Forecasting Global Liquids Supply Deficit in 2019

Assuming energy pricing gradually cycles higher, expect credit quality for energy industry to be stable.

Morningstar Credit Ratings, LLC
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Andrew J. O'Conor
Vice President
+1 312 348-3021
andrew.oconor@morningstar.com

Executive Summary

We have increased our forecast for both a liquids supply deficit and crude inventory draw for full-year 2019, and we think a deficit could continue in 2020. This analysis enhances conviction for our current crude-oil price forecast: an average 2019 oil price of between $55 and $60 per barrel and, for 2020, $60 per barrel. Our forecast for $65 in 2021 and 2022 also remains the same. Since we published our last global liquids supply and demand analysis in January, the West Texas Intermediate oil price has continued to rise, from $52 per barrel to about $61 today, which we believe is driven by market concerns about supply. Western producers began the year with a cautious approach to spending, Venezuelan production has continued its sharp decline, Saudi Arabia's large voluntary cuts have resulted in overall excellent compliance with the OPEC+ production cut agreement implemented Jan. 1, and the anticipation of and actual reinstatement on May 2 of full U.S.-imposed Iranian sanctions are constricting oil exports there. The reduction in our forecast for global liquids supply should help mitigate demand headwinds caused by U.S.-China trade tensions. Assuming energy pricing continues to gradually move higher, we expect the credit trend for the energy industry—including the exploration and production, oilfield-services, refining, and integrated segments—to remain stable.

Global Liquids Supply and Demand Analysis

To bookend the range of potential outcomes, we considered a high and low set of price assumptions in forecasting the balance between global liquids' (crude oil plus natural gas liquids) supply and demand. That is, our high-price scenario incorporates strong global liquids demand growth and weak supply assumptions, and our low-price scenario incorporates weak global liquids demand growth and strong supply assumptions. Our global forecast is the result of a bottom-up approach, where we forecast both supply and demand on a regional or individual country basis.

We reference the OPEC Monthly Oil Market Report (May 2019) at www.opec.org and the U.S. Energy Information Administration at www.eia.gov for historical information. To align with OPEC, our definition of liquids includes crude oil and byproduct NGLs. We estimate that NGLs make up 13%-17% of total liquids.

Liquids Supply Deficit Appears Likely for 2019, Supporting Our View for a Continued Rebound in the Oil Price

Our forecast for a liquids supply deficit and crude inventory draw for full-year 2019 and possible continuation in 2020 supports our current crude-oil price forecast: an average 2019 oil price of between $55 and $60 per barrel and, for 2020, $60 per barrel. Our forecast for $65 in 2021 through 2023 also remains the same. The spot WTI oil price averaged about $63.90 for April 2019, $54.83 for first-quarter

2019, $59.08 per barrel for fourth-quarter 2018, $64.90 for full-year 2018, $50.80 in 2017, $43.30 in 2016, and $48.70 in 2015.

Since the beginning of 2018, Organization for Economic Cooperation and Development commercial crude-oil stocks are nearly unchanged at 1.45 billion barrels (through March), slightly above the five-year average. Within the OECD, U.S. crude-oil inventory has increased by about 10% to 467 million barrels currently from 425 million. However, U.S. total motor gasoline stocks are currently 229 million barrels, which is near the average of the five-year range for this time of year.

For 2019, we forecast that global liquids supply will range from 5% below demand in our high-price scenario to slightly above demand in our low-price scenario. We think a liquids supply deficit is likely for full-year 2019, implying a net reduction in global crude-oil inventory for the year, which should support price. Our high-price scenario assumes demand growth as high as 2.3% for the year combined with a 3.5% contraction in supply, incorporating the impact from a resilient global economy, the enforcement of full Iranian sanctions, worsening Venezuelan economic problems, and compliance with pledged OPEC-Russia oil production cuts (implemented on Jan. 1). To the downside, we believe a worsening trade war would hinder global GDP growth, constraining liquids demand growth to 1.8% (the low end of our 2019 range). We believe weaker demand may drive a slight global surplus of liquids if major producers fail to faithfully adhere to production cut agreements.

Beyond 2019, our forecast range of outcomes widens. In 2020, we forecast that global supply will range from a 5% deficit to a 2% surplus. Although this suggests a supply deficit may continue through 2020, we think the likelihood of a deficit next year is less than in 2019, given the variables that can have an impact on both supply and demand one year in the future. Commensurate with our projection for a liquids supply deficit in both 2019 and 2020, we expect that global oil inventory will be drawn down, but we believe a reduction is less likely in 2020 than 2019. We show the results in a chart (Exhibit 1) and, in tables, for our high-price scenario in Exhibit 3 and the low-price scenario in Exhibit 4.

Liquids Demand Forecast; Tariff Escalation Could Weaken Global GDP, Constraining Growth in Liquids Demand

The major assumptions incorporated in our liquids demand forecast include:

Strong Global Demand

- In our scenario for strong global demand, we project 2.3% demand growth in 2019 and a 2.0% compound annual growth rate from 2018 through 2021. These growth rates are at the high end of historical compound rates taken at three-, five-, 10-, and 15-year intervals through 2018.
- Our 2.3% global growth rate for 2019 incorporates 5.3% growth for China, 2.8% for developing countries (includes India, Brazil, and the Middle East), 1.4% for the Americas (includes the United States, Mexico, and Canada), 1.3% for Europe (includes France, Germany, Italy, and the United Kingdom), and 0.7% for Asia-Pacific (includes Japan, South Korea, and Australia).

Weak Global Demand

- In our scenario for weak global demand, we project 1.8% demand growth in 2019 and a 1.4% compound annual growth rate from 2018 through 2021. These growth rates are toward the low end of historical compound rates taken at various intervals through 2018.
- Our downside 1.8% global demand growth estimate for 2019 incorporates 4.5% growth in China, 2.0% for developing countries, 1.1% for the Americas, 0.9% for Europe, and nil for Asia-Pacific.

Worsening trade tensions between the United States and China could lessen global liquids demand growth by slowing overall economic growth. On May 10, the U.S. raised the tariff rate to 25% from 10% on $200 billion worth of Chinese products. Further, the U.S. has begun the process to provide for public notice and comment to raise tariffs on essentially all remaining imports from China, which are valued at approximately $300 billion. In retaliation, China announced that it will increase tariffs on $60 billion of U.S. goods beginning on June 1. More optimistically, the U.S. recently delayed a final decision on tariffs against auto imports from the European Union and Japan for six months. Additionally, the U.S. agreed to end tariffs against imports of steel and aluminum from Mexico and Canada. In return, Canada and Mexico dropped retaliatory tariffs against a broad range of U.S. products.

In deriving our liquids demand growth projections, we referenced historical information from the World Bank and its Global Economic Prospects report (January 2019) and The Conference Board (Nov. 13, 2018, and May 8 update) for gross domestic product forecasts by region and country.

Liquids Supply Forecast; Lower Bound for Supply Reflects Adherence to OPEC-Russia Cut Agreement Through Year-End 2019

To help offset surging U.S. shale oil output, Iranian sanction waivers, and other imbalances that were building between global supply and demand, OPEC and several large non-OPEC producing countries, including Russia, Mexico, Oman, and Kazakhstan, implemented a collective production cut of 1.2 million barrels of crude per day (1.0%-1.5% of global supply) for an initial six-month period that began on Jan. 1. Given their exceptional conditions, OPEC members Libya, Iran, and Venezuela are exempt from the agreement. The cut agreement will be reviewed at the next regularly scheduled OPEC meeting on June 25. Since the agreement was implemented, market reports indicate more than 90% overall compliance by participants. Saudi Arabia has provided especially strong support, cutting nearly 300,000 barrels per day more than its commitment and offsetting Russia, which has exceeded its commitment by about 80,000 bpd. Recent reports indicate mixed signals by Russia regarding its desire to extend the cut agreement beyond June 30.

