stock releases.

Poland, Hungary and Czech Republic combined drew down ~300k b/d in May; affected refineries may have added another 150k b/d by drawing on operational inventories

* Russia exported 400k b/d more to seaborne markets vs April, with Druzhba shut for most of May; occurred as global refinery throughput at 2-year low

* "Severely discounted" Urals also trying to find buyers; "the availability of massive amounts of discounted crude looking for a home also acted as a general dampening factor for oil prices"

* Clean-up of trunk section of pipeline from Russia to Mozyr in Belarus expected to be complete by mid-August; "full transit could be restored by the end of that month"

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John Deane, Amanda Jordan

By Saket Sundria

(Bloomberg) -- Global LPG and ethane demand will rise by a combined 395k b/d and naphtha demand by 110k b/d by the end of 2020 if 15 new petrochemicals projects become operational, the International Energy Agency says in its monthly oil market report for June.

* IEA surveyed new petrochemical projects and estimated their feedstock consumption. Of these, 15 projects are most likely to start operations by the end of 2020

** New plants are located in the U.S., China, S. Korea and Thailand

* Weak petrochemicals market affected naphtha demand in 1Q19

** Global naphtha markets softened for the third month in a row with cracker maintenance in North West Europe and Asia damping demand

** Naphtha consumption declined 100k b/d and LPG usage fell 50k b/d in 1Q in the OECD countries due to weakening of demand for petrochemical feedstocks

** Europe's LPG and naphtha demand decreased 120k b/d and 80k b/d from a year ago, respectively

** South Korean naphtha and fuel oil consumption fell unexpectedly, while naphtha consumption declined by 30k b/d in India

* READ: Naphtha Contango Longest in 7 Months as Korean Work Saps Demand

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Mohammed bin Salman to Asharq Al-Awsat: We Don't Want War but We Won't Hesitate in Dealing with Any Threat

Sunday, 16 June, 2019 - 06:15



Crown Prince Mohammed bin Salman during the interview with Asharq Al-Awsat's Editor in Chief Ghassan Charbel. - Photographer Bandar Al-Jaloud

Jeddah - Ghassan Charbel

Crown Prince Mohammed bin Salman, Deputy Prime Minister and Minister of Defense, said that Saudi Arabia does not want a war in the region, but stressed that it “will not hesitate in dealing with any threat against our people, sovereignty and vital interests.”

In an interview with Asharq Al-Awsat, the Crown Prince said that the Kingdom “supported the re-imposition of US sanctions on Iran out of our belief that the international community needed to take a decisive stance against Iran.”

He hoped that the Iranian regime “would opt to become a normal state and cease its malign behavior.”

The Crown Prince told Asharq Al-Awsat that the attacks on oil tankers in the Gulf, oil facilities in the Kingdom and Abha airport “underscore the importance of our demands for the international community to take a decisive stance against an expansionist regime that has supported terrorism and spread death and destruction over the past decades not only in the region, but the whole world.”

He criticized Iran for using the nuclear deal’s economic benefits “to support its hostile activities in the region through its tools of chaos and destruction.”

While stressing that the Kingdom’s hand is always extended for peace, he said that “the Iranian regime

did not respect the (Japanese) prime minister as a guest (in Iran) during his visit and in effect responded to his efforts by attacking the two oil tankers in the Gulf, one of which was apparently Japanese.”

“It also employed its militias to carry out a heinous attack against Abha Airport. This is clear evidence of the Iranian regime’s policy and intentions to target the security and stability of the region.”

The Crown Prince said that Saudi Arabia “places great importance on the strategic ties with the US,” considering it a “main factor in achieving regional security and stability.”

He also expressed confidence that “our strategic relations with the US will not be affected by media campaigns or arbitrary stances.”

The Kingdom constantly seeks to “clarify facts and misconceptions by some parties in the US and other countries. We listen to various views and we welcome constructive and rational advice, but ultimately our priority is our national interest.”

He said Saudi Arabia backed all efforts to reach a political solution to the Yemeni crisis but “the Houthi militias prioritize Iran’s agenda over the interests of Yemen and its people.”

“The Kingdom cannot accept the presence of militias operating outside the apparatus of states on our borders,” he said, adding “we not only seek to liberate Yemen from the Iranian militias, but achieve prosperity and stability for all of the people of Yemen.”

The Crown Prince said in the interview that his country is greatly concerned with the security and stability of Sudan, “not only due to the strategic importance of its location and danger of the collapse of its state institutions, but also the strong brotherly ties that bind us.”

He pledged to “continue to support our brothers in all fields until Sudan achieves what it deserves in prosperity and progress.”

On the Syrian crisis, he said Riyadh is working with its allies to achieve its objectives, including “defeating ISIS, preventing the re-emergence of terrorist organizations, dealing with the destabilizing Iranian influence in Syria and using all possible means to achieve political transition in line with Resolution 2254, in a manner that preserves Syria’s unity.”

The Crown Prince described the murder of Saudi citizen Jamal Khashoggi as a “very painful crime.”

The Kingdom is seeking to “achieve full justice and accountability, without getting distracted by positions taken by some for their own domestic considerations that are known to everyone,” he said. “Any party seeking to politically exploit the case must cease doing so and present whatever evidence it has to the courts in the Kingdom to help achieve justice.”

He also pledged to “continue to forge forward in our unwavering approach in confronting all forms of extremism and sectarianism, and the policies that support them.”

“We will not waste our time in offering partial solutions to extremism as history has proven the futility of such efforts,” said the Crown Prince.

On the economy, he expressed commitment to “the initial public offering of Saudi Aramco given it is under the appropriate circumstances, and in a timely manner.” But said “setting the location of the IPO now is premature.” And he noted the completion of several preliminary measures in preparation for the

offering.

He said that Saudi Vision 2030 has “moved from planning and design to implementation on all levels, and started finding results.”

“What is happening in the Kingdom is not simply a set of financial and economic reforms aiming to realize specific figures,” but a comprehensive restructuring of the Kingdom's economy aimed at transforming economic and development performance in the medium and long terms.

“We are now shifting from a rentier economy to one that is characterized by productivity and global competitiveness,” he said.

He expressed that “Vision 2030 and its programs, like all strategic plans has to be reviewed and updated according to circumstances that may arise during implementation, without compromising its foundation or objectives.”

“I am proud that Saudi citizens are driving change at a time many feared the vision will face resistance due to the size of the change it entails,” he added.

Here is the full text of the interview:

*The region has recently witnessed dangerous developments that threaten the security and stability of the region and world. What is Saudi Arabia’s stance towards these developments and how does the Kingdom deal with this escalation?

-Saudi Arabia’s stance is clear as stipulated in its official statements. It does not want a war in the region, but we will not hesitate in dealing with any threat against our people, sovereignty and vital interests. Our priority is our national interest and achieving the aspirations of our people through the economic and social goals of the Kingdom’s vision 2030 and through development, and economic and social reform. This demands a stable and enabling environment within the Kingdom and region. This is why you will find that the role of the Kingdom, whether in the Arabian Gulf, North Africa, Horn of Africa or other regions, is supporting stability and peace. This is a policy that the Kingdom has adopted since its establishment whereby it has always sought to shun division, sectarianism and extremism and instead preserve unity and stability in the region and international peace.

The Kingdom also plays an important role in the international community through its efforts to ensure that oil supplies pass through vital routes that surround it with the aim of protecting the stability of the global economy. The world witnessed how we dealt with the Iranian tanker in the Red Sea. It was handled based on what our morals and principles and what international treaties and norms demand. In return, we see how the Iranian regime and its proxies have carried out sabotage operations against four oil tankers near Fujairah port. Two of the tankers were Saudi. This confirms the approach followed by this regime in the region and entire world. Plenty of evidence supports this and which has accumulated over many years.

We must not forget that this regime had openly declared since 1979 that its priority and main goal is to export the revolution. It seeks to achieve this at the expense of the aspirations of its people and the peoples of the region. This explains the behavior of the Iranian regime. The export of the revolution and Wilayat al-Faqih principle demand the destabilization of countries and the region, stoking sectarianism, spreading extremism and dedicating the resources of the Iranian people towards financing and arming terrorist militias.

Despite this, the Kingdom has constantly extended its hand for peace with Iran to avoid the horrors of wars and destruction on the region and its people. Saudi Arabia even supported the nuclear deal with Iran because the Kingdom has throughout history never spared an effort to resolve any crisis through diplomatic and peaceful means. We had hoped that the Iranian regime would have taken advantage of this initiative to change its behavior towards the countries in the region and see it as a first step towards Iran's return to the international community as a normal state. Unfortunately, Iran misused the economic benefits of this deal to support its hostile acts in the region. It continued to violate international resolutions. It was better off dedicating the economic benefits in improving the lives of the Iranian people, developing infrastructure and achieving economic development instead of continuing its destructive behavior in the region.

Iran's recklessness has reached unprecedented levels. After the nuclear pact, the Iranian Revolutionary Guards Corps' budget increased and it intensified its support for sectarian militias in the region and even the whole world. We have all seen how terrorist and hostile Iranian operations were recently thwarted in Europe. This is why the Kingdom supported the re-imposition of US sanctions on Iran. It did so out of our belief that the international community needed to take a decisive stance against Iran. It must also take the necessary measures to limit the regime's ability to spread chaos and destruction in the whole world.

Recent developments in the region, including the targeting of Aramco oil pumping stations by the Iran-backed Houthi militias, underscores the importance of our demand for the international community to take a decisive stance against an expansionist regime that has supported terrorism and spread death and destruction over the past decades not only in the region, but the whole world.

The choice is clear before Iran. Does it want to be a normal country that plays a constructive role in the international community or does it want to be a rogue state? We hope that the Iranian regime would opt to become a normal country and cease its malign behavior.

*You have pointed to the American stance on Iran, which coincides with the Saudi stance, as is the case with the majority of strategic issues. Recent months have, however, seen criticism directed at the Kingdom from within the United States over a number of issues, especially the Jamal Khashoggi case. Has this criticism affected the strategic cooperation between the two countries?

- The Kingdom places great importance on the strategic ties with the US. They are relations that extend to more than 70 years during which this strategic partnership has defeated several challenges that have targeted the security, stability and sovereignty of our countries. Our ties with the US are important and pivotal, not only for achieving joint interests, whether economic, on the security level or others, but they are a main factor in achieving regional security and stability. Together with the US, and in cooperation with several countries in the region and world, we seek to achieve sustainable stability in the region that would establish the necessary environment to meet the aspirations of its people to live in dignity and real development. We do so by confronting the forces of chaos, destruction and instability embodied in terrorist organizations and their state-sponsors, starting with the Iranian regime, and confronting all forms of extremism.

As for media campaigns or some stances in the US, they certainly do not serve the joint interests of our countries. Throughout the Kingdom's history, however, we have previously faced such campaigns that are often biased and not based on accurate information. We constantly seek to clarify facts and misconceptions by some parties in the US and other countries. We listen to various views and we welcome constructive and rational advice, but ultimately our priority is our national interest. Our priority is the citizen in Riyadh, Jeddah, Jazan, Tabuk, Dammam and other regions in the Kingdom, not the beliefs or views of others about the Kingdom. Throughout the Kingdom's history, we have managed to work with our main allies, despite natural differences that exist between all countries, by respecting the sovereignty

of nations and avoiding meddling in their internal affairs. We expect nothing less than reciprocal treatment when it comes to our sovereignty and internal affairs. I am confident that our strategic relations with the US will not be affected by media campaigns or arbitrary stances.

As for the murder of citizen Jamal Khashoggi, as I have previously said, this is a very painful crime that is unprecedented in the history of the Kingdom. Such acts are alien to our culture and contradict our principles and values. The Kingdom has taken the necessary measures, whether through the judiciary to hold the perpetrators to account or through taking procedural measures to prevent such unfortunate crimes from taking place again in the future. These measures stem first and foremost from the importance we place, in the Kingdom, on the lives of every Saudi citizen, irrespective of their views. These measures have not and will not be affected by any other factors. We are a state governed by the rule of law and it is unacceptable for the life of a citizen to be violated in such a painful way under any circumstance. Unfortunately, the suspects are government employees and we seek to achieve full justice. Any party seeking to politically exploit the case must cease doing so and present whatever evidence it has to the courts in the Kingdom to help achieve justice.

