Corporate Credit Spread Chartbook
Energy Sector

Morningstar Credit Ratings, LLC
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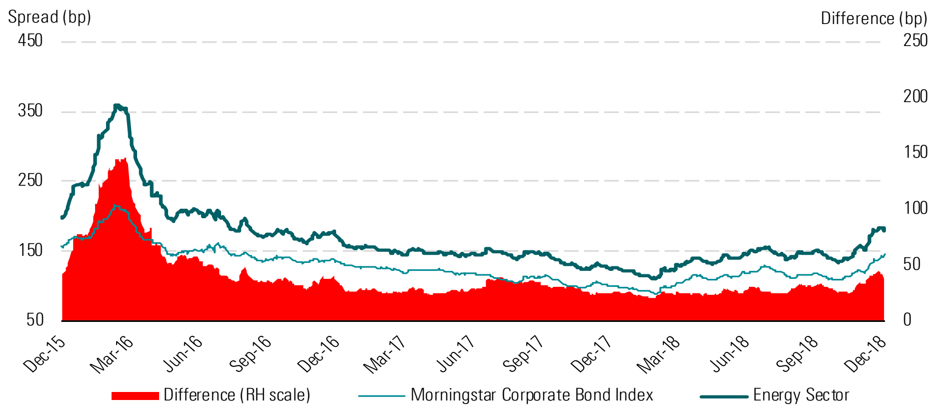
Contents

Andrew J. O'Conor
Vice President
+1 312 348-3021
andrew.oconor@morningstar.com

Executive Summary
Since we published our last energy chartbook in September, the West Texas Intermediate oil price has dropped by 40%, from $76 peak in early October to its current level around $45, on concerns about rising global crude supplies, combined with angst over the well-being of global economic growth, potentially resulting in overall increasing inventories. However, a new production cut agreement by OPEC and its allies, the possibility that Venezuelan production plunges further, recent evidence that Western producers are cutting 2019 capital budgets that should slow production growth, and economic growth kindled by lower oil prices should lead to a gradually improving supply and demand balance over the next several months. We are cutting our price forecast to a range of $55-$60 per barrel for 2019 from a range of $65-$70 per barrel, previously, and trimming 2020 to $60 from $65. Our forecast for $65 in 2021 and 2022 remains the same. Assuming energy pricing gradually cycles higher, we expect the credit trend for the E&P and oilfield-services segments to be stable. However, if pricing continues to languish, the credit trend for these energy industry segments could potentially deteriorate. Given recent, negative fundamental trends, energy sector bond spreads have moderately widened since October.

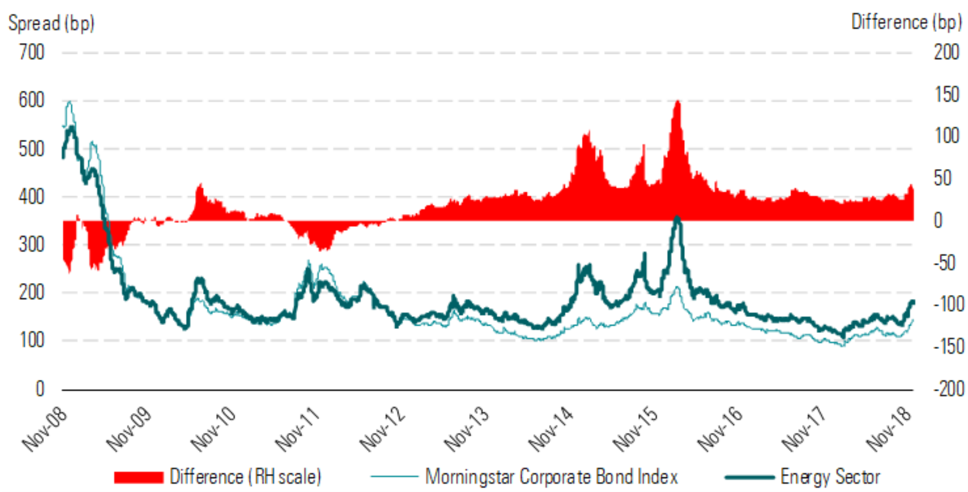
Historical Sector Spreads: Energy
After the oil price hit an interim peak in early October, pricing has sharply dropped, and the energy sector index widened 46 basis points to +181 basis points while the Morningstar Corporate Bond Index has widened 37 basis points to +146 basis points (see Exhibits 1 and 2). Because the energy sector accounts for about 10% of the CBI, we estimate that 10% of the CBI widening was energy related. Within energy, the oilfield services subsector widened 54 basis points, partly mitigated by the integrated subsector, which widened 27 basis points, with the other subsectors in between.