The major assumptions incorporated in our global liquids supply forecast include:

Weak Supply Scenario

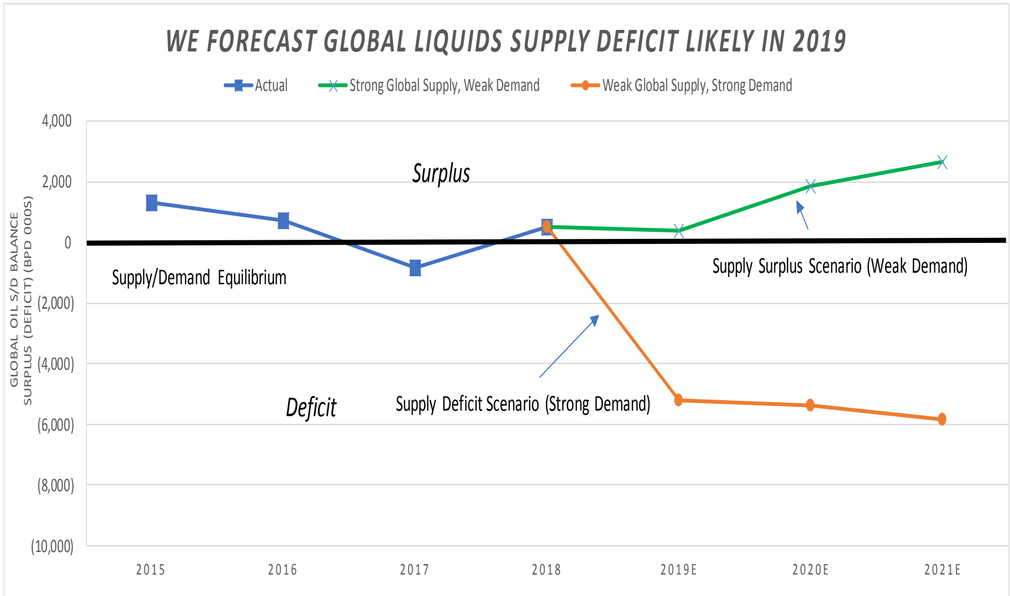
- The scenario for weak global supply results in a 3.5% global supply contraction in 2019 and nearly flat compound annual growth rate from 2018 through 2021. These growth rates are below the low end of historical compound rates taken at three-, five-, 10-, and 15-year intervals through 2018.

- In this scenario, we assume OPEC-Russia production cuts implemented on Jan. 1 for an initial six-month period remain near 100% compliant and are extended to year-end 2019. OPEC is estimated to average 32.9 million barrels per day of liquids output in 2019. This includes 2.4 million bpd average production in Iran. Temporary waivers granted to eight countries just before the U.S. imposed economic sanctions against Iran in November expired May 2. Thereafter, we assume that U.S. sanctions are fully employed against Iran, constricting Iranian oil exports.
- Our other supply assumptions for 2019 include 600,000 bpd average production in Venezuela, 2.3 million bpd combined production from OPEC members Libya and Nigeria, and average U.S. production of 18.0 million bpd liquids (made up of 12.1 million bpd oil and 5.9 million bpd NGLs).
- For 2019, these assumptions equate to 3.7% year-over-year growth for the Americas (includes the U.S.), negligible growth for developing countries (includes Brazil, Oman, Indonesia, Qatar, and India), negative 0.6% for FSU (includes Russia, Kazakhstan, and Azerbaijan), and negative 10.3% for OPEC. Within OPEC, average Venezuelan and Iranian liquids output are forecast to contract by 56% and 32%, respectively, versus 2018.

Strong Supply Scenario

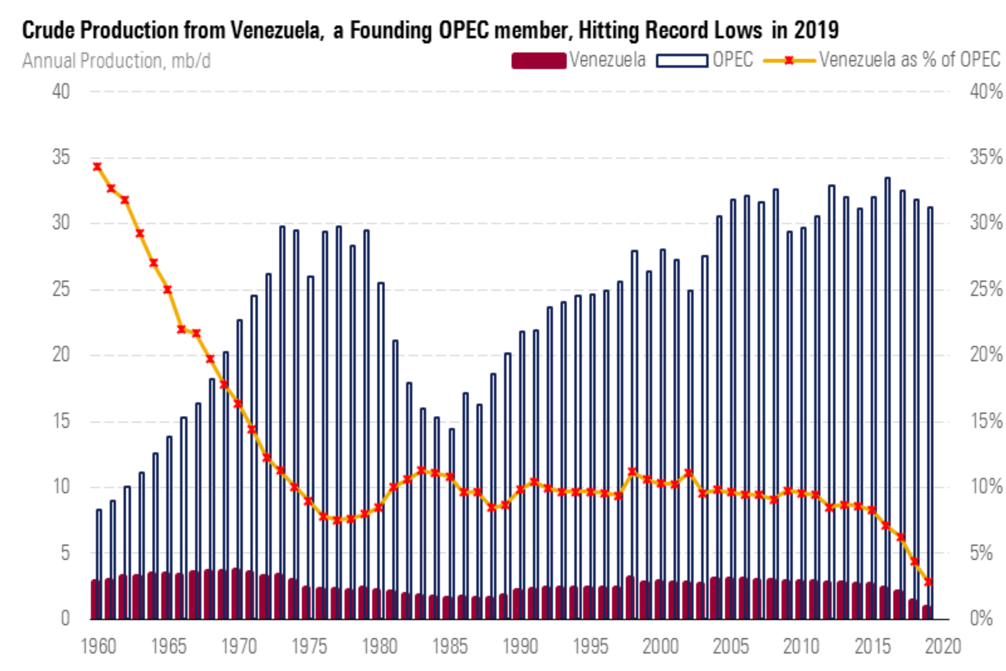
- The scenario for strong global supply results in 1.6% global supply growth in 2019 and a 2.1% compound annual growth rate from 2018 through 2021. These growth rates are above the high end of historical compound rates taken at various intervals through 2018. With the likelihood of only a modest rebound in upstream spending in 2019 (see Exhibit 5), we think it is unlikely that 2019 supply would be more than our estimate in the strong scenario.
- In this scenario, we assume that participants in the OPEC-Russia production cut agreement are less than 70% compliant through 2019 and the cuts are not extended beyond September 2019. There is a history of cheating by OPEC members and other participants on previous agreements to cut production. However, given high fiscal break-even prices for many OPEC and allied-nation producers—including Iran ($126), Bahrain ($95), Saudi Arabia ($85), Algeria ($116), Libya ($71), Iraq ($64), and the United Arab Emirates ($65), according to the International Monetary Fund—the participants seem highly incentivized to comply with the agreement to help support a higher oil price. OPEC averages 35.9 million bpd liquids output in 2019. This includes 2.8 million bpd average for Iran, increasing to 2.9 million bpd in 2020.
- For Venezuela, we incorporate 900,000 bpd average liquids production in 2019. Second, Libya and Nigeria produce 2.7 million bpd combined this year, but the constant threat of sectarian violence makes production from both countries uncertain. Last, U.S. production averages 18.5 million bpd liquids (composed of 12.4 million bpd oil and 6.1 million bpd NGLs) in 2019. However, the sharp crude price decline in late 2018 has caused some U.S. shale oil producers to take a more cautious approach to spending year to date, likely slowing production growth in 2019.
- For 2019, these assumptions equate to 7.1% year-over-year growth for the Americas, 1.3% for developing countries, negative 2.4% for OPEC, and 1.5% for FSU.