*Does the agreement with the US on Iran apply to the situation in Syria, especially in wake of the American decision to withdraw from the country?

- We are in agreement on the objectives in Syria, which are the defeat of the ISIS, preventing the re-emergence of terrorist organizations, dealing with the destabilizing Iranian influence in Syria and using all possible means to achieve political transition according to Resolution 2254, in a manner that preserves Syria's unity. We are working with friendly countries to achieve these goals.

*How do you interpret the Japanese Prime Minister's recent visit to Iran and his meeting with the supreme leader?

- We thank the (Japanese) prime minister for his good intentions and the Kingdom's hand is always extended for peace to achieve security and stability of the region.

The Iranian regime, however, did not respect the (Japanese) prime minister as a guest (in Iran) during his visit and in effect responded to his efforts by attacking the two oil tankers in the Gulf, one of which was apparently Japanese. It also employed its militias to carry out a heinous attack against Abha Airport. This is clear evidence of the Iranian regime's policy and intentions to target the security and stability of the region. Iran is the party that is constantly escalating tensions in the region. It carries out terrorist attacks and immoral acts of aggression directly or through its militias. The problem lies in Tehran, not anywhere else. As I have previously stated, Iran must choose between becoming a normal country that plays a constructive role in the international community or remain a rogue state and assume the international consequences of its choice.

*The Turkish president and other Turkish officials have recently escalated their rhetoric in questioning the credibility of the Kingdom's judiciary and held the Kingdom and its leadership responsible in Khashoggi's case. How do you respond to such accusations?

- Jamal Khashoggi is a Saudi citizen and there is no doubt that what happened to him was painful and unfortunate. The Kingdom has taken all measures to hold the perpetrators accountable and the accused have been referred to the judiciary. The judiciary in the Kingdom is an independent authority and no one can meddle in its affairs. We confront any development firmly and without hesitation, by taking the steps that are necessary to achieve justice, rectify any flaw and prevent mistakes from taking place again, while disregarding any claims and accusations.

As for the statements by some Turkish officials towards the Kingdom, the Kingdom, as the home of the two holy mosques, seeks strong ties with all Islamic countries, including Turkey. This is important for the interest of the region and joint Islamic work in particular. In the Kingdom, we work in service of the holy mosques and their visitors. We work on achieving the security and stability of our nation, not becoming embroiled in disputes that harm the interests of our nation and Islamic world. We will forge forward in achieving these goals, without getting distracted by positions taken by some for their own domestic considerations that are known to everyone

*Four years have passed since the Arab coalition kicked off its operations in Yemen. How do you assess the political and military progress that has been achieved and what are the prospects for resolving the crisis in Yemen, especially in wake of the Stockholm deal and terrorist Houthi attacks on Saudi oil pumping stations and its Najran and Abha airports?

- Many parties forget or claim to forget how the crisis in Yemen first broke out. The coalition operations began after the international community had exhausted all political solutions between Yemeni parties and the Houthi militias. One must be reminded that the Kingdom is the pioneer of the political solution. It presented the GCC initiative and worked on achieving peaceful political transition in Yemen in 2011. It supported the national dialogue and presented over 7 billion dollars in economic support for Yemen between 2012 and 2014. Since 2011, the Kingdom's efforts have sought to achieve smooth political transition in a manner that preserves the country's independence and sovereignty and unity of its political and security institutions to prevent it from slipping into chaos.

Indeed, the Yemeni parties met in Riyadh and signed the GCC initiative and its implementation mechanism. All Yemeni parties, including the Houthis, were present at the comprehensive national dialogue.

Unfortunately, Iran obstructed the political process in Yemen through its proxy houthi militias, which started to occupy Yemeni cities and seize the state's various resources and capabilities. The Kingdom offered all possible opportunities to resolve the situation through peaceful means, but Iran was following a policy of imposing a new reality in Arab countries by force of arms. Unfortunately, the international community at the time did not confront Iran's expansionist and sectarian agenda. Iran therefore, continued to try, through its militias, to impose its control in Yemen. The Yemeni people and leadership, however, made a historic stand against this Iranian interference. Along with our brothers in the coalition, we responded immediately to the appeal of the legitimate government to protect Yemen and its people and our national security. The Kingdom cannot accept the presence of militias operating outside the apparatus of states on our borders.

Most Yemeni territories have been liberated and we have supported all efforts to reach a political solution to the crisis. Unfortunately, the Houthi militias prioritize Iran's agenda over the interests of Yemen and its people. We have recently witnessed the terrorist attack on oil facilities and Najran airport, which the Houthis boasted of claiming. This once again demonstrates that these militias do not care for the interests of the Yemeni people or any political process to resolve the crisis. Their actions reflect the priorities of Tehran, not Sanaa.

The Arab coalition's stance is very clear about resolving the crisis. We support efforts to reach a political solution based on UN Security Council resolution 2216, the GCC initiative and its implementation mechanism, and national dialogue outcomes. We accept the participation of all Yemeni parties in the political process, but according to the three references. The Kingdom will not accept the militias to remain outside state control. We will pursue this ultimate goal and maintain our operations and continue on offering support to the Yemeni people in their effort to protect their independence and sovereignty despite our sacrifice. The Kingdom will also maintain its humanitarian and economic relief in Yemen. We

not only seek to liberate Yemen from the Iranian militias, but achieve prosperity and stability for all of the people of Yemen.

*You have spoken of a dream to transform the Middle East into the new Europe. How do you confront obstacles in reaching this dream given the major regional political upheaval and economic and development challenges?

- We must not become hostages of temporary conditions that prevent us from fulfilling our primary duty, as leaders in the region, of reviving our states. Today's challenges must also not prevent us from working promptly to achieve a better future for the coming generations.

You mentioned political upheaval. This is undoubtedly taking place in the region. At the same time, however, we must look at the overall Arab region and realize that the majority of the countries are unanimous in prioritizing a dignified life for the people and achieving security and stability. The people do not want to be hostages to ideological conflicts that waste their potential. We are before a precedent in that everyone shares one goal. Competition between the majority of our countries focuses on reaching the best standard of living for the people, attracting investment and achieving development in all fields.

The source of political upheaval is well known. They are terrorist groups, such as ISIS, al-Qaeda, the Muslim Brotherhood and policies of the Iranian regime, the top sponsor of terrorism and extremism. We will not waste our time in offering partial solutions to extremism as history has proven the futility of such efforts. God willing, we will continue to forge forward in our unwavering approach in confronting all forms of extremism and sectarianism, and the policies that support them.

The Kingdom is the home of the Two Holy Mosques. It has been blessed with natural resources, a strategic location, and wise leadership since the days of its founder and until the present reign of the Custodian of the Two Holy Mosques. It is also blessed with its great and innovative people. Today, it is living in security, stability and prosperity. It is unbecoming for this great nation not to occupy leading positions in all fields regardless of the conditions and challenges. We will not rest until we first achieve this goal for our nation and then our brothers in the region.

*How do you assess the upheaval in Sudan and the political changes?

- We are greatly concerned with the security and stability of Sudan, not only due to the strategic importance of its location and danger of the collapse of its state institutions, but also the strong brotherly ties that bind us. Our brothers and sisters in Sudan have been and continue to be a part of our social fabric, they have contributed greatly to our progress in all fields. We will not spare any effort to achieve the security and stability for Sudan and its people. The Kingdom has taken measures to support the brotherly people of Sudan, including an economic aid package and depositing 250 million Dollars in its Central Bank. We will continue to support our brothers in all fields until Sudan achieves the prosperity and progress it deserves.

*Three years after launching Saudi Vision 2030, where are we at?

- We moved from the planning and design phase to implementation on all levels, and started seeing results on the ground. On developing the financial sector, for example, we have seen noteworthy progress after the launching of the Vision as the Saudi market joined three global indices, the FTSE, the Morgan Stanley (MSCI) Emerging Markets Index, and S&P Dow Jones Indices. This will pump capital worth billions into the market. The Kingdom has seen a 40 % increase in investors in investment funds, a first since 2006. The Kingdom has recently achieved the greatest leap among some of the world's most competitive countries in the IMD World Competitiveness Rankings 2019, ranking 26th, moving up 13

ranks compared to last year, and ranking 7th among G20 member states.

In the telecommunications and information sector, we witnessed remarkable development. The contribution of the digital economy to the GDP increased both directly and indirectly, with the Kingdom becoming one of the top 10 fastest e-commerce growing countries worldwide with a rate of 32%. Simultaneously, Internet speeds have improved fourfold to accelerate digital transformation. The Kingdom was also the first country in the Middle East and North Africa region to roll out 5G network services back in 2018 in the Eastern Province for trial. Today, we have 1,000 communication towers in the Kingdom that are offering this new service and expanding.

In the field of energy and industry, non-oil exports increased by 22% in 2018 compared to 2017, and we launched many industrial cities in different regions across the Kingdom. This confirms the keenness of the government of the Custodian of the Two Holy Mosques to achieve balanced and comprehensive development in various cities and regions, including the King Salman Energy Park (Spark), Jizan, and Waad Al Shamal where the first phase of the production of phosphates and phosphate fertilizers has been achieved, laying down the foundation for the second phase, which will make the Kingdom, God willing, the second largest producer of phosphate fertilizers globally.

I would like to note that what is happening in the Kingdom is not simply a set of financial and economic reforms aiming to realize specific figures, but a comprehensive restructuring of the Kingdom's macro-economy aimed at improving economic and development performance in the medium and long terms. We have undertaken major economic and structural reforms that contribute to fiscal balance and financial control and the diversification of income sources, while maintaining a continuing macroeconomic growth, sustaining public finances, supporting social expenditures, raising government spending efficiency and stimulating the private sector, which is considered a key partner in growth and development, and achieving the Vision's objectives.

***But there are claims about setbacks in some of Vision 2030's initiatives?**

- What is happening in the Kingdom is a comprehensive structural change in the economy aimed at creating a shift in medium- and long-term economic performance. The Vision 2030 and its programs, like all strategic plans has to be reviewed and updated according to circumstances that may arise during implementation, without compromising its foundation or objectives and with the aim of achieving top results, especially at a time we have gained a higher quality of decision-making based on studies, analyses, figures, facts and data.

Responding to your question about some Vision-related initiatives that might be in decline: We do not expect this. The Vision's programs are effectively contributing to the economic transformation process and we are now shifting from a rentier economy to one that is characterized by productivity and global competitiveness.

***Some may argue that the Public Investment Fund (PIF) is giving the private sector a run for its money with its direct investments and mega projects. What role does it play in achieving the Vision and how can negative effects be avoided?**

- In line with Vision 2030 and in order to achieve its objectives, it was important to review the role of the PIF and transform it into a state sovereign fund. In 2015 we re-launched PIF with a new vision and mission aimed at developing new sectors in Saudi Arabia, investing in leading international partnerships and the formation of a new board of directors under my leadership. Between 2016 and 2018, the number of staffers increased from 40 to nearly 500 employees. Meanwhile, PIF assets have increased from SR500 billion to SR 1 trillion, nearly doubling within two years.

The PIF is now a vital state instrument for economic diversification, and targets both domestic and international investments. Domestically, it targets major project investments that the private sector alone cannot finance, such as NEOM, the Red Sea project and Qiddiya, that will offer dozens, if not hundreds, of good investment opportunities for the private sector.

For PIF and the government, it is of utmost importance to involve the private sector. We have earmarked 13 programs for privatization, giving the private sector a greater opportunity to participate in investment, achieve profitable returns and improve spending efficiency and services.