Exhibit 1 Morningstar Corporate Bond Index vs. Energy Sector (Trailing 36 Months)



Source: Morningstar, Inc. data as of December 5, 2018

Exhibit 2 Morningstar Corporate Bond Index vs. Energy Sector (Trailing 10 Years)



Source: Morningstar, Inc. data as of December 5, 2018

Reducing Our 2019 Oil Price Objective to a Range of $55-$60 vs $65-$70, Previously

As we enter 2019, the oil price is still assimilating recent major changes affecting expectations for the global balance between supply and demand. Perhaps the most significant change was the granting of six-month waivers to certain countries by the U.S. government just before implementing renewed U.S. sanctions to choke Iranian banking, energy, and shipping industries on Nov. 5. Under the sanctions, nations that continue to import Iranian goods face financial penalties by the United States. The temporary waivers allow eight countries—including India, South Korea, Japan, and China, all large importers of Iranian oil—to continue to purchase Iranian oil through a barter system, thus undercutting the impact of the sanctions. After months of harsh U.S. rhetoric against Iran and heightened anticipation that much less Iranian oil would flow in to the global marketplace, the waivers were a major surprise to participants, helping to rapidly deflate price. All eight countries must reapply for extended exemptions at the end of six months, but given the recent experience the market is now wary of U.S. policies on Iranian sanctions.

To help offset surging U.S. shale oil output, Iranian waivers, and other imbalances that were building between global supply and demand, OPEC along with Russia and its allies decided to implement a collective production cut of 1.2 million barrels crude per day (1.0%-1.5% of global supply) in early December. Given their exceptional conditions, OPEC members Libya, Iran, and Venezuela are exempt from the new cut agreement. The cuts will be implemented on Jan. 1, 2019, for an initial period of six months, with an interim review in April 2019. Since the new agreement was finalized, Saudi Arabia—the de facto leader of OPEC—has reinforced its sincerity by stating that it is in favor of extending the new accord beyond the initial six months.

Market fears largely centering on anxiety about global economic growth, increasing U.S. shale oil production, rising U.S. inventory, and Iranian waivers have pressured the oil price back to the mid-$40s per barrel (WTI basis) currently, following an interim peak of $76 hit in October on positive price sentiment from previous tough U.S. sanction talk. Since the beginning of the year, the OECD crude oil inventory has decreased slightly to 1,430 million barrels (through October) from 1,448 million. However, within the OECD, U.S. crude oil inventory has increased by about 4% to 443 million barrels currently from 425 million.

Integrating all these points, we are cutting our price forecast to a range of $55-$60 per barrel for 2019 from a range of $65-$70 per barrel, previously, and trimming 2020 to $60 from $65. Our forecast for $65 in 2021 and 2022 remains the same. The spot WTI oil price has averaged about $59.20 per barrel for the fourth quarter to date and $64.90 for 2018 to date. Previously, WTI averaged $50.80 in 2017, $43.30 in 2016, and $48.70 in 2015.