Exhibit 1 Liquids Supply Deficit Is Likely for 2019, Supporting Our View for a Continued Rebound in the Oil Price



Sources: Monthly Oil Market Report May 2019, www.opec.org.

Exhibit 2 Extreme Underinvestment Will Likely Make a Turnaround in Venezuelan Output a Long-Term Project



Sources: www.asb.opec.org.

Exhibit 3 High-Price Oil Scenario

	"High" Oil Price Scenario						
	Assumes Weak Global Supply, Strong Demand						
	2016	**2017**	**2018**	**2019E**	**2020F**	**2021F**	**'18-'21**
OECD Demand							**CAGR**
Americas	24,870	25,060	25,530	25,887	26,146	26,408	1.1%
YoY %	*1.2%*	*0.4%*	*1.9%*	*1.4%*	*1.0%*	*1.0%*	
Europe	13,990	14,300	14,290	14,469	14,577	14,686	0.9%
YoY %	*1.4%*	*2.1%*	*-0.1%*	*1.3%*	*0.8%*	*0.8%*	
Asia Pacific	8,100	8,110	8,060	8,120	8,141	8,161	0.4%
Total OECD	46,960	47,470	47,880	48,477	48,864	49,255	0.9%
YoY %	*1.1%*	*0.9%*	*0.9%*	*1.2%*	*0.8%*	*0.8%*	
DCs	31,510	32,130	32,610	33,507	34,344	35,203	2.6%
YoY %	*1.9%*	*1.9%*	*1.5%*	*2.8%*	*2.5%*	*2.5%*	
FSU	4,630	4,700	4,820	4,904	4,978	5,053	1.6%
Other Europe	700	720	740	766	785	805	2.8%
China	11,800	12,320	12,710	13,377	13,946	14,539	4.6%
YoY %	*2.6%*	*4.2%*	*3.2%*	*5.3%*	*4.3%*	*4.2%*	
Global Demand (mbpd)	95,600	97,340	98,760	101,031	102,917	104,854	2.0%
YoY %	*1.5%*	*1.7%*	*1.5%*	*2.3%*	*1.9%*	*1.9%*	
OPEC Supply							
Iran, I.R.	3,651	3,840	3,553	2,400	2,500	2,600	-9.9%
Iraq	4,648	4,458	4,480	4,350	4,400	4,450	-0.2%
Kuwait	2,954	2,705	2,742	2,700	2,750	2,750	0.1%
Saudi Arabia	10,460	9,955	10,314	9,800	10,250	10,500	0.6%
YoY %	*2.6%*	*-4.8%*	*3.6%*	*-5.0%*	*4.6%*	*2.4%*	
UAE	3,088	2,940	2,995	2,900	2,950	3,000	0.1%
Other OPEC (ex-Qatar)	8,640	8,191	7,735	6,400	6,575	6,800	-4.2%
YoY %	*-0.4%*	*-5.2%*	*-5.6%*	*-17.3%*	*2.7%*	*3.4%*	
Total OPEC	33,442	32,089	31,819	28,550	29,425	30,100	-1.8%
YoY %	*6.6%*	*-4.0%*	*-0.8%*	*-10.3%*	*3.1%*	*2.3%*	
Non-OPEC Supply							
Americas	20,580	21,490	24,100	25,000	25,600	26,000	2.6%
YoY %	*-2.5%*	*4.4%*	*12.1%*	*3.7%*	*2.4%*	*1.6%*	
Europe	3,850	3,820	3,830	3,600	3,450	3,450	-3.4%
Asia Pacific	420	390	410	400	400	390	-1.7%
Total OECD	24,850	25,700	28,340	29,000	29,450	29,840	1.7%
YoY %	*-2.0%*	*3.4%*	*10.3%*	*2.3%*	*1.6%*	*1.3%*	
DCs	13,530	13,390	13,470	13,470	13,470	13,520	0.1%
YoY %	*-1.8%*	*-1.0%*	*0.6%*	*0.0%*	*0.0%*	*0.4%*	
FSU	13,850	14,050	14,290	14,200	14,500	14,750	1.1%
YoY %	*1.2%*	*1.4%*	*1.7%*	*-0.6%*	*2.1%*	*1.7%*	
Other Europe	130	130	120	110	100	100	-5.9%
China	4,090	3,980	4,010	3,900	3,850	3,850	-1.3%
Processing gains	2,190	2,210	2,250	2,267	2,284	2,301	0.8%
Tot Non-OPEC Supply	58,640	59,460	62,480	62,947	63,654	64,361	1.0%
YoY %	*-1.5%*	*1.4%*	*5.1%*	*0.7%*	*1.1%*	*1.1%*	
OPEC NGLs + NCOs	4,810	4,940	4,980	4,311	4,443	4,545	-3.0%
YoY %	*2.6%*	*2.7%*	*0.8%*	*-13.4%*	*3.1%*	*2.3%*	
% Total OPEC	*14.4%*	*15.4%*	*15.7%*	*15.1%*	*15.1%*	*15.1%*	
Global Supply (mbpd)	96,892	96,489	99,279	95,808	97,522	99,006	-0.1%
YoY %	*1.4%*	*-0.4%*	*2.9%*	*-3.5%*	*1.8%*	*1.5%*	
Global S/D Balance (mbpd)							
Global Supply	96,892	96,489	99,279	95,808	97,522	99,006	
Global Demand	95,600	97,340	98,760	101,031	102,917	104,854	
Surplus (Deficit)	1,292	(852)	519	(5,223)	(5,395)	(5,848)	

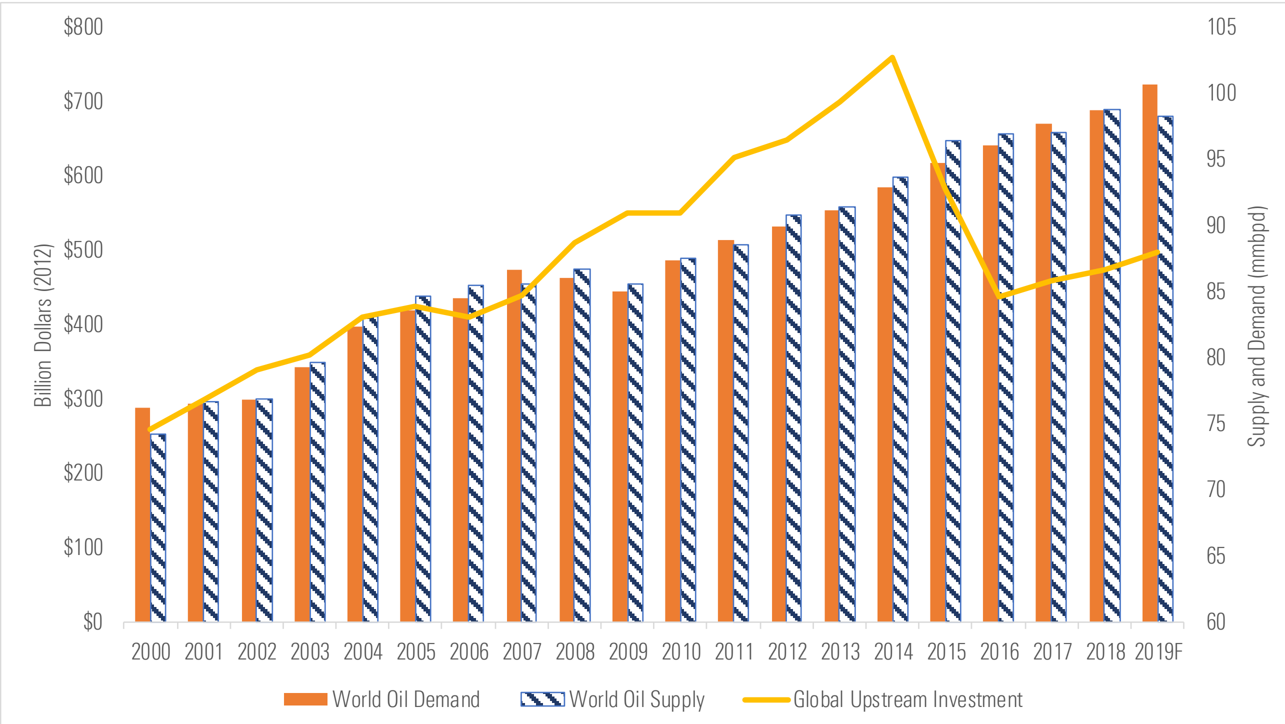
Sources: Monthly Oil Market Report May 2019, www.opec.org.