In terms of foreign investments, apart from achieving attractive returns on its assets, PIF will play an important role in establishing economic partnerships that will help boost knowledge exchange, stimulate high-efficiency investments and enhance local content, generating long-term returns for future generations. The PIF also targets new strategic sectors such as tourism and entertainment. These sectors have an important dimension in stimulating foreign investment, regional development, creating a large number of jobs and improving overall quality of life.

The PIF operates under an outstanding level of corporate governance and transparent investment strategy, which were approved after completing its reform and governance process in 2015. It operates within a system that includes a board, executive committee and investment committee that play clear roles in guaranteeing distinguished levels of professionalism in performance. The PIF also has investment portfolios distributed according to development priorities, such as in Saudi companies, promising sectors and major projects.

*What are the latest developments in the privatization program?

- We now have an exceptional and global center specialized in privatization that is built on the best practices drawn from experiences of more than 20 countries that have undertaken privatization in the past. When establishing the center, it was taken into account that it contains a legal structure ensuring the rights of both the state and investors. We have identified promising opportunities for privatization in 12 sectors. Our goal from the privatization program is for it to strengthen the effectiveness of the role of government and to maximize the contribution of the private sector to GDP.

In 2019, the National Center for Privatization (NCP) supported the signing of five agreements with a total value exceeding SR 12.5 billion, inked by local and international companies in various fields and with 70% foreign financing from six countries. These agreements include projects that focus on sewage treatment, desalination plants and health services, through dialysis centers.

The NCP is currently working on finalizing agreements totaling over SR2 billion and that cover flour mills and medical and shipping services. These agreements are expected to be completed by the end of 2019. Work is also underway for privatizing education sector projects, expected in 2020 with investments adding up to about SR1 billion.

In the future, the private sector will also have the largest investment share in electricity sector projects, especially power generation plans and including major renewable energy projects previously announced.

*Amidst such economic transformation, what is your Highness's message to citizens?

- I am proud that Saudi citizens are driving change at a time many feared the Vision will face resistance due to the size of the change it entails. Many have told me that the most difficult part I will face in realizing this strategic transformation is resistance. But I saw this as a very small factor when looking at

Saudi youth that is now leading change.

I would like to pay tribute to the role of young people in the transformation currently taking place in the Kingdom. It is a young Vision with a young spirit.

Discussions have shifted from a change desired from the state to the change we all make together.

*When following news about the anticipated Saudi Aramco's IPO in global markets, we find there is a lack of information about the issue and the timeline. Where are matters now? And what actions have been taken in this regard?

- We are committed to the initial public offering of Saudi Aramco, but under the appropriate circumstances and in a timely manner. As I mentioned previously, I expect that it will happen between 2020 and the beginning of 2021, and setting the location of the IPO now is premature. Much of the work has been successfully completed, and the timeframe for the offering will depend on several factors including: market conditions for the IPO, given its size, and Aramco's acquisition of a majority stake in SABIC from PIF.

The latter is a deal which would create a stellar transformation through establishing a fully integrated national energy and petrochemical company that will lead the global energy sector and further enhance Saudi Aramco's growth potential and profitability in volatile oil markets.

As for preparations for Aramco's IPO, several important actions have been taken, including the issuance of the hydrocarbon tax system, the re-issuance of an exclusive franchise agreement, the appointment of a new board of directors and the first-ever releasing of Aramco's annual financial report and audit of its oil reserves. All these measures reinforce transparency, which is a core principle of Saudi Vision 2030, which is committed to protecting the Kingdom's interests and those of potential investors.

Saudi Aramco, for its part, has also logged several achievements within its internal program in preparation for the IPO. One of the most important features of the program was amending internal rules and regulations, the transformation into a joint stock company and releasing its financial report, meeting requirements of potential financial markets for the IPO.

This has left investors satisfied worldwide, as we have seen through the recent bond offering.

Comments

<https://noc.ly/index.php/en/new-4/4876-noc-expresses-concern-over-military-presence-inside-ras-lanuf-terminal>

NOC expresses concern over military presence inside Ras Lanuf terminal

National Oil Corporation (NOC) expresses concern over an increased military presence at the Ras Lanuf oil terminal, potentially making it a military objective. These actions could result in the withdrawal of NOC personnel from the port for their safety.

A group of around 80 military personnel under the command of Major General Abdullah Nur al-Din al-Hamali entered the port on Wednesday, June 5, 2019.

The group has taken over a building within the terminal and is converting it for military use. In addition, forces have attempted to fuel a warship, appropriated meals designated for staff, and seized 31 dormitories allocated to Harouge Oil Operations (HOO) employees, the NOC subsidiary operating the port.

“NOC works on behalf of all Libyans,” said NOC chairman Eng. Mustafa Sanalla. “We cannot accept a situation where any party to the current conflict misuses oil facilities.”

“The presence of forces inside the terminal represents an unacceptable risk to employees. This renders the terminal a potential military target, thereby risking the destruction of Libyan oil infrastructure - and the resulting economic crisis that would follow.”

NOC will not compromise on the safety of staff. If risk assessment indicates that continued operations present an unacceptable risk to workers, the corporation will take steps necessary to protect them - including their withdrawal from the terminal.

NOC reiterates its neutrality, non-partisanship and detachment from the ongoing conflict.

13 June 2019
Tripoli

<https://www.libyaobserver.ly/news/khalifa-haftar%E2%80%99s-armed-groups-militarize-oil-terminals-noc-warns-destruction-oil-infrastructure>

Khalifa Haftar's armed groups militarize oil terminals, NOC warns of destruction of oil infrastructure

June 13, 2019 - 14:01

Posted in:
NEWS

Written By: NewsDesk



The National Oil Corporation (NOC) has expressed concern over an increased military presence of eastern forces led by warlord Khalifa Haftar at the Ras Lanuf oil terminal.

“These actions could result in the withdrawal of NOC personnel from the port for their safety.” The NOC warned in a statement on Thursday.

The state-run NOC said a group of around 80 military personnel under the command of Major General Abdullah Nur al-Din al-Hamali entered the port on Wednesday, June 5, 2019, potentially making it a military objective.

“The group has taken over a building within the terminal and is converting it for military use. In addition, forces have attempted to fuel a warship, appropriated meals designated for staff, and seized 31 dormitories allocated to Harouge Oil Operations (HOO) employees, the NOC subsidiary operating the port.” The statement reads.

NOC chairman Mustafa Sanalla said “The presence of forces inside the terminal represents an unacceptable risk to employees. This renders the terminal a potential military target, thereby risking the destruction of Libyan oil infrastructure - and the resulting economic crisis that would follow.”

Meanwhile, oil workers from Ras Lanuf revealed that a group of French military officers arrived at Fadeel Hotel in Ras Lanuf town, west of the oil terminal, on Thursday to help forces of warlord Khalifa Haftar.

Russia May Fully Restore Druzhba Pipeline Ops From July 1: Tass
2019-06-14 15:45:32.907 GMT

By Ilya Khrennikov
(Bloomberg) -- Russia's Transneft is aiming to fully restore Druzhba pipeline operations from July 1 after it has squeezed out contaminated oil from it, Tass reports, citing Vice President Sergey Andronov.

* Transneft is now forming a schedule for July, compiling supply requests from oil firms and demand from refineries; co. is still in talks with Belarus on volumes
* READ: How Russia Plans to Clean Druzhba Oil Flows to Germany, Poland
* NOTE: The Giant Soviet Pipeline System That's Full of Tainted Crude

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<https://tass.com/economy/1063351>
11 JUN, 06:57

Transneft expects normal loading of Druzhba to be restored within 2-3 months

MOSCOW, June 11. /TASS/. The loading of the Druzhba pipeline may be restored to the level prior to the incident with contamination and subsequent transit suspension within the next 2-3 months, Vice President of Russia's pipeline operator Transneft Rashid Sharipov told a telephone conference on Tuesday.

"Regarding Druzhba loading, we expect to return to the normal level within 2-3 months," he said.

Transneft Says Druzhba Cleanup to Take 6-8 Mos: Kommersant (1)
2019-05-30 07:39:44.156 GMT

By Anatoly Medetsky and Olga Tanas

(Bloomberg) -- (Updates with more details from the interview from fourth bullet.)

* Sergey Andronov, vice president at pipeline operator

Transneft, comments on contaminated oil in the Druzhba link in an interview with Kommersant

* The amount of tainted oil exported via Druzhba and the port of Ust-Luga totaled about 3m metric tons

* Belarus will return about 1.3m tons of the oil to Russia;

there is no plan for Poland to send the oil back

* Total volume of dirty oil, supplied via Adamowo-Zastawa, to Poland and Germany is about 690.5k tons

* Discounts for dirty oil aren't in the Transneft's area of responsibility as oil shipped via Druzhba doesn't belong to the company

** Transneft together with the Energy Ministry calculated possible compensation for oil suppliers; proposal was discussed at the meeting involving suppliers, most of which have agreed

* Transneft also drafted proposals for how to improve control of accepting oil to the pipeline

* If any shipper doesn't accept compensation proposal, issue will have to be resolved in court

* Andronov said that Transneft's view was that contaminated oil in Poland's pipelines could be brought up to the appropriate level by transferring it to storage tanks and mixing it with clean oil delivered from Gdansk port and through the Druzhba pipeline

* READ: Total Will Seek to Recoup Costs Arising From Tainted Russian Oil

* READ: Transneft Has No Plans to Ask Govt to Cut 2018 Divs on Druzhba

* READ: Why a Contaminated Russian Pipe Means Less Gasoline for New York

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Helen Robertson, John Deane

U.S. Escalates Online Attacks on Russia's Power Grid

WASHINGTON — The United States is stepping up digital incursions into Russia's electric power grid in a warning to President Vladimir V. Putin and a demonstration of how the Trump administration is using new authorities to deploy cybertools more aggressively, current and former government officials said.

In interviews over the past three months, the officials described the previously unreported deployment of American computer code inside Russia's grid and other targets as a classified companion to more publicly discussed action directed at Moscow's disinformation and hacking units around the 2018 midterm elections.

Advocates of the more aggressive strategy said it was long overdue, after years of public warnings from the Department of Homeland Security and the F.B.I. that Russia has inserted malware that could sabotage American power plants, oil and gas pipelines or water supplies in any future conflict with the United States.

But it also carries significant risk of escalating the daily digital Cold War between Washington and Moscow.

The administration declined to describe specific actions it was taking under the new authorities, which were granted separately by the White House and Congress last year to United States Cyber Command, the arm of the Pentagon that runs the military's offensive and defensive operations in the online world.

But in a public appearance on Tuesday, President Trump's national security adviser, John R. Bolton, said the United States was now taking a broader view of potential digital targets as part of an effort "to say to Russia, or anybody else that's engaged in cyberoperations against us, 'You will pay a price.'"

Power grids have been a low-intensity battleground for years.

Since at least 2012, current and former officials say, the United States has put reconnaissance probes into the control systems of the Russian electric grid.

But now the American strategy has shifted more toward offense, officials say, with the placement of potentially crippling malware inside the Russian system at a depth and with an aggressiveness that had never been tried before. It is intended partly as a warning, and partly to be poised to conduct cyberstrikes if a major conflict broke out between Washington and Moscow.

The commander of United States Cyber Command, Gen. Paul M. Nakasone, has been outspoken about the need to “defend forward” deep in an adversary’s networks to demonstrate that the United States will respond to the barrage of online attacks aimed at it.



“They don’t fear us,” he told the Senate a year ago during his confirmation hearings.

But finding ways to calibrate those responses so that they deter attacks without inciting a dangerous escalation has been the source of constant debate.

Mr. Trump issued new authorities to Cyber Command last summer, in a still-classified document known as National Security Presidential Memoranda 13, giving General Nakasone far more leeway to conduct offensive online operations without receiving presidential approval.

But the action inside the Russian electric grid appears to have been conducted under little-noticed new legal authorities, slipped into the military authorization bill passed by Congress last summer. The measure approved the routine conduct of “clandestine military activity” in cyberspace, to “deter, safeguard or defend against attacks or malicious cyberactivities against the United States.”