Longer term, we maintain our view that oil prices will gradually increase, subject to bouts of volatility. With support from newfound austerity on upstream spending, we expect production growth to slow in 2019 and look for oil pricing over the next 12-18 months to move cautiously higher—two steps ahead, one step back—in anticipation of gradually more balanced global supply and demand.

Near term, crude-oil concerns include the following:

- Despite a slight decline since the beginning of 2018, global inventories of crude oil remain adequate. Within this, U.S. commercial crude inventories remain in the upper half of the average range for this time of year and U.S. total motor gasoline inventories are at the top end of the average range.
- U.S. crude oil production has surged by 1.5 million barrels per day (15%), to 11.5 million bpd currently from 10.0 million bpd at year-end 2017. From a longer-term pricing perspective, the current oil price pullback is healthy because it signals to all producers, especially U.S. shale oil speculators, that their investments are not a sure bet, which should help to brake the runup in development.
- It remains to be seen how well OPEC and its allies honor the new (Dec. 7) production cut agreement. 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 Venezuela ($216 estimated), Nigeria ($127), Libya ($114), Bahrain ($111), Saudi Arabia ($88), Algeria ($84), Angola ($83), Iran ($72), and the United Arab Emirates ($72)—the participants seem highly

incentivized to comply with the agreement to help support a higher oil price. (Source: according to The Wall Street Journal on December 18, 2018.)

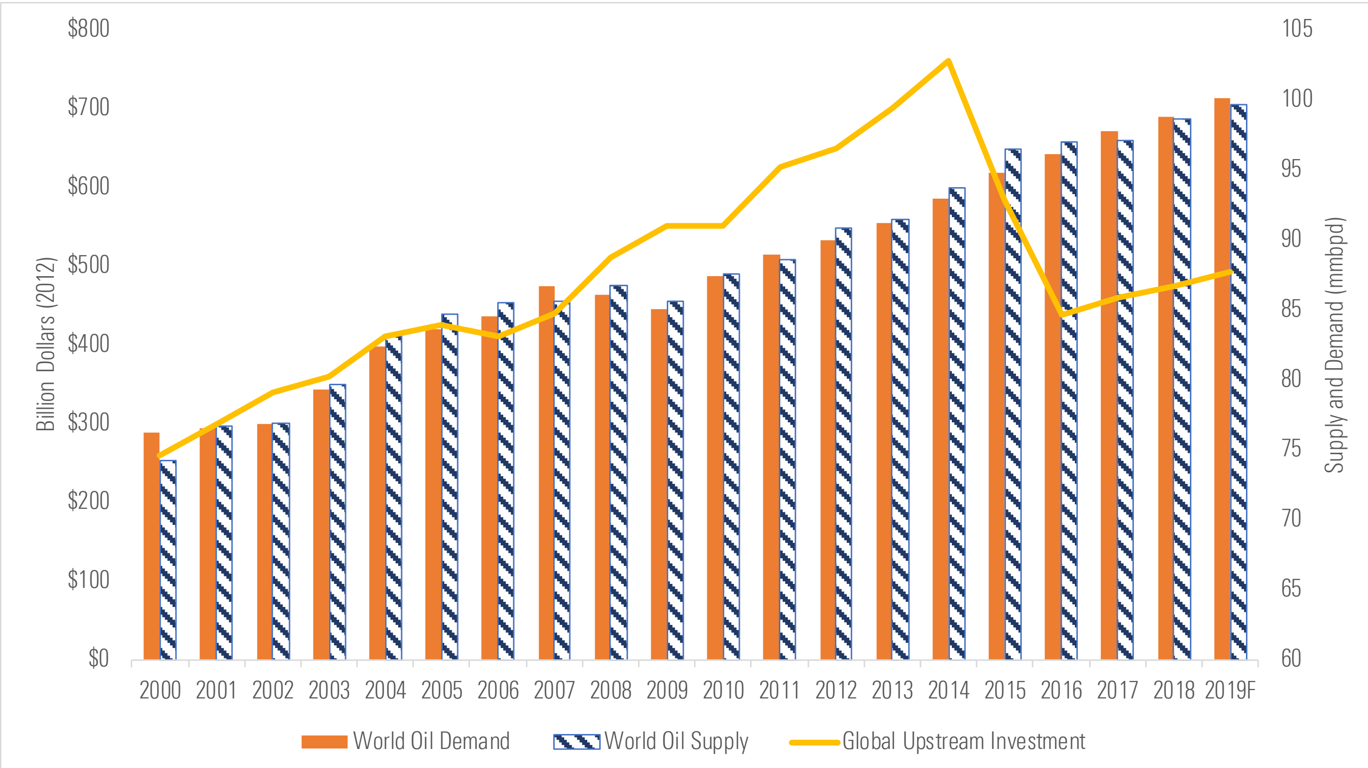
- Through the third quarter of 2018, the global oil demand growth rate has slowed a bit since mid-2017, largely related to slowing demand growth in China. Year over year, the quarterly growth rate for Chinese oil demand has declined to 3.5% currently from about 6% to 7% in mid-2017. However, excluding China, the quarterly growth rate for total world oil demand has declined less steeply. That is, the total world growth rate is currently 1.4%, down from 1.7% to 1.8% in mid-2017. However, a lower crude price should eventually stimulate more global demand for refined oil products (e.g., gasoline, distillate), helping provide price support.