Exhibit 4 Low-Price Oil Scenario

	"Low" Oil Price Scenario Assumes Strong Global Supply, Weak Demand						
	2016	**2017**	**2018**	**2019E**	**2020F**	**2021F**	**'18-'21 CAGR**
OECD Demand							
Americas	24,870	25,060	25,530	25,811	25,940	26,070	0.7%
YoY %	*1.1%*	*0.8%*	*1.9%*	*1.1%*	*0.5%*	*0.5%*	
Europe	13,990	14,300	14,290	14,419	14,455	14,491	0.5%
YoY %	*1.2%*	*2.2%*	*-0.1%*	*0.9%*	*0.2%*	*0.2%*	
Asia Pacific	8,100	8,110	8,060	8,076	8,076	8,076	0.1%
Total OECD	46,960	47,470	47,880	48,306	48,471	48,637	
YoY %	*0.9%*	*1.1%*	*0.9%*	*0.9%*	*0.3%*	*0.3%*	0.0%
DCs	31,510	32,130	32,610	33,262	33,844	34,437	1.8%
YoY %	*2.0%*	*2.0%*	*1.5%*	*2.0%*	*1.8%*	*1.8%*	
FSU	4,630	4,700	4,820	4,892	4,953	5,015	1.3%
Other Europe	700	720	740	753	759	764	1.1%
China	11,800	12,320	12,710	13,282	13,714	14,159	3.7%
YoY %	*2.7%*	*4.4%*	*3.2%*	*4.5%*	*3.3%*	*3.3%*	
Global Demand (mbpd)	95,600	97,340	98,760	100,495	101,741	103,012	1.4%
YoY %	*1.5%*	*1.8%*	*1.5%*	*1.8%*	*1.2%*	*1.2%*	
OPEC Supply							
Iran, I.R.	3,651	3,840	3,553	2,800	2,900	3,000	-5.5%
Iraq	4,648	4,458	4,480	4,600	4,650	4,700	1.6%
Kuwait	2,954	2,705	2,742	2,800	2,850	2,900	1.9%
Saudi Arabia	10,460	9,955	10,314	10,500	10,750	11,000	2.2%
YoY %	*2.6%*	*-4.8%*	*3.6%*	*1.8%*	*2.4%*	*2.3%*	
UAE	3,088	2,940	2,995	3,200	3,250	3,300	3.3%
Other OPEC (ex-Qatar)	8,640	8,191	7,735	7,300	7,550	7,800	0.3%
YoY %	*-7.4%*	*-5.2%*	*-5.6%*	*-5.6%*	*3.4%*	*3.3%*	
Total OPEC	33,442	32,089	31,819	31,200	31,950	32,700	0.9%
YoY %	*4.4%*	*-4.0%*	*-0.8%*	*-1.9%*	*2.4%*	*2.3%*	
Non-OPEC Supply							
Americas	20,580	21,490	24,100	25,800	27,000	27,700	4.8%
YoY %	*-2.4%*	*4.4%*	*12.1%*	*7.1%*	*4.7%*	*2.6%*	
Europe	3,850	3,820	3,830	4,000	4,150	4,250	3.5%
Asia Pacific	420	390	410	475	475	500	6.8%
Total OECD	24,850	25,700	28,340	30,275	31,625	32,450	4.6%
YoY %	*-2.0%*	*3.2%*	*10.3%*	*6.8%*	*4.5%*	*2.6%*	
DCs	13,530	13,390	13,470	13,650	13,750	13,850	0.9%
YoY %	*-2.5%*	*0.0%*	*0.6%*	*1.3%*	*0.7%*	*0.7%*	
FSU	13,850	14,050	14,290	14,500	14,800	15,000	1.6%
YoY %	*1.5%*	*1.4%*	*1.7%*	*1.5%*	*2.1%*	*1.4%*	
Other Europe	130	130	120	120	125	130	2.7%
China	4,090	3,980	4,010	4,150	4,200	4,250	2.0%
Processing gains	2,190	2,210	2,250	2,282	2,313	2,346	1.4%
Tot Non-OPEC Supply	58,640	59,460	62,480	64,977	66,813	68,026	2.9%
YoY %	*-1.6%*	*1.6%*	*5.1%*	*4.0%*	*2.8%*	*1.8%*	
OPEC NGLs + NCOs	4,810	4,940	4,980	4,711	4,824	4,938	-0.3%
YoY %	*1.7%*	*1.0%*	*0.8%*	*-5.4%*	*2.4%*	*2.3%*	
% Total OPEC	*18.4%*	*19.1%*	*15.7%*	*15.1%*	*15.1%*	*15.1%*	
Global Supply (mbpd)	96,892	96,489	99,279	100,888	103,588	105,664	2.1%
YoY %	*0.6%*	*0.0%*	*2.9%*	*1.6%*	*2.7%*	*2.0%*	
Global S/D Balance (mbpd)							
Global Supply	96,892	96,489	99,279	100,888	103,588	105,664	
Global Demand	95,600	97,340	98,760	100,495	101,741	103,012	
Surplus (Deficit)	1,292	(852)	519	393	1,847	2,652	

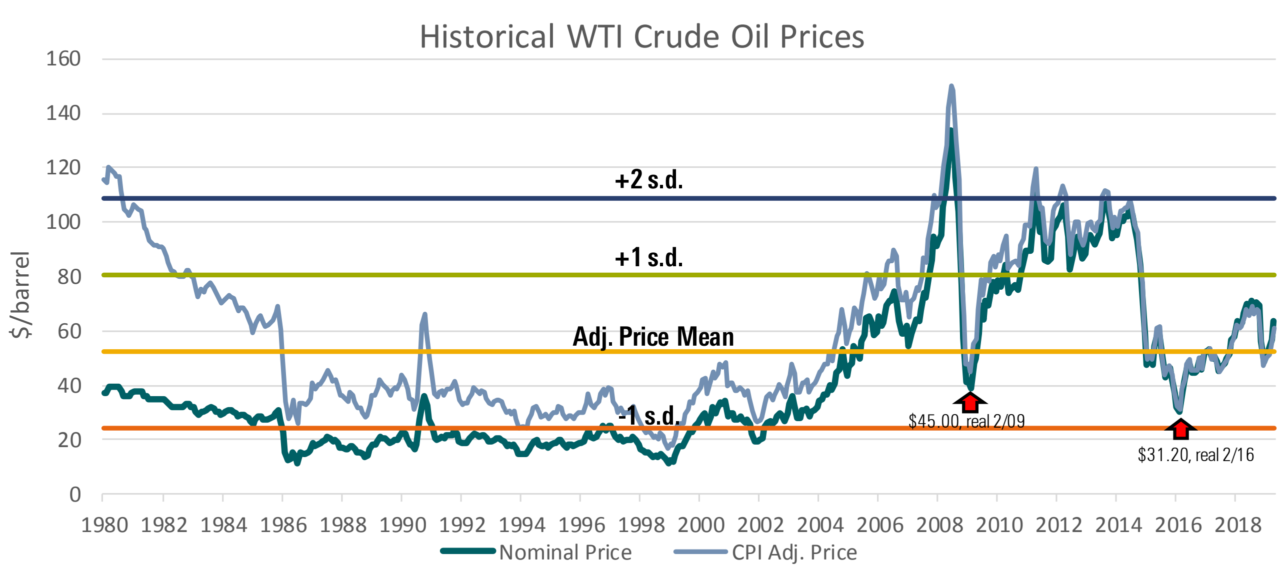
Sources: Monthly Oil Market Report May 2019, www.opec.org.