Under the law, those actions can now be authorized by the defense secretary without special presidential approval.

“It has gotten far, far more aggressive over the past year,” one senior intelligence official said, speaking on the condition of anonymity but declining to discuss any specific classified programs. “We are doing things at a scale that we never contemplated a few years ago.”

The critical question — impossible to know without access to the classified details of the operation — is how deep into the Russian grid the United States has bored. Only then will it be clear whether it would be possible to plunge Russia into darkness or cripple its military — a question that may not be answerable until the code is activated.

Both General Nakasone and Mr. Bolton, through spokesmen, declined to answer questions about the incursions into Russia's grid. Officials at the National Security Council also declined to comment but said they had no national security concerns about the details of The New York Times's reporting about the targeting of the Russian grid, perhaps an indication that some of the intrusions were intended to be noticed by the Russians.

Speaking on Tuesday at a conference sponsored by The Wall Street Journal, Mr. Bolton said: "We thought the response in cyberspace against electoral meddling was the highest priority last year, and so that's what we focused on. But we're now opening the aperture, broadening the areas we're prepared to act in."

He added, referring to nations targeted by American digital operations, "We will impose costs on you until you get the point."

Two administration officials said they believed Mr. Trump had not been briefed in any detail about the steps to place "implants" — software code that can be used for surveillance or attack — inside the Russian grid.

Pentagon and intelligence officials described broad hesitation to go into detail with Mr. Trump about operations against Russia for concern over his reaction — and the possibility that he might countermand it or discuss it with foreign officials, as he did in 2017 when he mentioned a sensitive operation in Syria to the Russian foreign minister.

Because the new law defines the actions in cyberspace as akin to traditional military activity on the ground, in the air or at sea, no such briefing would be necessary, they added.

The intent of the operations was described in different ways by several current and former national security officials. Some called it "signaling" Russia, a sort of digital shot across the bow. Others said the moves were intended to position the United States to respond if Mr. Putin became more aggressive.

So far, there is no evidence that the United States has actually turned off the power in any of the efforts to establish what American officials call a "persistent presence" inside Russian networks, just as the Russians have not turned off power in the United States. But the placement of malicious code inside both systems revives the question of whether a nation's power grid — or other critical infrastructure that keeps homes, factories, and hospitals running — constitutes a legitimate target for online attack.

Already, such attacks figure in the military plans of many nations. In a previous post, General Nakasone had been deeply involved in designing an operation code-named Nitro Zeus that amounted to a war plan to unplug Iran if the United States entered into hostilities with the country.

How Mr. Putin's government is reacting to the more aggressive American posture described by Mr. Bolton is still unclear.

"It's 21st-century gunboat diplomacy," said Robert M. Chesney, a law professor at the University of Texas, who has written extensively about the shifting legal basis for digital operations. "We're showing the adversary we can inflict serious costs without actually doing much. We used to park ships within sight of the shore. Now, perhaps, we get access to key systems like the electric grid."

Russian intrusion on American infrastructure has been the background noise of superpower competition for more than a decade.

A successful Russian breach of the Pentagon's classified communications networks in 2008 prompted the creation of what has become Cyber Command. Under President Barack Obama, the attacks accelerated.

But Mr. Obama was reluctant to respond to such aggression by Russia with counterattacks, partly for fear that the United States' infrastructure was more vulnerable than Moscow's and partly because intelligence officials worried that by responding in kind, the Pentagon would expose some of its best weaponry.

At the end of Mr. Obama's first term, government officials began uncovering a Russian hacking group, alternately known to private security researchers as Energetic Bear or Dragonfly. But the assumption was that the Russians were conducting surveillance, and would stop well short of actual disruption.

That assumption evaporated in 2014, two former officials said, when the same Russian hacking outfit compromised the software updates that reached into hundreds of systems that have access to the power switches.

"It was the first stage in long-term preparation for an attack," said John Hultquist, the director of intelligence analysis at FireEye, a security company that has tracked the group.

In December 2015, a Russian intelligence unit shut off power to hundreds of thousands of people in western Ukraine. The attack lasted only a few hours, but it was enough to sound alarms at the White House.

A team of American experts was dispatched to examine the damage, and concluded that one of the same Russian intelligence units that wreaked havoc in Ukraine had made significant inroads into the United States energy grid, according to officials and a homeland security advisory that was not published until December 2016.

"That was the crossing of the Rubicon," said David J. Weinstein, who previously served at Cyber Command and is now chief security officer at Claroty, a security company that specializes in protecting critical infrastructure.

In late 2015, just as the breaches of the Democratic National Committee began, yet another Russian hacking unit began targeting critical American infrastructure, including the electricity grid and nuclear power plants. By 2016, the hackers were scrutinizing the systems that control the power switches at the plants.

Until the last few months of the Obama administration, Cyber Command was largely limited to conducting surveillance operations inside Russia's networks. At a conference this year held by the Hewlett Foundation, Eric Rosenbach, a former chief of staff to the defense secretary and who is now at Harvard, cautioned that when it came to offensive operations "we don't do them that often." He added, "I can count on one hand, literally, the number of offensive operations that we did at the Department of Defense."

But after the election breaches and the power grid incursions, the Obama administration decided it had been too passive.

Mr. Obama secretly ordered some kind of message-sending action inside the Russian grid, the specifics of which have never become public. It is unclear whether much was accomplished.

"Offensive cyber is not this, like, magic cybernuke where you say, 'O.K., send in the aircraft and we drop the cybernuke over Russia tomorrow,'" Mr. Rosenbach said at the conference, declining to discuss specific operations.

After Mr. Trump's inauguration, Russian hackers kept escalating attacks.

Mr. Trump's initial cyberteams decided to be far more public in calling out Russian activity. In early 2018, it named Russia as the country responsible for "the most destructive cyberattack in human history," which paralyzed much of Ukraine and affected American companies including Merck and FedEx.

When General Nakasone took over both Cyber Command and the N.S.A. a year ago, his staff was assessing Russian hackings on targets that included the Wolf Creek Nuclear Operating Corporation, which runs a nuclear power plant near Burlington, Kan., as well as previously unreported attempts to infiltrate Nebraska Public Power District's Cooper Nuclear Station, near Brownville. The hackers got into communications networks, but never took over control systems.

In August, General Nakasone used the new authority granted to Cyber Command by the secret presidential directive to overwhelm the computer systems at Russia's Internet Research Agency — the group at the heart of the hacking during the 2016 election in the

United States. It was one of four operations his so-called Russia Small Group organized around the midterm elections. Officials have talked publicly about those, though they have provided few details.

But the recent actions by the United States against the Russian power grids, whether as signals or potential offensive weapons, appear to have been conducted under the new congressional authorities.

As it games out the 2020 elections, Cyber Command has looked at the possibility that Russia might try selective power blackouts in key states, some officials said. For that, they said, they need a deterrent.

The question now is whether placing the equivalent of land mines in a foreign power network is the right way to deter Russia. While it parallels Cold War nuclear strategy, it also enshrines power grids as a legitimate target.

"We might have to risk taking some broken bones of our own from a counterresponse, just to show the world we're not lying down and taking it," said Robert P. Silvers, a partner at the law firm Paul Hastings and former Obama administration official. "Sometimes you have to take a bloody nose to not take a bullet in the head down the road."

David E. Sanger reported from Washington, and Nicole Perlroth from San Francisco.

Source: [Read Full Article](#)

http://blogs.platts.com/2018/08/13/insight-oil-companies-scramble-stay-ahead-cybersecurity-threats/?utm_source=twitter&utm_medium=social&utm_term=oil&utm_content=photo&utm_campaign=barrel&hootPostID=54c6dd8fb5bf2bd4e92b28658812c4d3

August 13, 2018 00:00 UTC (0)



Insight: Oil companies scramble to stay ahead of cybersecurity threats

This is the first in a series of two special features on cybersecurity in the oil and gas sector

But for a coding error, an attempted cyberattack last year on a **petrochemical plant in Saudi Arabia** could have led to a catastrophic explosion.

Malware implanted into the control system to sabotage the plant accidentally triggered a shutdown, but investigators say the attack was one of the most technologically advanced they had ever seen. Chillingly, they say the assailants – still not publicly identified – have likely already fixed the glitch and are lying in wait to target their next facility.

That close call and several others have many experts convinced that the oil industry, even as it invests millions of hours on safety procedures, is ill-prepared on the cyber front.

Part 2: Kaspersky Lab contest reveals ease of hacking an oil refinery

“The sector is becoming fair game. [Hackers] are seeing opportunities to attack the sector, and facility operators believe they are very well-protected,” a Washington-based cybersecurity analyst at FireEye and former oil industry consultant, Marina Krotofil said, “It is not a good combination.”

Much of the focus on energy-related **cybersecurity has been on power plants and grids**, but authorities say oil and gas companies — responsible for critical infrastructure including refineries, pipelines and ports — are ripe targets for hackers to implant malware that can disrupt operations, endanger public safety, wreak havoc on markets and disclose sensitive information.

Spending on security measures is insufficient by and large, and collaboration among companies on best practices is woeful, given the secretive and competitive nature of the oil business, according to people in the field.

Often, national security can be at stake.

In the Middle East alone, which accounts for more than a third of global crude production, cyberattacks cost the oil and gas industry \$1 billion last year in outages and loss of confidential data, according to a March report by industrial services provider Siemens and the Ponemon Institute. However, only 47% of Middle East oil and gas companies surveyed in the report said they prioritize continually monitoring all infrastructure for cyber threats and attacks.

“In general, the oil industry is conservative in nature,” said Gary Williams, a senior director for **Schneider Electric, which installs control and safety systems** in refineries and other critical infrastructure often targeted by hackers.

“The industry tends to take an ‘if it ain’t broke, don’t fix it’ approach to how we operate. But we must change this model, and our culture, when it comes to cybersecurity.”

Some experts warn it may take a major successful cyberattack for the industry to fully grasp how great the danger is.

“Organizations need to invest in cybersecurity, but they don’t see it’s a major threat,” senior research fellow with Chatham House’s International Security Department Beyza Unal, said. “We haven’t seen an event where an entire critical infrastructure got taken out. But it will happen. So how do you get companies to invest in that?”

More complex, more often

Across the industry, energy companies spend less than 0.2% of their revenues on cybersecurity, according to a recent analysis by consultancies Precision Analytics LLC and the CAP Group. That is less than a third of what banks and financial services companies spend protecting their businesses from hackers.

Meanwhile, hackers targeting the industry don’t discriminate by size. Spanish oil company Cepsa is a relative minnow compared with giants like Saudi Aramco or ExxonMobil, but still finds its network targeted about 20 times

each day. “Both the range and number of potential attacks are increasing,” Cepsa spokeswoman Marta Llorente Señorans said.

None of the attacks has succeeded, to its knowledge, according to company officials. Its facilities have not failed, and its operations have remained unscathed by any cyber-related outages.

The company, which operates two refineries with a throughput of 430,000 b/d and holds working interests in upstream projects with an output of about 100,000 b/d, is increasing cybersecurity spending by a minimum of 25% annually.

Eni, the Italian energy giant, said it has fended off several cyberattacks targeting its industrial control systems, including at the company’s refineries.

“Cyberattack is one of our corporate top risks,” Eni spokesman Roberto Carlo Albini said. “We have developed a specific security architecture for industrial control systems we perform vulnerability and security assessments on our infrastructure regularly, and we have a dedicated team for security monitoring and incident response.”

Cepsa and Eni’s acknowledgement of the problem is unusual. Many oil and gas companies contacted by S&P Global Platts for this story — ranging from state-owned companies to integrated majors, independent refiners and terminal operators — declined to comment on the issue or disclose cyber defense spending. Few disclosed any assaults on their systems.

Unknown unknowns

But experts say that known attempts account for likely just a fraction of the assaults launched every day — and it’s the ones that remain undetected that are the most worrying.