We believe these concerns are partly mitigated by fears of a more significant Venezuelan oil production outage caused by the worsening economic and political crises there. Year to date, Venezuelan crude production has declined more than 35%. The sharp drop in Venezuelan output is being compounded by a lower crude price, making it very difficult for the country to pay for services and debts. With the Venezuelan government teetering on widespread default, output there could plunge further in 2019.

U.S. Gas Inventory 20% Below Five-Year Average, Helping Support Price

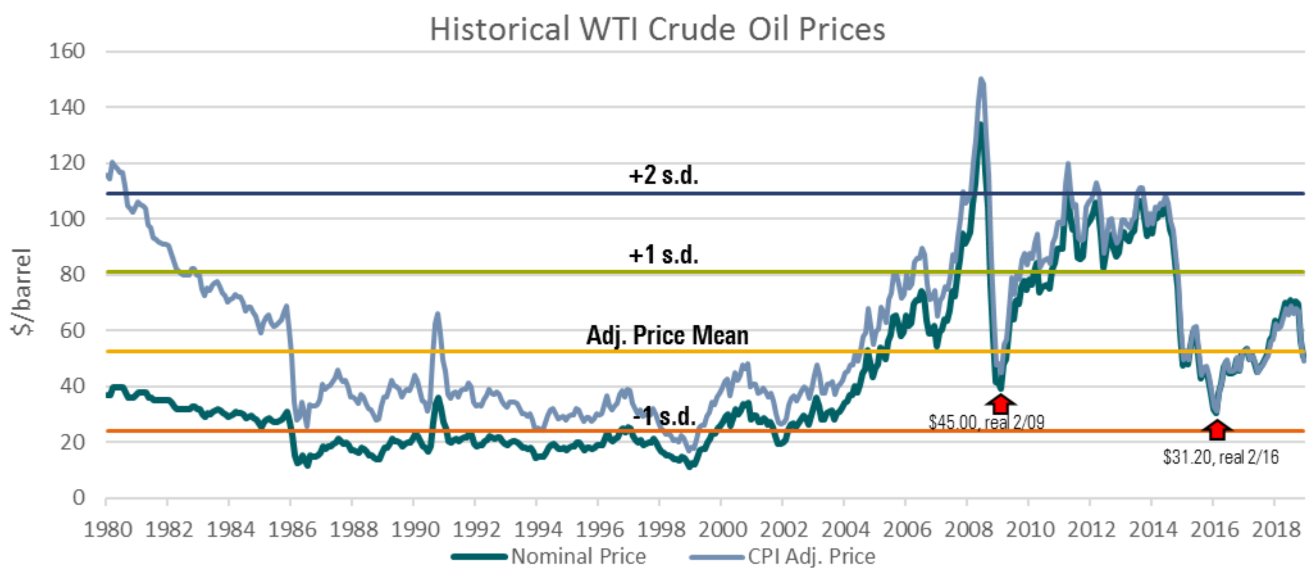
The spot U.S. natural gas price jumped to $4.85 per million British thermal units in mid-November, caused by a surge in heating demand as earlier-than-usual cold winter temperatures set in combined with low gas inventories. Since then, the gas price has deflated to about $3.50 per mmBtu. A continuous, gradual decline in gas inventories over the summer left them below typical seasonal levels. As of Dec. 18, the U.S. underground gas storage inventory is about 2.8 trillion cubic feet, 20% below the five-year average. Domestic gas demand typically peaks during winter, with the gas withdrawal season running from early November through March. With the brunt of the heating season ahead of us, combined with lower-than-typical gas inventory, steadily growing power plant demand and ongoing growth in pipeline and liquefied natural gas exports could spark another price surge.