Exhibit 5 Doing More With Less: Taking Into Account Field Productivity Gains, We Forecast a 5% Overall Increase in 2019 Upstream Investment



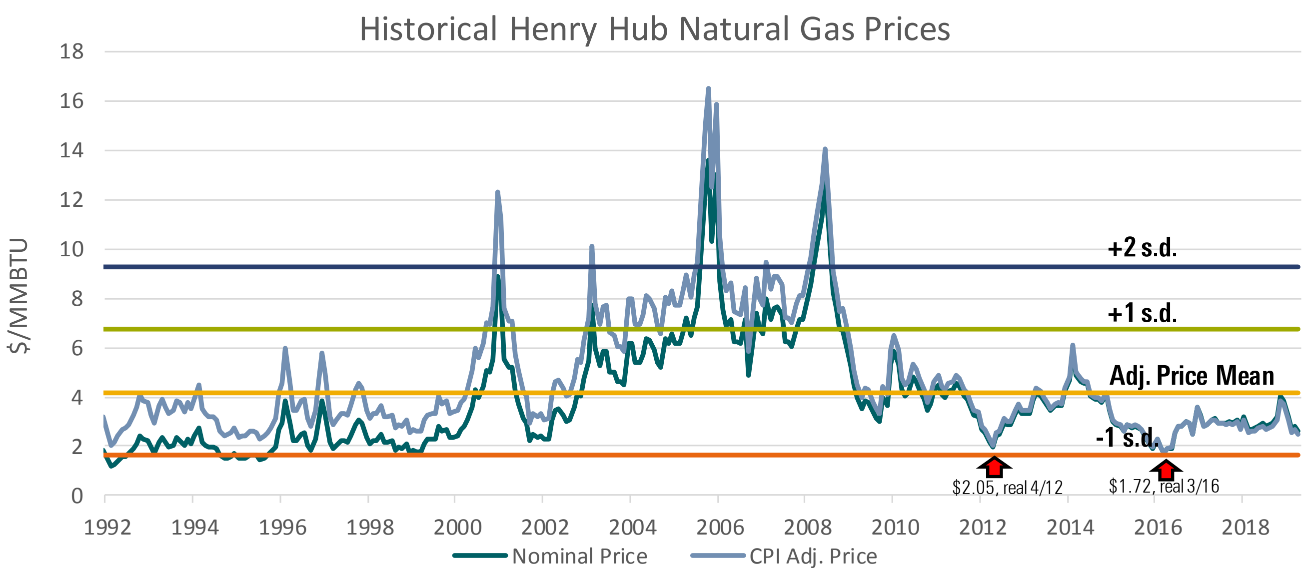
Sources: International Energy Agency as of May 2019 and Morningstar Credit Ratings, LLC estimates.

Exhibit 6 Current WTI Oil Price of $61 per Barrel Is 16% Above Historical Mean of $52.51 (Real Basis)



Source: Federal Reserve Bank of St. Louis as of May 13, 2019.

Exhibit 7 Current Natural Gas Price of $2.55 per mmBtu Is Well Below Historical Mean of $4.19 (Real Basis)



Source: Federal Reserve Bank of St. Louis as of May 13, 2019.

Looking Ahead, a Persistently Strong Dollar and Higher Local Oil Price in Developing Countries Could Dent Liquids Demand There

Between June 2017 and October 2018, coinciding with an acceleration in the strengthening of the U.S. dollar and a steady rise in the dollar price of oil (Brent basis), the price of oil in local currencies had surged higher – sharply higher with respect to some currencies. During this time, the price for Brent crude increased by $40 per barrel (87%) to $86. Companies and consumers alike, especially in developing countries, felt the squeeze from the surge in fuel costs.

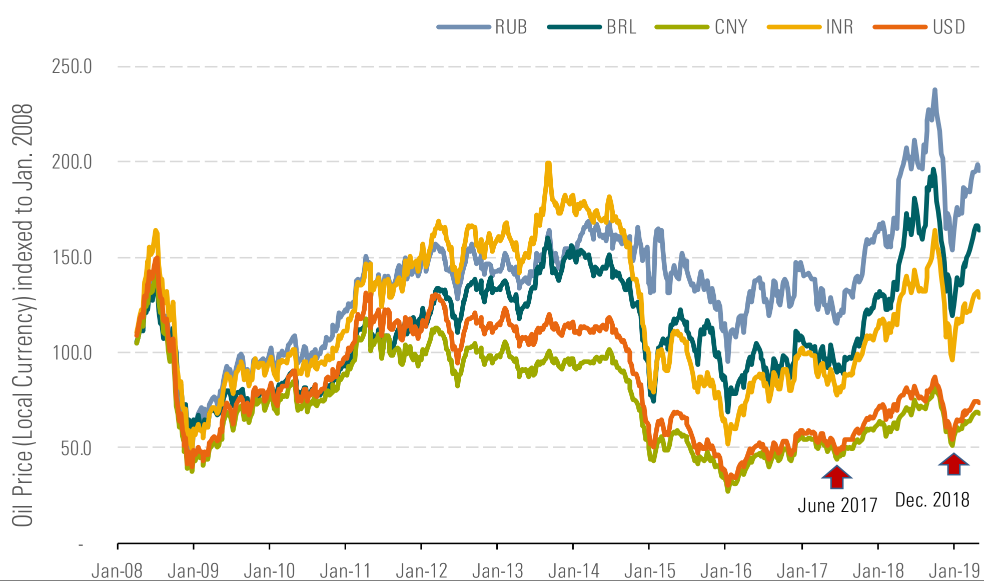
Since the steep sell-off in late 2018, during which Brent crude declined to $46, the price of oil in local currencies for most developing countries has rebounded by about the same as U.S.-dollar-denominated Brent in 2019. The combination of U.S.-China trade tensions, a rebounding local crude price, and weakening exchange rates represents a headwind to many emerging-market economies—including Indonesia, Turkey, and Chile. However, providing a partial offset, interest rates in some developing countries have declined since the beginning of the year as price and inflationary pressures have eased.

Higher pricing could renew pressure on oil demand in developing countries, but, collectively, these areas do not account for a large percentage of global oil consumption. We reviewed how the local oil price and oil consumption have been trending for the past two to three years for the top 15 oil-consuming nations, which account for nearly 70% of global consumption. These countries include, in order: United States (20.2% of 2017 global oil consumption), China (13.0%), India (4.8%), Japan (4.1%), Saudi Arabia

(4.0%), Russia (3.3%), Brazil (3.1%), South Korea (2.8%), Germany (2.5%), Canada (2.5%), Mexico (1.9%), Iran (1.8%), Indonesia (1.7%), United Kingdom (1.6%), and Singapore (1.5%).