Many malware programs are intended to gather information on a plant, not necessarily launch an imminent attack, and they may lurk inside a system for months or even years before their creators gain enough intelligence to develop and unleash custom-built viruses that can take down an entire facility.

Hackers who have gained access to a system may just be waiting for the right moment to do their worst, said Daniel Quiggin, a research fellow at Chatham House who specializes in energy systems. “A lot of reconnaissance has gone on,” he said. “To what end, we don’t know, and that is why everybody is so concerned.”

In the case of the Saudi petrochemical plant incident, hackers implanted malware into the facility’s Triconex safety control system — hardware and programs manufactured by Schneider Electric — which regulates voltage, pressure and temperature.

But rather than forcing a shutdown or disruption of the plant, the malware sought to reprogram the safety system, so that fail-safes would not be triggered when a subsequent piece of malware caused the plant to overheat, explode or otherwise catastrophically malfunction, according to FireEye.

Given the sophistication of the malware involved and the likely long development time and cost it would have taken to build, authorities say only one kind of actor could be behind the intrusion: a nation state.

Investigators continue to look into the incident and have neither named the facility nor identified the attackers, though officials suspect they were backed by Saudi Arabia’s longstanding geopolitical rival Iran, a charge Tehran has denied.

With tensions rising in the Middle East, Krotofil said to expect more incidents targeting oil and gas operations there.

“It’s strategic,” she said. “It’s countries where their ability to produce or not produce oil has a huge impact on global oil markets. Therefore, there [are] continuous, multiple attempts to disrupt operations in the Middle East.” Iran has been steadily building its hacking capabilities, and the fear among US security experts is it could then turn a volley of attacks on the US, as it withdraws from the nuclear deal and re-imposes sanctions that bite at Iran’s oil exports.

“There are legitimate reasons to be concerned that Tehran’s intention in targeting critical infrastructure is to hold social and economic assets in adversarial countries at risk in the event it needs to escalate or retaliate during conflict,” the Carnegie Endowment for Peace warned in a recent report on Iran’s cyber threat.

But Iran, too, has been a cyberattack victim. In 2010, the Stuxnet virus struck Iran's Natanz uranium enrichment plant, manipulating its computers to send its centrifuges spinning at dangerous speeds. That incident occurred in the lead-up to an Iranian presidential election, and media reports later attributed Stuxnet to the US and Israel.

Late to the game

As the scale and complexity of malware has exploded in recent years, cyberwarfare has emerged as a new front in the battle to gain geopolitical supremacy. Governments and companies are scrambling to stay ahead of hackers and protect vital assets and resources.

But maintaining adequate cyber defenses is costly, as systems must be constantly updated to stay ahead of hackers as they innovate.

The industry has yet to agree on common standards, though trade associations, such as the International Association of Oil & Gas Producers and US refineries group **American Fuel and Petrochemical Manufacturers have fostered discussion** among their members, in concert with governmental bodies.

However, oversight is uneven and restricted by an inability for national governments and companies to keep pace with the rapid development of malware threats, consultancy Oxford Analytica said in a recent report.

Many governments are already late to the game and hampered by a skills shortage.

"Although leaders might acknowledge the growing importance of the issue, few understand how to proceed," the report said.

Also troubling is a growing relationship between state actors and criminal groups, with countries providing funding to low-level cybercriminals, as well as access to sophisticated hacking resources via encrypted dark web sites.

"I think what's interesting that we'll see in maybe five, 10 years' time is the nexus between organized crime, terrorist organizations and hackers on the dark web," Chatham House's Unal said.

In the past, cyberattacks on oil facilities typically involved cybercriminals seeking proprietary information such as production levels, which they could use for market manipulation, said FireEye's Krotofil. But attacks in recent years have become far more sinister, ambitious and potentially destructive.

Cyberattacks "have become much, much more complex, much more dramatic," she said. "Attackers right now are trying to attack everything and see how far they go."

It is a risk that oil and gas producers can no longer ignore.

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Tags: Cyberattack, Cybersecurity, Oil Refinery, Pipelines

A cyber attack in Saudi Arabia failed to cause carnage, but the next attempt could be deadly

At a time when the world faces a dangerous escalation in cyber warfare, a series of assaults on petrochemical companies in Saudi Arabia – possibly backed by nation states – has caused alarm

- [Nicole Perlroth](#), [Clifford Krauss](#)
- 3 days ago
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Computers crashed at sites including Sadara Chemical Company, a joint venture between the oil and chemical giants Saudi Aramco and Dow Chemical *Sadara*

In August, a petrochemical company with a plant in Saudi Arabia was hit by a new kind of cyber assault. The attack was not designed to simply destroy data or shut down the plant, investigators believe. It was meant to sabotage the firm's operations and trigger an explosion.

The attack was a dangerous escalation in international cyber warfare, as faceless enemies demonstrated both the drive and the ability to inflict serious physical damage. And US government officials, their allies and cybersecurity researchers worry that the culprits could replicate it in other countries, since thousands of industrial plants all over the world rely on the same US-engineered computer systems that were compromised.

Investigators have been tight-lipped about the August attack. They still won't identify the company or the country where it is based and have not identified the culprits.

But the attackers were sophisticated and had plenty of time and resources, an indication that they were likely to have been supported by a government, according to more than a dozen people, including cybersecurity experts who have looked into the

attack and asked not to be identified because of the confidentiality of the continuing investigation.

The only thing that prevented an explosion was a mistake in the attackers' computer code, the investigators say.

The assault was the most alarming in a string of cyber attacks on petrochemical plants in Saudi Arabia. In January 2017, computers went dark at the National Industrialisation Company (Tasnee for short), which is one of the few privately owned Saudi petrochemical companies. Computers also crashed 15 miles away at Sadara Chemical Company, a joint venture between the oil and chemical giants Saudi Aramco and Dow Chemical.

Within minutes of the attack at Tasnee, the hard drives inside the company's computers were destroyed and their data wiped clean, replaced with an image of Alan Kurdi, the small Syrian child who drowned off the coast of Turkey during his family's attempt to flee that country's civil war.

The intent of the January attacks, Tasnee officials and researchers at the security company Symantec believe, was to inflict lasting damage on the petrochemical companies and send a political message. Recovery took months.

Energy experts say the August attack could have been an attempt to complicate Crown Prince Mohammad bin Salman's plans to encourage foreign and domestic private investment to diversify the Saudi economy and produce jobs for the country's growing youth population.

"Not only is it an attack on the private sector, which is being touted to help promote growth in the Saudi economy, but it is also focused on the petrochemical sector, which is a core part of the Saudi economy," says Amy Myers Jaffe, an expert on Middle East energy at the Council on Foreign Relations.

Saudi Arabia has cut oil exports in recent years to support global oil prices, a strategy central to its efforts to make a potential public offering of shares of government-controlled Saudi Aramco more attractive to international investors. The kingdom has

tried to compensate for its lost revenue by expanding its petrochemical and refining industry.

Some technical details of the attack in August have been previously reported, but this is the first time the earlier attacks on Tasnee and other Saudi petrochemical companies have been reported.

Security analysts at Mandiant, a division of the security firm FireEye, are still investigating what happened in August, with the help of several companies in the United States that investigate cyber attacks on industrial control systems.

A team at Schneider Electric, which made the industrial systems (Triconex safety controllers) that were targeted, is also looking into the attack. So are the National Security Agency, the FBI, the Department of Homeland Security and the Pentagon's Defence Advanced Research Projects Agency, which has been supporting research into forensic tools designed to assist hacking investigations.

All of the investigators believe the attack was most likely intended to cause an explosion that would have killed people. In the past few years, explosions at petrochemical plants in China and Mexico – though not triggered by hackers – have killed several employees, injured hundreds and forced evacuations of surrounding communities.

What worries investigators and intelligence analysts the most is that the attackers compromised Schneider's Triconex controllers, which keep equipment operating safely by performing tasks like regulating voltage, pressure and temperatures. Those controllers are used in about 18,000 plants around the world, including nuclear and water treatment facilities, oil and gas refineries, and chemical plants.

"If attackers developed a technique against Schneider equipment in Saudi Arabia, they could very well deploy the same technique here in the United States," says James A Lewis, a cybersecurity expert at the Centre for Strategic and International Studies, a Washington think tank.

The Triconex system was believed to be a "lock and key operation". In other words, the safety controllers could be tweaked or dismantled only with physical contact.

So how did the hackers get in? Investigators found an odd digital file in a computer at an engineering workstation that looked like a legitimate part of the Schneider controllers but was designed to sabotage the system. Investigators will not say how it got there, but they do not believe it was an inside job. This was the first time these systems were sabotaged remotely.

The only thing that prevented significant damage was a bug in the attackers' computer code that inadvertently shut down the plant's production systems.

Investigators believe that the hackers have probably fixed their mistake by now, and that it is only a matter of time before they deploy the same technique against another industrial control system. A different group could also use those tools for its own attack.

The August attack was also a significant step up from earlier attacks in Saudi Arabia. Starting on 17 November 2016, computer screens at a number of Saudi government computers went dark and their hard drives were erased, according to researchers at Symantec, which investigated the attacks.

Two weeks later, the same attackers hit other Saudi targets with the same computer virus. On 23 January 2017, they struck again, at Tasnee and other petrochemical firms, deploying a computer virus known as Shamoon, after a word embedded in its code.

The Shamoon virus first surfaced five years earlier at Saudi Aramco, wiping out tens of thousands of computers and replacing the data with a partial image of a burning American flag. Leon Panetta, US Defence Secretary at the time, said the attack could be a harbinger.

"An aggressor nation or extremist group could use these kinds of cyber tools to gain control of critical switches," he said in 2012.

Government officials and cybersecurity experts in Saudi Arabia and the United States attributed the 2012 Shamoon attack to Iranian hackers.

“Another attacker could have adopted that code” for the January 2017 attacks, says Vikram Thakur, a senior researcher at Symantec, “but our analysis showed the likelihood it was the same perpetrator was pretty high.”

The attack in August was not a Shamoon attack. It was much more dangerous.

Investigators believe a nation state was responsible because there was no obvious profit motive, even though the attack would have required significant financial resources. And the computer code had not been seen in any earlier assaults. Every hacking tool had been custom-built.

The attackers not only had to figure out how to get into that system, they had to understand its design well enough to know the layout of the facility – what pipes went where and which valves to turn in order to trigger an explosion.

Investigators believe someone would have had to buy the same version of the Triconex safety system to figure out how it worked. The components, investigators say, could be purchased for \$40,000 (£29,000) on eBay.

The attack has also shown the challenge of attributing with unquestionable evidence an attack to one country.

Cybersecurity experts say Iran, China, Russia, the United States and Israel had the technical sophistication to launch such attacks. But most of those countries had no motivation to do so. China and Russia are increasingly making energy deals with Saudi Arabia, and Israel and the United States have moved to cooperate with the kingdom against Iran.

That leaves Iran, which experts say had a growing cyberspace military programme, although the Iranian government has denied any involvement in cyber attacks.

Tensions between Iran and Saudi Arabia have steadily escalated in recent years, and the conflict has drifted into cyberspace.

US officials and security analysts blamed Iranian hackers for a spate of attacks on American banks in 2012 and more recent espionage attacks on the airline industry.

Iranian hackers were blamed for the 2012 Aramco attack and are also the leading suspects in the more recent Shamoon attacks.

The August attack was far more sophisticated than any previous attack originating from Iran, Thakur of Symantec says, but there is a chance Iran could have improved its cyber-warfare abilities or worked with another country, like Russia or North Korea.

Tasnee says it hired experts from Symantec and IBM to study the attack against it. The company says it has also “completely overhauled our security standards” and started using new tools to prevent cyberattacks.

“Being a global business,” the company says, “we believe that cybersecurity is a concern wherever you are in the world.”