Exhibit 3 Doing More With Less: Taking Into Account Current Oil Price Weakness, We Forecast a 3%-5% Overall Increase in 2019 Upstream Investment



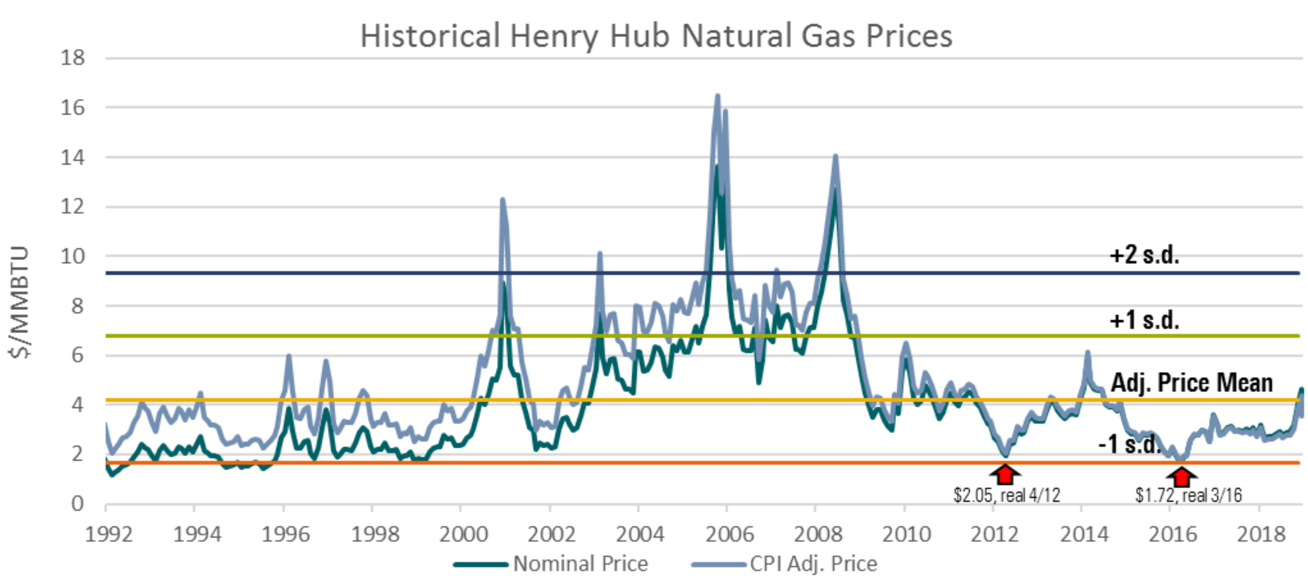
Sources: International Energy Agency as of July 2018 and Morningstar Credit Ratings, LLC estimates