- For the BRIC countries (Brazil, Russia, India, and China), since December 2018, the oil price quoted in local currency has increased by about 35% in China (yuan) and India (rupee), and by 38% in Brazil (real). For Russia, the oil price quoted in rubles per barrel has increased by 27%. By our estimates, the strengthening of the Russian ruble partially offset the increase in Brent crude quoted in U.S. dollars. For Brazil, we estimate the increase in U.S.-dollar-denominated Brent accounts for 85% of the total increase in local currency oil quote since late 2018 (remainder from currency weakening) and, for China and India, nearly 100%. In comparison, U.S.-dollar-denominated Brent (indexed to January 2008) has increased by 35% since late 2018.

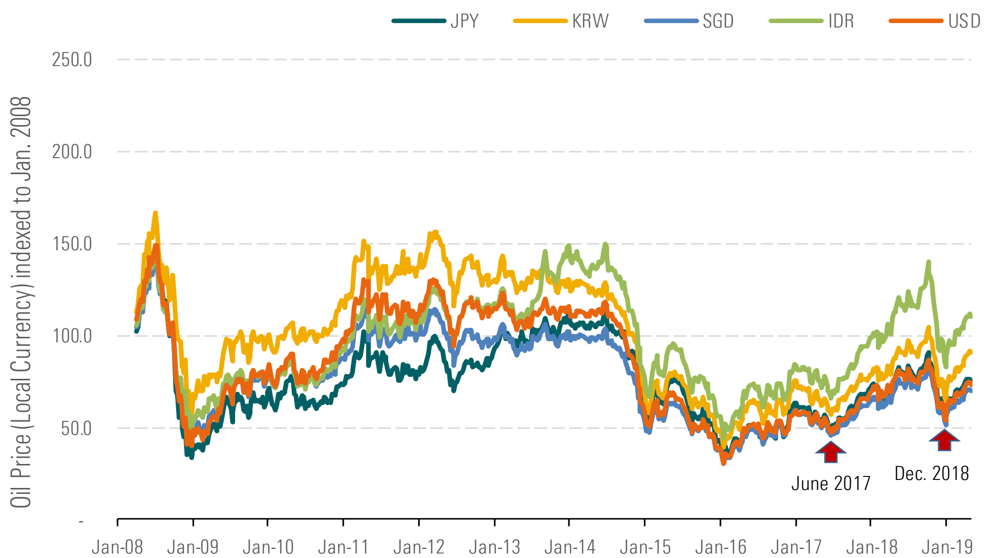
Exhibit 8 In BRIC Countries, Price of Oil in Local Currency Has Rebounded 25%-35% Since December 2018



Source: Bloomberg Data.

- For large Asian oil-consuming nations, since December 2018, the oil price quoted in local currency has increased by 42% in South Korea (won), risen by 37% in Japan (yen), and increased by about 35% in both Indonesia (rupiah) and Singapore (dollar). By our estimates, the increase in the oil price quoted in U.S. dollars accounts for nearly 100% of the total increase in local currency oil quotes for Japan, South Korea, and Indonesia, and for 80% of the increase in South Korea (remainder from currency weakening).

Exhibit 9 In Asian Countries, Price of Oil in Local Currency Has Increased 35%-40% since December 2018



Source: Bloomberg Data.

Recent Gradually Declining Global Oil Demand Growth Rate Largely Centers on China

Through the first quarter of 2019, the global oil demand growth rate has slowed a bit since mid-2017, largely related to slowing demand growth in China (see Exhibit 10). Year over year, the quarterly growth rate for Chinese oil demand has declined to 2.9% currently from about 6% to 8% in mid-2017. However, excluding China, the quarterly growth rate for total world oil demand has declined less steeply. That is, the total world growth rate (ex-China) is currently 1.0%, down from 1.5% to 2.0% in mid-2017. The following points summarize growth rates by OPEC-defined region:

- Total OECD: Year over year, the quarterly growth rate for OECD oil demand has declined to about 0.5% currently from 1.0% to 1.5% in mid-2017. Within this, demand growth has slowed in Europe and Asia-Pacific, more than offsetting U.S. demand growth.
- Total developing countries: Year over year, the quarterly growth rate for oil demand in developing countries has declined to 1.7% currently from about 2.6% to 2.8% in mid-2017. During this time, demand growth in India has increased to 4%, currently, from 2% to 3% in mid-2017, largely offsetting tepid growth elsewhere in this region.
- Total "other regions": Year over year, the quarterly growth rate for other regions oil demand has declined to 2.6% currently from about 6% in mid-2017. Within this region, the growth rate for Chinese oil demand has declined to 2.9%, currently, from about 6% to 8% in mid-2017.

Exhibit 10 Gradually Declining Global Oil Demand Growth Rate Largely Centers on China

	World Oil Demand in 2017-1Q19 (mb/d)									
	1Q17A	2Q17A	3Q17A	4Q17A	1Q18A	2Q18A	3Q18A	4Q18E	1Q19A	% of Total Demand
Americas	24.62	25.03	25.11	25.15	25.20	25.40	25.78	25.74	25.43	25.7%
of which U.S.	19.94	20.32	20.29	20.38	20.57	20.64	20.93	20.78	20.79	21.0%
YoY %	0.5%	1.7%	-0.1%	1.8%	3.2%	1.6%	3.2%	2.0%	1.1%	
Europe	13.83	14.17	14.66	14.28	13.95	14.19	14.68	14.32	13.97	14.1%
Asia Pacific	8.60	7.72	7.92	8.39	8.54	7.65	7.70	8.08	8.53	8.6%
Total OECD	**47.05**	**46.92**	**47.69**	**47.82**	**47.69**	**47.24**	**48.16**	**48.14**	**47.93**	48.4%
Seq %	0.2%	-0.3%	1.6%	0.3%	-0.3%	-0.9%	1.9%	0.0%	-0.4%	
YoY %	0.6%	1.5%	1.0%	1.8%	1.4%	0.7%	1.0%	0.7%	0.5%	
Other Asia	12.87	13.30	12.95	13.47	13.55	13.84	13.38	13.87	13.92	14.1%
of which India	4.43	4.42	4.20	4.81	4.83	4.74	4.40	4.96	5.03	5.1%
YoY %	-2.4%	3.0%	1.9%	5.5%	9.0%	7.2%	4.8%	3.1%	4.1%	
Latin America	6.27	6.51	6.82	6.46	6.35	6.49	6.81	6.47	6.36	6.4%
Middle East	8.11	7.91	8.42	7.79	8.19	7.98	8.43	7.85	8.25	8.3%
Africa	4.25	4.19	4.14	4.26	4.35	4.32	4.27	4.40	4.45	4.5%
Total DCs	**31.50**	**31.91**	**32.33**	**31.98**	**32.44**	**32.63**	**32.89**	**32.59**	**32.98**	33.3%
Seq %	1.2%	1.3%	1.3%	-1.1%	1.4%	0.6%	0.8%	-0.9%	1.2%	
YoY %	2.7%	2.9%	2.5%	2.8%	3.0%	2.3%	1.7%	1.9%	1.7%	
FSU	4.56	4.39	4.77	5.09	4.66	4.50	4.94	5.01	4.75	4.8%
YoY %	1.6%	0.5%	0.8%	1.0%	2.2%	2.5%	3.6%	-1.6%	1.9%	
Other Europe	0.71	0.67	0.70	0.79	0.73	0.69	0.73	0.82	0.75	0.8%
China	11.88	12.40	12.30	12.61	12.28	12.84	12.65	13.07	12.63	12.8%
YoY %	8.4%	8.0%	5.2%	7.9%	3.4%	3.5%	2.8%	3.6%	2.9%	
Total "Other regions"	**17.15**	**17.46**	**17.77**	**18.49**	**17.67**	**18.03**	**18.32**	**18.90**	**18.13**	18.3%
Seq %	-2.0%	1.8%	1.8%	4.1%	-4.4%	2.0%	1.6%	3.2%	-4.1%	
YoY %	6.3%	5.8%	6.0%	5.7%	3.0%	3.3%	3.1%	2.2%	2.6%	
Total World	**95.70**	**96.29**	**97.79**	**98.29**	**97.80**	**97.90**	**99.37**	**99.63**	**99.04**	100.0%
Seq %	0.1%	0.6%	1.6%	0.5%	-0.5%	0.1%	1.5%	0.3%	-0.6%	
YoY %	2.3%	2.7%	2.3%	2.8%	2.2%	1.7%	1.6%	1.4%	1.3%	
Total World (ex-China)	**83.82**	**83.89**	**85.49**	**85.68**	**85.52**	**85.06**	**86.72**	**86.56**	**86.41**	
Seq %	-0.1%	0.1%	1.9%	0.2%	-0.2%	-0.5%	2.0%	-0.2%	-0.2%	
YoY %	1.5%	2.0%	1.5%	2.1%	2.0%	1.4%	1.4%	1.0%	1.0%	