© *New York Times*

Elon Musk Confronts a Fateful Tesla Tweet and an ‘Excruciating’ Year

Image

Elon Musk, the chairman and chief executive of the electric-car maker Tesla. “This past year has been the most difficult and painful year of my career,” he said. Credit: Noah Berger/Bloomberg

By **David Gelles**, **James B. Stewart**, **Jessica Silver-Greenberg** and **Kate Kelly**

- Aug. 16, 2018

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Elon Musk was at home in Los Angeles, struggling to maintain his composure. “This past year has been the most difficult and painful year of my career,” he said. “It was excruciating.”

The year has only gotten more intense for Mr. Musk, the chairman and chief executive of the electric-car maker Tesla, since he abruptly [declared on Twitter](#) last week that he hoped to convert the publicly traded company into a private one. The episode kicked off a furor in the markets and within Tesla itself, and he acknowledged on Thursday that he was fraying.

At multiple points in an hourlong interview with The New York Times, he choked up, noting that he nearly missed his brother’s wedding this summer and spent his birthday holed up in Tesla’s offices as the company raced to meet elusive production targets on a crucial new model.

Asked if the exhaustion was taking a toll on his physical health, Mr. Musk answered: “It’s not been great, actually. I’ve had friends come by who are really concerned.”

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The events set in motion by Mr. Musk’s tweet have ignited a [federal investigation](#) and have angered some board members, according to people familiar with the matter. Efforts are underway to find a No. 2 executive to help take some of the pressure off Mr. Musk, people briefed on the search said. And some board members

FEDERAL VOTING INTENTIONS

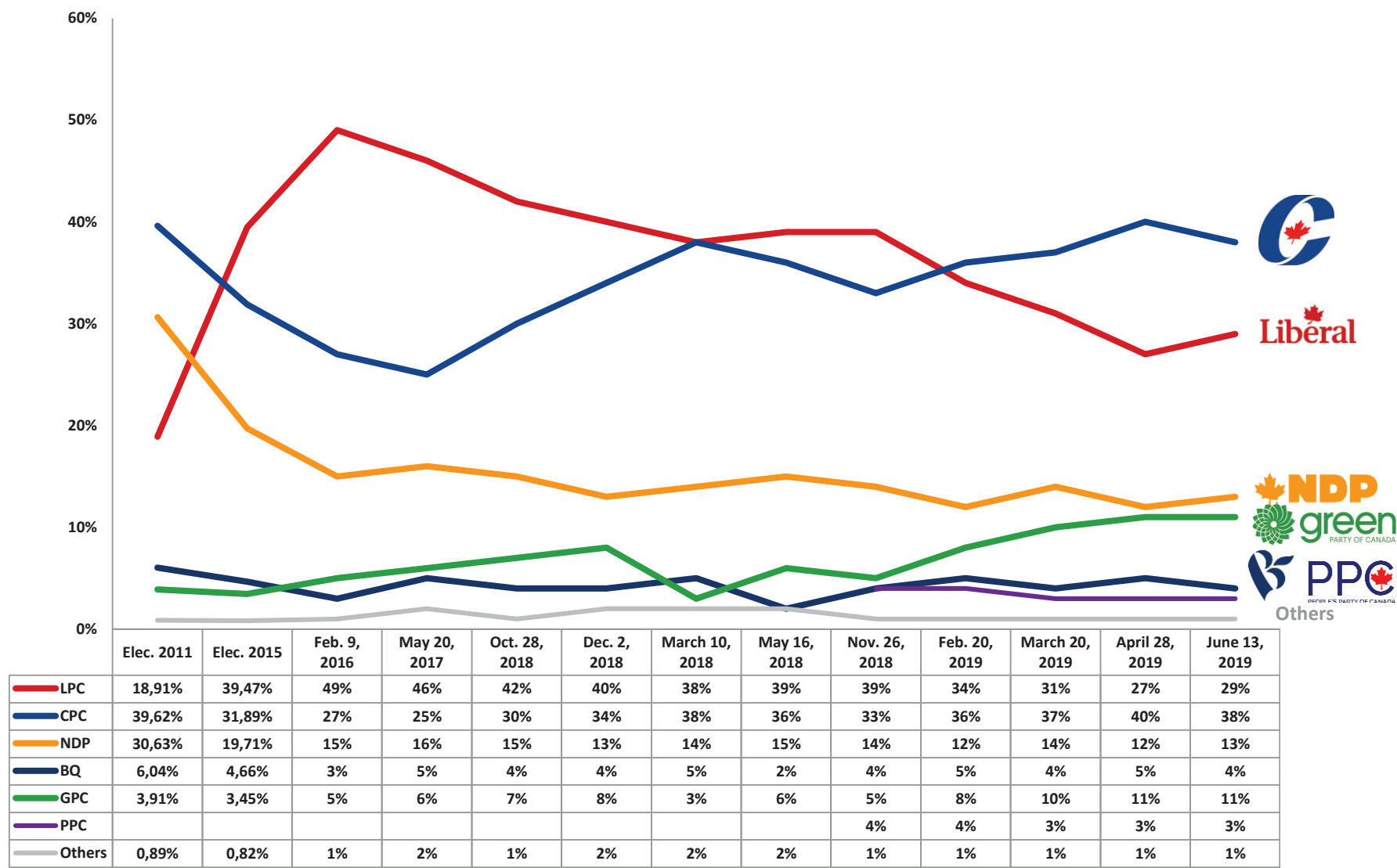
Q1A/Q1B. If FEDERAL elections were held today, for which political party would you be most likely to vote? Would it be for...?

In the event a respondent had no opinion, the following prompting question was asked: Even if you have not yet made up your mind, for which of the following political parties would you be most likely to vote? Would it be for...

Base: All respondents, except for Yves-François Blanchet, Quebecers only (n=411)

	TOTAL Before Distribution	TOTAL After Distribution	ATL	QC	ON	MB/SK	AB	BC	Male	Female	18-34	35-54	55+	April 28, 2019	Vari- ation
Weighted n =	1,522	1,220	75	272	477	77	146	174	606	614	303	410	507	1,236	
Unweighted n =	1,528	1,263	79	328	514	104	110	128	703	560	205	486	572	1,262	
...Andrew Scheer's Conservative Party of Canada	30%	38%	26%	30%	39%	49%	59%	31%	43%	33%	30%	36%	44%	40%	-2
...Justin Trudeau's Liberal Party of Canada	23%	29%	51%	28%	29%	20%	22%	30%	27%	30%	26%	29%	30%	27%	+2
...Jagmeet Singh's New Democratic Party of Canada	10%	13%	9%	9%	16%	13%	8%	18%	11%	14%	22%	13%	7%	12%	+1
...Elizabeth May's Green Party of Canada	9%	11%	8%	10%	11%	13%	7%	19%	8%	15%	14%	11%	11%	11%	-
...Yves-François Blanchet's Bloc Québécois	4%	4%	-	20%	-	-	-	-	6%	3%	3%	5%	5%	5%	-1
...Maxime Bernier's People's Party of Canada	3%	3%	6%	3%	3%	6%	4%	3%	4%	3%	4%	5%	2%	3%	-
...for another party	1%	1%	0%	1%	2%	0%	0%	0%	0%	2%	1%	1%	1%	1%	-
I would not vote	6%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I would cancel my vote	2%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
I don't know	9%	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Refusal	3%	-	-	-	-	-	-	-	-	-	-	-	-	-	-

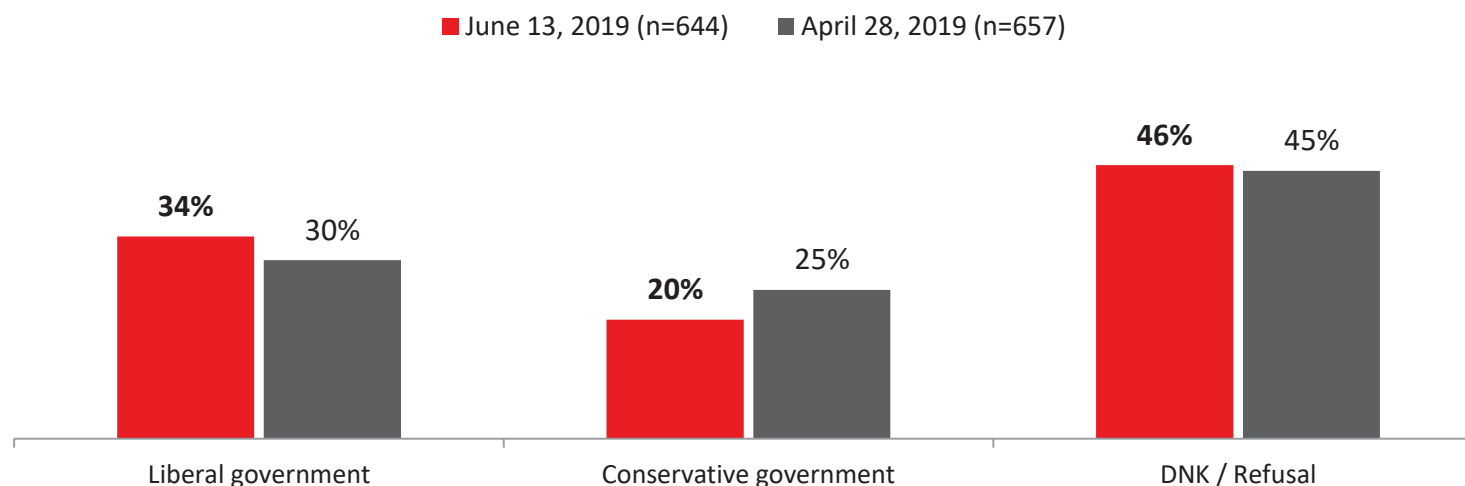
TRENDS IN VOTING INTENTIONS IN CANADA



PREFERENCE BETWEEN A CONSERVATIVE OR LIBERAL GOVERNMENT

Q4. While there are many political parties to choose from at the next Federal election in October 2019, most agree that who forms government will be decided between the Liberals and the Conservatives. At the end of the day, do you think that Canada will be better off with a Liberal government or a Conservative government?

Base: Respondents who don't intend to vote for the Liberals or Conservatives (n=644)

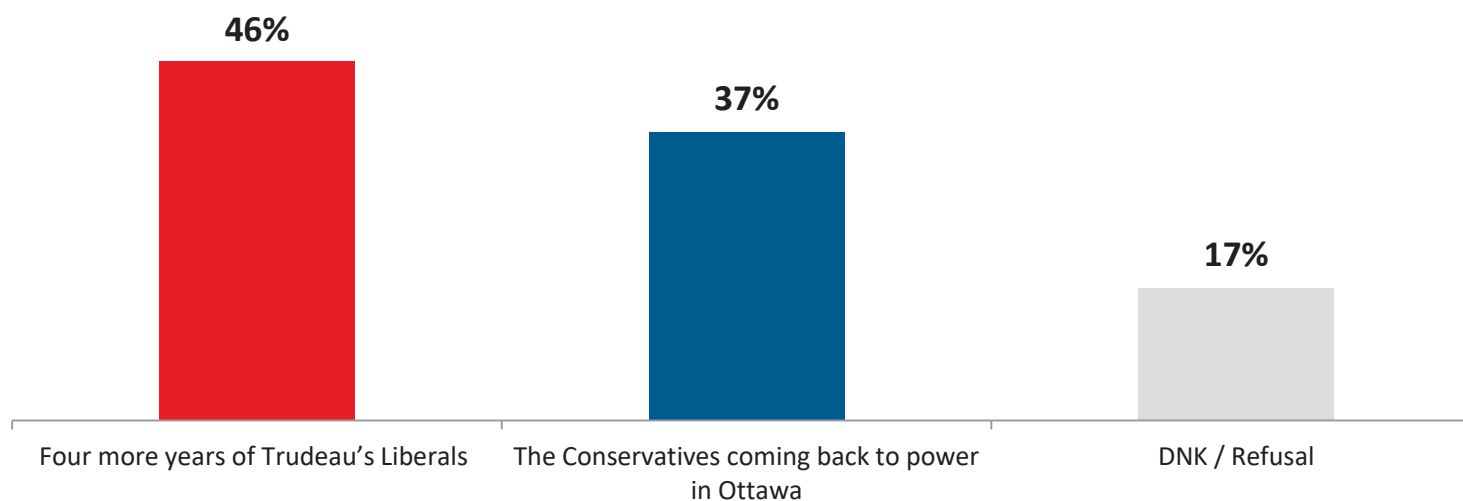


	TOTAL	ATL	QC	ON	MB/SK	AB	BC	Male	Female	18-34	35-54	55+
Weighted n =	705	46	202	259	45	54	100	307	398	233	255	218
Unweighted n =	644	34	212	240	51	36	71	303	341	138	271	235
Liberal government	34%	35%	31%	38%	20%	32%	37%	38%	31%	45%	27%	30%
Conservative government	20%	7%	25%	19%	30%	27%	14%	20%	20%	14%	23%	25%
I don't know	38%	53%	35%	36%	45%	38%	39%	33%	41%	33%	40%	40%
Refusal	8%	5%	9%	8%	4%	3%	10%	9%	8%	9%	10%	5%

PERSPECTIVE THAT MOST WORRIES CANADIANS

Q5. And, which of the following two perspectives worries you the most?