Exhibit 4 Current WTI Oil Price of $45 per Barrel Is 14% Below Historical Mean of $52.50 (Real Basis)



Source: Federal Reserve Bank of St. Louis as of Dec. 17, 2018

Exhibit 5 Current Natural Gas Price of $3.50 per mmBtu Is 17% Below Historical Mean of $4.22 (Real Basis)

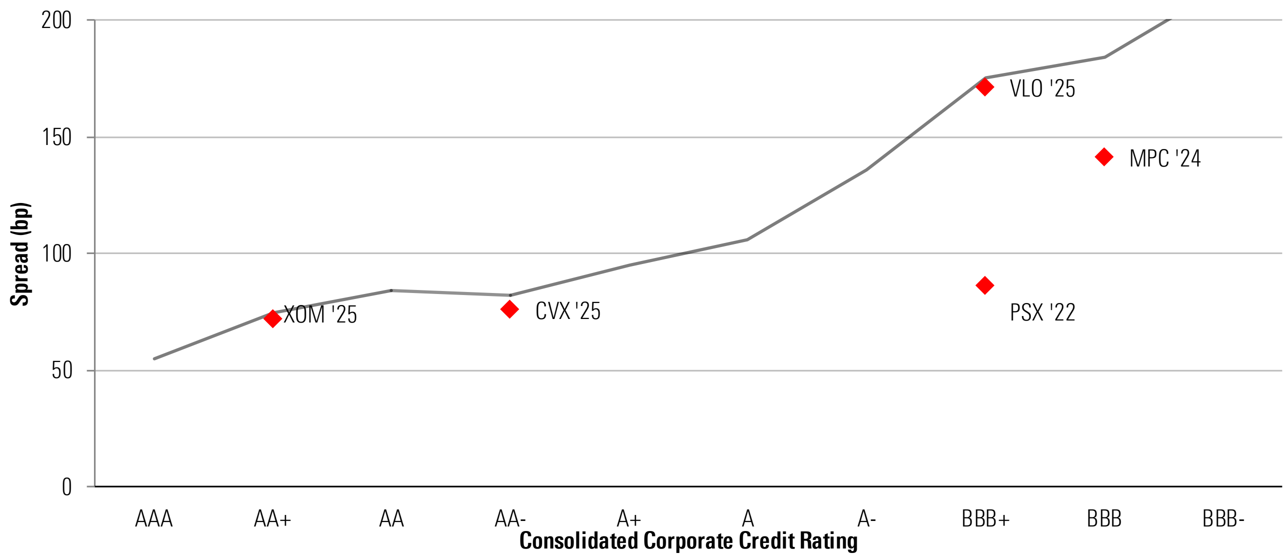


Source: Federal Reserve Bank of St. Louis as of Dec. 17, 2018

Spread Charts by Energy Sector

Integrated and Refining, Marketing, and Transportation Sectors

Exhibit 6 Integrated and Refining, Marketing, and Transportation Sectors vs. Morningstar Corporate Bond Index



Source: Morningstar Credit Ratings, LLC , Morningstar, Inc., and Bloomberg as of Dec. 19, 2018
(UR) = rating under review / (p) = positive outlook / (n) = negative outlook

Integrated Sector Trends

Vertically integrated oil and gas companies, or the majors, have total or near-total ownership and operation of the entire energy supply chain, from exploration to refining and retail. Historically, earnings have mostly been derived from the upstream (exploration and production) segment, with a minority from downstream (refining, marketing, and transportation). However, this mix reversed for some majors in 2015 and 2016 following the sharp, sustained downturn in oil and gas prices. Downstream operations often achieve higher margins during times of low crude pricing, partially offsetting the decline of oil and gas production income. In view of the recent sharp drop in crude and refined product prices, we expect financial discipline to remain a priority going ahead. We forecast that 2019 capital expenditures for the integrated segment will increase by 5% or so from actual 2018 spending, less than a 7% increase estimated for 2018 versus 2017. Since energy prices hit an interim peak in early October, pricing has sharply dropped and, simultaneously, integrated bond spreads have modestly widened.