Source: www.opec.org, May 2019.

We Characterize Current Position for Net Commitments of Futures Traders As "Neutral," Does Not Add to Our Constructive Outlook on Oil Price Based on Fundamentals

According to data from the U.S. Commodity Futures Trading Commission (CFTC), commercial traders reduced their shorts on a near-continuous basis from late September 2018 through early January of this year. Since then, the net short position began rebuilding (reversed). The change of direction indicates that commercial traders correctly sensed that the oil price hit an interim bottom. These actions were roughly consistent with a WTI-basis oil price peak of $76 per barrel on Oct. 3 and subsequent bottom at about $42 on Dec. 24.

Since January, the commercial net short position had been steadily rebuilding. During the past few weeks, commercial short building has paused. The current position for the net commitment of futures traders is near the midpoint of the five-year range. Therefore, in our opinion, the current position for net commitments is not providing as clear a signal for oil-price trend reversal as it might when net commitments are at or near a historical extreme. Our fundamental supply and demand analysis indicates a likelihood for a higher oil price, but the current position for net commitments is not adding to our conviction based on fundamentals. See Exhibits 11 and 12.

The Commitments of Traders report is a weekly publication by the U.S. CFTC that shows in aggregate holdings of different types of participants in the U.S. futures market. Collectively, the trading positions reported to the CFTC account for 70% to 90% of the total open interest for any given market. The participants include:

- Commercial traders (hedgers): Entities that produce or deal with actual commodities (crude oil, grains, metals, for example) or financial instruments as part of doing business. They trade in those futures as a hedge against risks they run in the course of that business.
- Noncommercial traders (large speculators): Traders whose trading levels are large enough that they must be reported to the CFTC. They have no need for the underlying commodity or instrument and trade only to make a profit.
- Nonreportable (small speculators): traders that do not meet the position size that requires them to report to the CFTC. They are the remainder after the commercials and large speculators have been subtracted from total open interest.

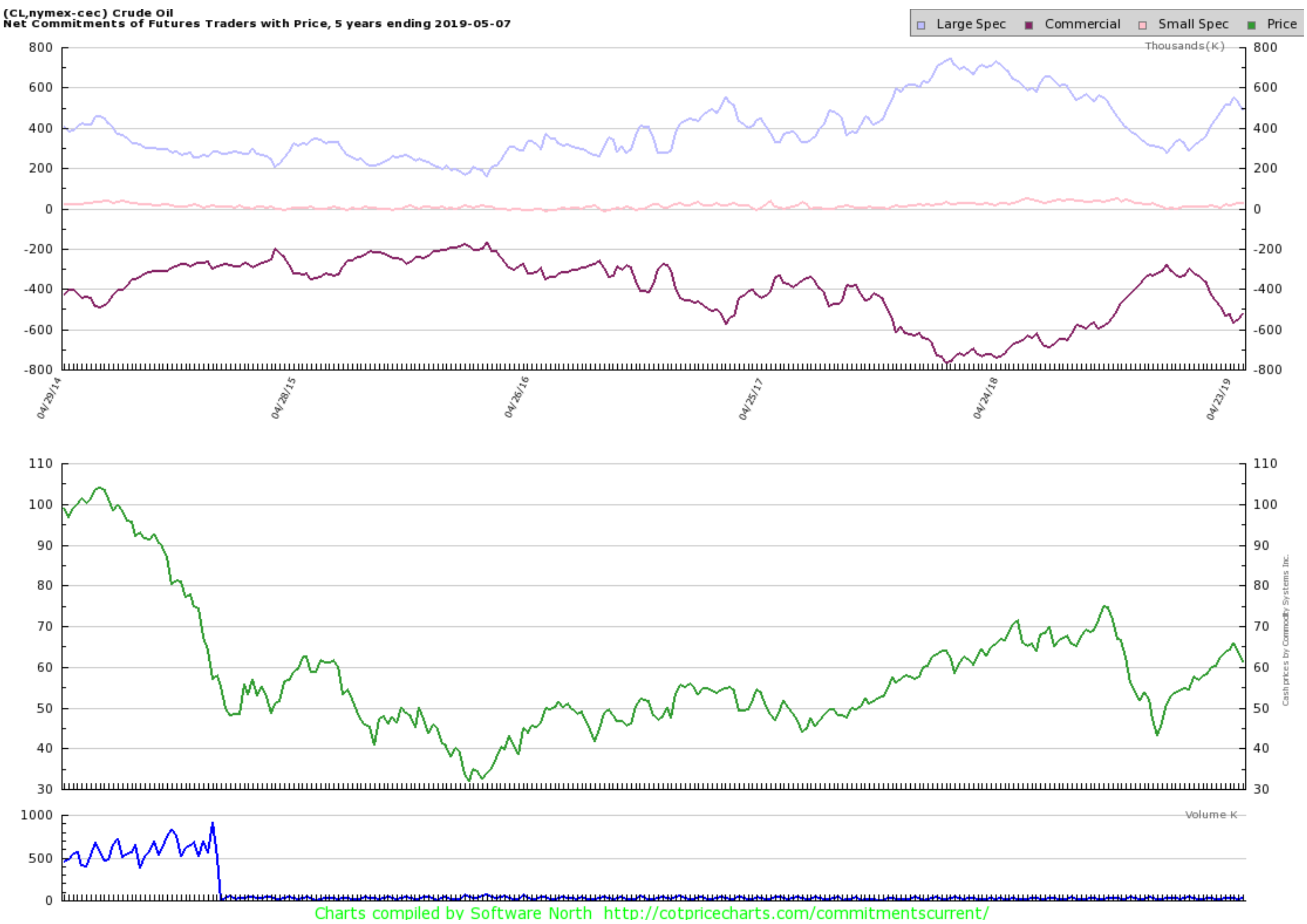
Exhibit 11 Since January 2019, Commercial Net Short Position in WTI-Basis Oil Had Been Rebuilding; Is the Current Pause Temporary?