Base: All respondents (n=1,528)



	TOTAL	ATL	QC	ON	MB/SK	AB	BC	Male	Female	18-34	35-54	55+
Weighted n =	1,522	104	359	584	97	172	206	732	789	404	522	596
Unweighted n =	1,528	100	411	614	125	125	153	826	702	261	599	668
Four more years of Trudeau's Liberals	46%	33%	42%	43%	66%	63%	45%	50%	42%	38%	47%	50%
The Conservatives coming back to power in Ottawa	37%	44%	36%	41%	28%	26%	38%	36%	38%	40%	34%	37%
I don't know	15%	23%	18%	15%	5%	8%	15%	13%	16%	20%	15%	11%
Refusal	2%	1%	4%	2%	1%	2%	2%	1%	3%	2%	4%	1%

SAN **Dan Tsubouchi** @Energy_Tidbits · 5h
Trump, Centcom, MBS all say don't want war with Iran. Wonder if that incl cyber?
[@nytimes](#) story is US cyber plan re Russia, surely US has cyber plan re Iran? Iran has cyber capability, should we be worried about fall out on oil infra/supply?
#OOTT



U.S. Escalates Online Attacks on Russia's Power Grid

The Trump administration is using new authority to take more aggressive digital action in a warning to Moscow and in a demonstration of its abilities.
[nytimes.com](#)

🗨️ ↺️ 1 ❤️ 📊

SAN **Dan Tsubouchi** @Energy_Tidbits · 5h
Must read Saudi MBS interview – “does not want a war in the region”, blames Iran not its surrogates, for tanker attacks, not giving up its fight vs Houthis, committed to Aramco IPO “between 2020 and the beginning of 2021”, many more tidbits. #OOTT [aawsat.com/english/home/a...](#)



Mohammed bin Salman to Asharq Al-Awsat: We Don't Want War but ...

Crown Prince Mohammed bin Salman, Deputy Prime Minister and Minister of Defense, said that Saudi Arabia does not want a war in the region, but s...
[aawsat.com](#)

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Dan Tsubouchi @Energy_Tidbits · Jun 14

SAF IEA OMR, 2019 fits weak demand narrative, 2019 demand growth lowered by 0.1 mmb/d to +1.2 mmb/d YoY. IEA 1st look at 2020 shows need for OPEC+ to continue/even increase cuts. In 2020, non-OPEC supply growth +2.3 mmb/d vs demand growth +1.4 mmb/d #OOTT



Oil Market Report: 2020 vision

World trade growth has fallen back to its slowest pace since the financial crisis ten years ago, and the consequences for oil demand are becoming...

iea.org

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Dan Tsubouchi @Energy_Tidbits · Jun 13

SAF Excellent CAPP "Crude Oil Forecast, Markets and Transportation" report - great data, charts & maps. Even w/ industry challenges, CAPP's new oil forecast is a little higher this yr, a key factor is liquids rich Montney/Duvernay. #OOTT capp.ca/publications-a...

CAPP June 2019 Forecast							CAPP June 2018 Forecast						
Table 2.1 Canadian Crude Oil Production							Table 2.1 Canadian Crude Oil Production						
Million b/d	2018	2020	2025	2030	2035	Change	Million b/d	2017	2020	2025	2030	2035	Change
Eastern Canada	0.23	0.30	0.32	0.18	0.09	-0.14	Eastern Canada	0.22	0.28	0.29	0.19	0.07	-0.16
Western Canada	4.36	4.64	5.17	5.48	5.76	1.41	Western Canada	3.06	4.65	4.96	5.21	5.53	+1.50
Total Canada*	4.59	4.94	5.49	5.66	5.86	1.27	Total Canada*	4.18	4.93	5.25	5.40	5.60	+1.41
*Total may not add up due to rounding							*Total may not add up due to rounding						
Table 2.3 Western Canada Crude Oil Production							Table 2.3 Western Canada Crude Oil Production						
Million b/d	2018	2020	2025	2030	2035	Change	Million b/d	2017	2020	2025	2030	2035	Change
Conventional	1.44	1.45	1.59	1.60	1.51	0.07	Conventional	1.32	1.43	1.49	1.40	1.33	+0.02
Crude oil	1.04	0.99	1.09	0.98	0.95	(0.09)	Crude oil	0.99	1.01	0.99	0.95	0.92	-0.06
Perforated and Condensate	0.41	0.45	0.50	0.61	0.56	0.16	Perforated and Condensate	0.33	0.43	0.50	0.44	0.41	+0.08
Oil sands							Oil sands						
Bitumen + Upgraded	2.91	3.29	3.57	3.88	4.25	1.34	Bitumen + Upgraded	2.65	3.22	3.47	3.82	4.19	+1.55
Total Western Canada*	4.36	4.64	5.17	5.48	5.76	1.41	Total Western Canada*	3.98	4.65	4.96	5.21	5.53	+1.56
*Total may not add up due to rounding							*Total may not add up due to rounding						

1

Dan Tsubouchi @Energy_Tidbits · Jun 13
SAF Pompeo reportedly saying today's tanker attack was a "torpedo attack". Mines are a real risk ,but a torpedo attacks and rocket attacks add that different element of longer distance attack. Iran's new Jask-2 torpedo reportedly has a range of 19 miles. #OOTT popularmechanics.com/military/navy-...



🗨️ ↻️ 1 ❤️ 📺

Dan Tsubouchi @Energy_Tidbits · Jun 13
SAF I am hoping this prediction comes true, be a big plus to Cdn heavy oil



🗨️ ↻️ 1 ❤️ 7 📺

Dan Tsubouchi @Energy_Tidbits · Jun 13

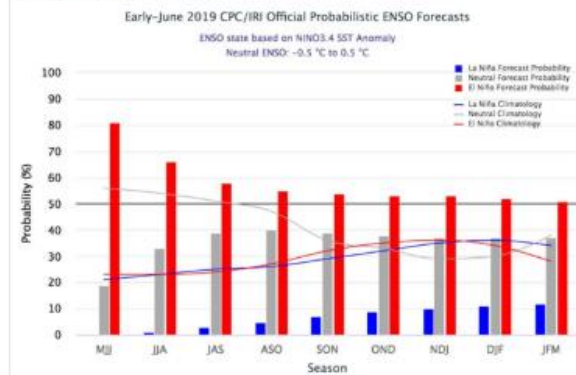
SAF No major oil/nat gas takeaways from new El Nino forecast. Reduced El Nino prob for key A/S/O hurricane mths to 55% (was 60%), not a major swing for hurricane odds. Reduced key D/J/F winter mths to 52% prob (was 57%), too early to make a diff for winter. iri.columbia.edu/our-expertise/...

https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/?enso_tab=enso-cpc_plume

IRI ENSO Forecast

CPC/IRI Official Probabilistic ENSO Forecast

Published: June 13, 2019



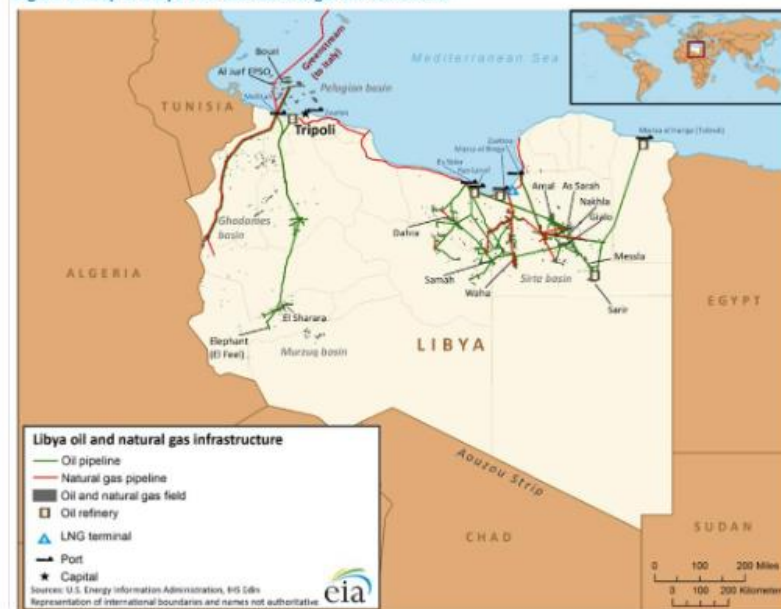
CPC/IRI Early-Month Official ENSO Forecast Probabilities

Season	La Niña	Neutral	El Niño
MJJ 2019	0%	19%	81%
JJA 2019	1%	33%	66%
JAS 2019	3%	39%	58%
ASO 2019	5%	40%	55%
SON 2019	7%	39%	54%
OND 2019	9%	38%	53%
NDJ 2019	10%	37%	53%
DJF 2020	11%	37%	52%
JFM 2021	12%	37%	51%

Dan Tsubouchi @Energy_Tidbits · Jun 13

SAF Libya oil news, Haftar's military move into Ras Lanuf export terminal. Libya NOC warns may have to withdraw workers from terminal ie. risk that 2nd largest Libya oil export terminal 220,000 b/d loading capacity will be shut down. noc.ly/index.php/en/n...

Figure 1. Map of Libya's oil and natural gas infrastructure



SAF (GROUP) **Dan Tsubouchi** @Energy_Tidbits · Jun 13
 BP Statistical Review of World Energy, good 2018 for nat gas, but SAF blog "BP's 2018 Natural Gas/LNG Data Reminds That LNG Price Pressures Should Continue In 2020/2021" reminds challenge from 3.6 bcf/d Power of Siberia and 5.3 bcf/d Nord Stream 2 #LNG safgroup.ca/research/artic...