Charts compiled by Software North http://cotpricecharts.com/commitmentscurrent/

----- Weekly Price -----					--- Large Speculators ---				------ Commercial ------				-- Small Speculators --			Open
Open	High	Low	Close		#	Long	Short	Bullish	#	Long	Short	Bullish	Long	Short	Bullish	Intrest
63.69	64.25	63.69	64.25	04/16/19	384	616,110	100,852	86%	201	732,726	1,262,716	37%	91948	77,216	54%	2,092,151
63.96	65.95	63.96	65.95	04/23/19	373	644,670	97,311	87%	197	716,970	1,287,439	36%	96400	73,290	57%	2,139,213
65.67	65.67	63.29	63.89	04/30/19	377	638,298	114,195	85%	199	711,575	1,260,738	36%	90558	65,498	58%	2,144,648
63.65	63.65	61.48	61.48	05/07/19	386	616,789	122,453	83%	203	693,384	1,214,963	36%	97401	70,158	58%	2,133,539
62.19	62.19	61.29	62.09	05/14/19	385	607,979	120,171	83%	216	735,104	1,243,983	37%	90955	69,884	57%	2,153,657

Source: Software North, LLC. Y-Axis for top chart is US$/barrel (WTI); for bottom chart is net commitments of futures (left) and open interest (right).

Exhibit 12 Current Net Short Position in Crude Oil by Commercial Traders is Near the Median for the 5-Year Range; Not At/Near an Extreme



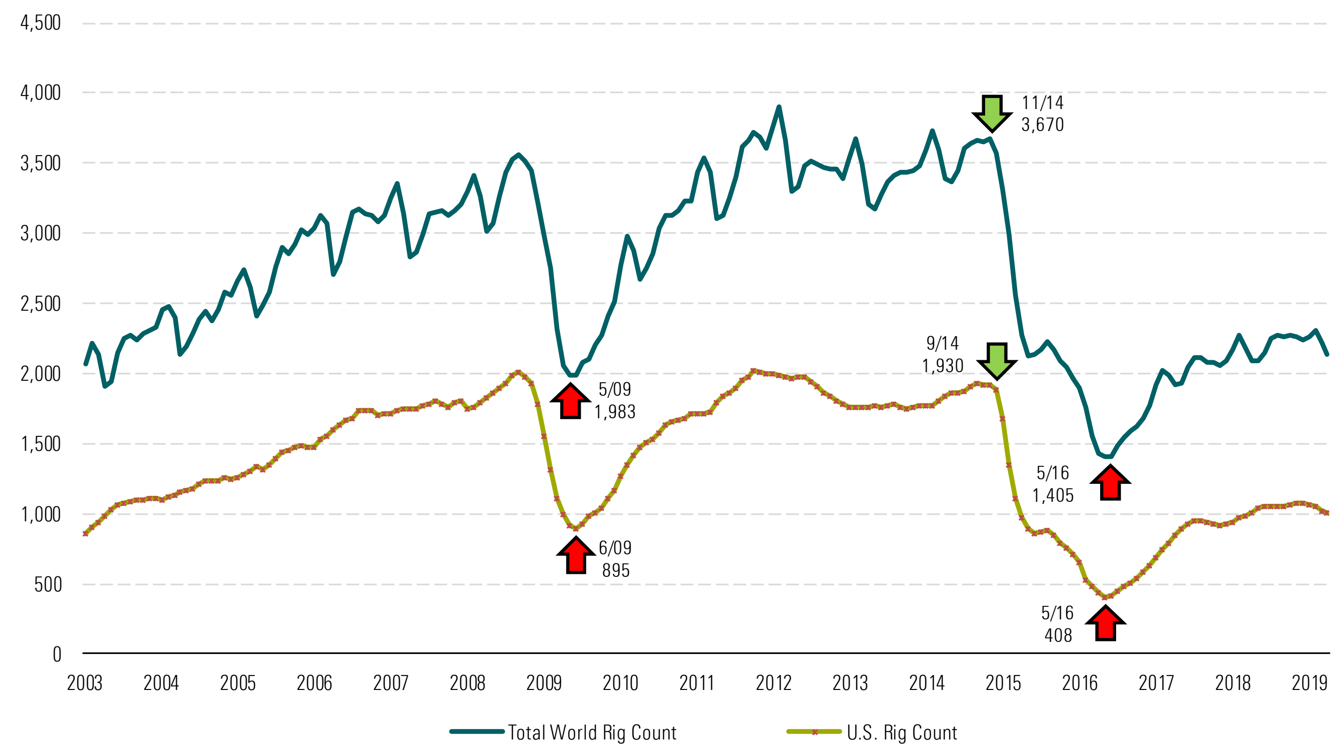
Source: Software North, LLC. Y-Axis for top chart is net commitments of futures; for middle chart is US$/barrel (WTI).

Late-2018 Oil Price Spasm Causes Dip in North American and Global Rig Counts

- According to data provided by Baker Hughes, a GE Co. (not rated), the total world rig count hit an interim peak in February 2014 at 3,736, then began a long slide, bottoming at 1,405 in May 2016 (see Exhibit 13). Since hitting bottom, about 740 rigs have been added to the worldwide rig count, as North American land-based E&P activity has bounced back. Within the total, the rig count for the U.S. rebounded by 670 to 1,080 in December, falling back to 1,012 in April on interim oil-price weakness. Simultaneously, the rig count in Asia-Pacific has moderately increased but is nearly unchanged in Latin America. In the U.S., the E&P rebound since May 2016 has been largely centered in the prolific Permian Basin (Texas and New Mexico), Bakken Shale (North Dakota), Eagle Ford Shale (Texas), and Cana Woodford Shale (Oklahoma).
    - The Canadian rig count typically peaks in December-February. However, because of unusual conditions, Canada's count declined to average 182 from 268 for this period last year after

Alberta announced a mandatory cut in oil production at the beginning of December to reduce regional oversupply and support very low local pricing. As widely chronicled, pipeline transportation constraints are hindering crude exports from Alberta, which is the largest producing province in Canada. Local pricing has sharply rebounded since so that the government is gradually easing the cuts, but Canada's rig count remains lower than typical.

Exhibit 13 Following a Near-Continuous Increase Since May 2016, the Late-2018 Oil Price Spasm Has Caused the North American Rig Count to Dip



Source: Baker Hughes, a GE Co. as of May 7, 2019.

Exhibit 14 Morningstar Credit Ratings Sector Coverage: Energy

Issuer	Ticker	Credit Rating	Rating Outlook	Moat*	Moat Trend*	Uncertainty*
Integrated Companies						
Exxon Mobil Corp	XOM	AA+	Negative	Narrow	Stable	Low
Chevron Corp	CVX	AA-	Stable	Narrow	Stable	Medium
Exploration & Production						
Occidental Petroleum Corp	OXY	A/UR-	-------	None	Stable	High
ConocoPhillips	COP	A	Stable	Narrow	Stable	High
EOG Resources Inc	EOG	BBB+	Stable	Narrow	Stable	High
Pioneer Natural Resources	PXD	BBB	Stable	Narrow	Stable	High
Apache Corp	APA	BBB-	Stable	None	Stable	Very High
Oilfield Services						
Schlumberger Ltd	SLB	A	Stable	Narrow	Stable	High
Halliburton Co	HAL	BBB+	Stable	Narrow	Negative	High
National Oilwell Varco Inc	NOV	BBB+	Stable	None	Stable	Very High
Refining, Marketing & Transportation						
Valero Energy Corp	VLO	BBB+	Stable	Narrow	Stable	High
Marathon Petroleum Corp	MPC	BBB	Stable	Narrow	Stable	High

*Denotes data provided by Morningstar, Inc. and licensed by Morningstar Credit Ratings, LLC.
Information as of May 20, 2019. Source: Morningstar Credit Ratings, LLC and Morningstar, Inc.

About Morningstar® Credit Research

Morningstar Credit Research provides independent, fundamental equity research differentiated by a consistent focus on sustainable competitive advantages.

For More Information

Todd Serpico
+1 312 384-5488
todd.serpico@morningstar.com

MORNINGSTAR®

22 West Washington Street
Chicago, IL 60602 USA