World Vs China 2018 Natural Gas Demand Vs Supply							
bcfd	2016	2017	YoY 17 v 16%	Change YoY	2018	YoY 18 v 17%	Change YoY
World							
Consumption	342.6	353.5	10.9	3.2%	372.4	18.9	5.3%
Pipeline Imports	46.3	49.4	3.1	6.7%	49.6	0.2	0.4%
LNG Imports	34.6	38.1	3.5	10.1%	41.7	3.6	9.4%
China							
Consumption	20.2	23.3	3.1	15.3%	27.4	4.1	17.6%
Supply							
Production	13.3	14.4	1.1	8.3%	15.6	1.2	8.3%
Pipeline Imports	3.6	3.9	0.3	8.7%	4.6	0.8	19.9%
LNG Imports	3.6	5.1	1.6	44.2%	7.1	2.0	38.9%
	20.4	23.4	3.0	14.6%	27.3	4.0	16.9%
Gas % of China Energy Mi:	5.91%	6.58%	0.67%		7.43%	0.85%	
China Share of World							
Consumption	5.9%	6.6%	28.4%		7.4%	21.7%	
Pipeline Imports	7.7%	7.8%	10.0%		9.3%	385.0%	
LNG Imports	10.3%	13.4%	44.9%		17.1%	55.3%	

*Numbers may be off due to rounding
 Source: BP, SAF Group

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🔄 You Retweeted **Raf Sanchez** @rafsanchez · Jun 13
 Footage from Iranian state TV shows massive damage to the starboard side of one of the oil tankers

Press TV



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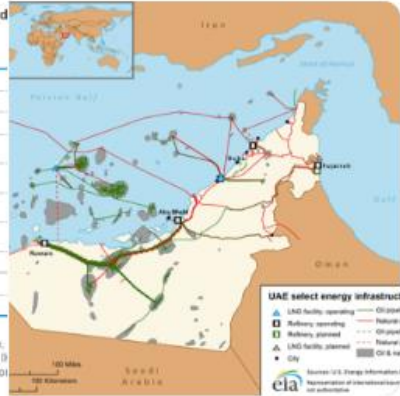
Dan Tsubouchi @Energy_Tidbits · Jun 13

SAF Brent is +\$2.43/b today, should it be higher? won't tanker owners want to halt tankers at least temporarily until they find out more on the risk? tankers leaving strait of hormuz have pass right by this risk area? #OOTT

of crude oil and petroleum liquids transported through world
d Hope, 2011-16 (million barrels per day)

	2011	2012	2013	2014
	17.0	16.8	16.6	16.9
	14.5	15.1	15.4	15.5
SUMED Pipeline	3.8	4.5	4.6	5.2
	3.3	3.6	3.8	4.3
	3.0	3.3	3.1	3.0
	2.9	2.7	2.6	2.6
	0.8	0.8	0.8	0.9
xpe	4.7	5.4	5.1	4.9
I trade	55.5	56.4	56.5	56.4
ply	88.8	90.8	91.3	93.8

ma Canal are by fiscal year.
gy Information Administration analysis based on Lloyd's List Intelligence,
gus FSU, Global Trade Tracker, BP Statistical Review of World Energy, B
d Gas Journal, Suez Canal Authority, and UNCTAD, using EIA conversion



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Eric Nuttall @ericnuttall · Jun 12

Passing Bill C-69 with all 187 amendments was never in the cards. As sad as it is Trudeau needs something to offer his base in exchange for next week's TMX approval. For me, TMX+Line 3(2021)+KXL (2022?) is good enough until... #OOTT



'Simply unacceptable': Liberals reject most Tory a...

Conservative senators, the Canadian Association of Petroleum Producers and five conservative premiers have all said that every single amendment has to be ac...

bnnbloomberg.ca

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Dan Tsubouchi @Energy_Tidbits · Jun 13
SAF MEHR news. Iran Foreign Ministry raises suspicion on timing of tanker attacks given Abe is in Iran, FM tweet added "and regards the event in contrast with regional and trans-regional orientations and efforts made to reduce tensions in the region".



Iran concerned about oil tanker attacked in Oman Sea : FM spox

TEHRAN, Jun. 13 (MNA) – In a tweet on Thursday, Iranian Foreign Ministry Spokesman Abbas Mousavi expressed Iran's concern about what happened en.mehmews.com

Dan Tsubouchi @Energy_Tidbits · Jun 13
SAF Do today's tanker attacks add more risk than Fujairah? Location close to Iran coast seems to add rocket/torpedo risk ie. reminds of Houthi rocket attacks on tankers in Red Sea, reinforces a key Strait of Hormuz risk. Location also adds more risk to UAE exports #OOTT



Dan Tsubouchi @Energy_Tidbits · Jun 13

SAF (GROUP) Tanker attacks are driving oil up today and rightly so. OPEC's MOMR just released in the last 10 min. As expected, follows EIA in lowering 2019 growth rate in oil demand down by 0.7 mmb/d to +1.14 mmb/d YoY. #OOTT see SAF June 9, 2019 Energy Tidbits safgroup.ca/research/trend...

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Dan Tsubouchi @Energy_Tidbits · Jun 12

SAF (GROUP) Reminder, Norway's decision is supposed to come today, with the likely decision to sell remaining oil/gas/coal stocks, incl US\$2.5b of Cdn oil/gas stocks as of Dec 31/18. See SAF Group June 9, 2019 Energy Tidbits memo. #OOTT safgroup.ca/research/trend...

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Dan Tsubouchi @Energy_Tidbits · Jun 11

SAF (GROUP) No surprise, EIA lowered its oil demand forecasts for 2019 to 101.14 mmb/d (was 101.36 mmb/d) + for 2020 to 102.56 mmb/d (was 102.89 mmb/d). Expect to see reductions in OPEC MOMR on June 13 and IEA on June 14. #OOTT see SAF June 9, 2019 Energy Tidbits. safgroup.ca/research/trend...

Energy Tidbits

June 9, 2019

Produced by: Dan Tsubouchi

Look For IEA, EIA, OPEC To Lower 2019 Oil Demand Growth Rate In This Week's New Monthly Forecasts

Welcome to new Energy Tidbits memo readers. We are continuing to add new readers to our Energy Tidbits memo and energy blogs. The focus and concept for the memo was set in 1999 with input from PMs, who were looking for research (both positive and negative items) that helped them shape their investment thesis to the energy space, and not focusing on day to day trading. Our priority was and still is to not just report on events, but interpret and point out implications therefrom. The best example is our review of investor days, conferences and earnings calls focusing on sector developments that are relevant to the sector and not just a specific company results/guidance. Our target is to write on 48 to 50 weekends per year and to send out by noon mountain time.

This week's memo highlights:

1. We expect to see IEA, EIA and OPEC to lower their 2019 oil demand growth rates when they post their new monthly forecasts this week. ([Click Here](#))
2. Good news for 830,000 b/d Keystone XL and Cdn heavy oil with the construction stop injunction overturned means now looking for in service in 2022. ([Click Here](#))
3. Increasing chatter that Liberals will approve TMX on June 18 and (surprising to us) start full construction this summer. ([Click Here](#))
4. Saudi Al Fali's expectations for the OPEC+ extension provided support for oil prices on Friday. ([Click Here](#))
5. Pompeo's leaked blame of Venezuelan opposition adds to the challenge to oust Maduro. ([Click Here](#))
6. Please follow us on Twitter at [@LINK](#) for breaking news that ultimately ends up in the weekly Energy Tidbits memo that doesn't get posted until Sunday noon MT.
7. For new readers to our Energy Tidbits and our blogs, you will need to sign up at our blog sign up to receive future Energy Tidbits memos. The sign up is available at [LINK](#).

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SAF GROUP **Dan Tsubouchi** @Energy_Tidbits · Jun 11

Great market intel @ericnuttall, points to TMX approval +, most importantly, full construction start July, ahead of Oct election. Lets hope so. Even if not, Keystone XL 830,000 b/d news last week should see full construction start in 2020/in service 2022. XL is now visible egress



Eric Nuttall @ericnuttall

TMX update: large diameter coated pipe is rolling through Calgary on its way to Kamloops. We reiterate our view that TMX gets approved next week providing line of sight to almost 600,000Bbl/d of incremental takeaway to...

4 5

SAF GROUP **Dan Tsubouchi** @Energy_Tidbits · Jun 10

Bloomberg: Iraq says "will begin trucking as much as 10k b/d of Kirkuk crude oil" "to Jordan's Zarqa refinery". Iran oil is going somewhere, is this part of ~200 kbpd being snuck out via trucking and rebranded? See SAF June 9, 2019 Energy Tidbits #OOTT safgroup.ca/research/trend...

Bloomberg Terminal

BFW 06/09 08:43 *IRAQ PLANS TO START EXPORTING OIL TO JORDAN BY END-JUNE OR JULY

Iraq Plans to Start Exporting Oil to Jordan by End-June or July
2019-06-09 08:50:04.104 GMT

By Khalid Al-Ansary

(Bloomberg) -- Iraq will begin trucking as much as 10k b/d of Kirkuk crude oil from the country's northern region to Jordan's Zarqa refinery, [Alaa Al-Yasiri](#), acting director-general of state-run Oil Marketing Co., says in phone interview.
* Oil will be sold on FOB basis
* Jordan to send Iraq a list of approved banks for issuance of letters of credit to finance purchases
* NOTE: May 1, Jordan Awards Contract to Transport Crude From Iraq: Minister

To contact the reporter on this story:

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To contact the editors responsible for this story:

Bruce Stanley at bstanley5@bloomberg.net

James Amott

SAF GROUP **Dan Tsubouchi** @Energy_Tidbits · Jun 10

TASS interview w/ Saudi Energy Minister al Falih - Russia (incl Putin)/ Saudi agree on need for extension, likely at lower level, and sets expectations to agree on levels @ G20 (June 28/29) as he "may" meet Novak then to "calibrate" positions. #OIL #OOTT



Saudi Arabia's energy minister: The benefit of parti...

Saudi Arabia's energy chief on the future of Vienna agreement, Saudi Aramco's plans for Russia's LNG projects and the St. Petersburg talks

tass.com

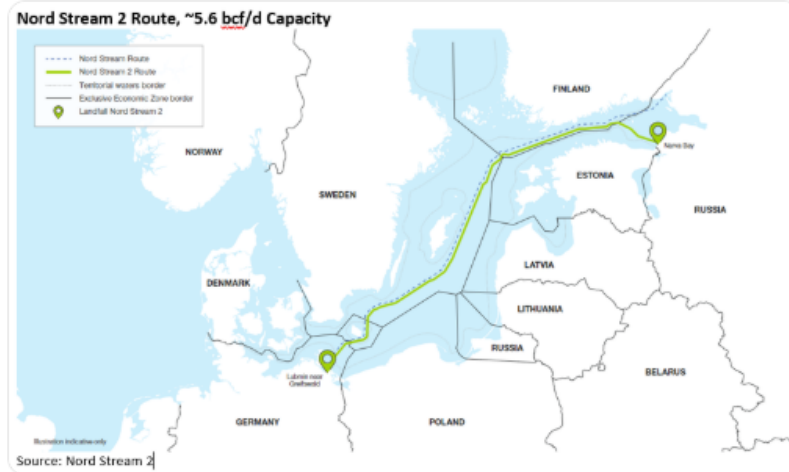
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SAF GROUP **Dan Tsubouchi** @Energy_Tidbits · Jun 9
... May miss Dec 31/19 in service, but will be quick once Denmark approves. A major negative to 2020 LNG prices. See SAF Mar 30/19 blog "LNG Price Pressures 2020/2021 With Gazprom Adding ~8.9 Bcf/D Export Gas Pipeline Capacity Into Europe And China" #LNG safgroup.ca/research/trend...

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SAF GROUP **Dan Tsubouchi** @Energy_Tidbits · Jun 9
Gazprom says 5.6 bcf/d Nord Stream 2 export pipeline to German is now 57.2% completed and work is going on every day to complete. Don't know when Denmark will approve,, but will only take ~5 weeks to complete ~130 km in Danish waters ... #LNG tass.com/economy/1062797



SAF GROUP **Dan Tsubouchi** @Energy_Tidbits · Jun 9
... likely to see at least minor drop in oil demand growth rates in 2019. Currently the IEA is +1.3 mmb/d YoY in 2019 (vs +1.2 mmb/d YoY in 2018), OPEC is +1.21 mmb/d (vs +1.41 mmb/d), and EIA is +1.38 mmb/d (vs 1.46 mmb/d). May not be huge, but will impact tone to oil #OOTT

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SAF GROUP **Dan Tsubouchi** @Energy_Tidbits · Jun 9
Look for lower 2019 oil demand growth rates in this week's monthly EIA STEO on June 11, OPEC MOMR on June 13, and IEA OMR on June 14. May forecasts wouldn't have included Trump May 5 China 25% tweet, World Bank June economic update, today's G20 finance ministers, etc #OOTT

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