Issuer Highlights

- In reviewing third-quarter 2018 financial results that were overall a large improvement from the year-ago period, Exxon Mobil (AA+, stable) management cited continued sharp growth from Permian/Bakken tight-oil output combined with higher oil price realizations that boosted the upstream segment's contribution, plus higher downstream margins, partially offset by lower chemical contributions. The chemicals segment was negatively impacted by higher feed and energy input costs, downtime (both scheduled and unscheduled events) and unfavorable foreign exchange effects caused by the strengthening of the U.S. dollar. Looking ahead, upstream priority projects include continued development of offshore fields in Guyana and Brazil, growing liquids production from U.S. unconventional assets, and development of Mozambique LNG. The focus on downstream chemical expansions is on upgrading to higher-value products. After capital expenditures, we estimate free cash flow will be $25 billion in 2018, increasing to nearly $30 billion in 2019.

  - Previously, ExxonMobil reiterated guidance for 2018 capital and exploration expenditures to be $24 billion (including its share of nonconsolidated affiliate expenditures), which would be slightly above $23.1 billion spent in 2017. The majority of 2018 spending is on upstream investments, including the first phase of development for the Liza field, one of the largest oil discoveries of the past decade, located offshore Guyana. We expect ExxonMobil to communicate 2019 capital plans early next year.

- Chevron's (AA-, stable) third-quarter 2018 financial results increased sharply from last year, driven by higher upstream-segment price realizations and increasing Australian LNG and Permian Basin production, partially offset by weaker downstream segment margins caused by higher operating expenditures and feed and energy input costs. Chevron continues to focus on cost-reduction measures, including ongoing field and capital efficiency gains and divestment of lower-margin operations and developments, resulting in a steadily declining cash operating cost per barrel of oil equivalent. After capital expenditures, we estimate free cash flow will be $17 billion in 2018, increasing to nearly $20 billion in 2019.
  - On Dec. 6, Chevron announced 2019 organic capital and exploratory spending program of $20.0 billion (includes company's share of affiliate expenditures), which would be about 3% more than $19.5 billion we estimate for 2018 and the first capital budget increase in four years. The company estimates more than two thirds of the 2019 budget will be for projects expected to realize cash flow within two years.

Refining, Marketing, and Transportation Sector Trends

The downstream sector refers to the refining of petroleum crude oil and the processing and purifying of raw natural gas as well as the marketing and distribution of products derived from crude oil and natural gas. The downstream sector reaches consumers through products such as gasoline or petrol, kerosene, diesel oil, heating oil, fuel oils, lubricants, and natural gas as well as hundreds of petrochemicals.

U.S. gasoline prices tend to gradually rise in the spring and peak in late summer when people drive more frequently. During winter, when driving declines, North American gasoline demand and prices tend to decline. Despite strong current domestic and export demand partly spurred by sharply lower prices, U.S. gasoline inventories are abundant for this time of the calendar year, currently above a five-year high.

Beginning in October, the price of crude began to rapidly decline caused by global oversupply and gasoline pricing fell nearly in lockstep with crude. Although cheaper prices are leading to higher-than-usual seasonal driving and gasoline demand, the combination of strong gasoline production and ample inventories should help keep pricing low into early 2019. However, U.S. distillate inventories are low, currently near the bottom of the five-year range for December. Good export demand and the brunt of cold-season distillate (heating oil) demand that is still ahead bodes well for all domestic petroleum refiners. We believe this will help support diesel cracks the next few months. Led by Mexico, export demand for U.S. gasoline and distillate in Latin America continues to grow, accounting for an increasing percentage of offtake from U.S. refiners. These factors combined with a strong domestic economy should help support refining crack spreads. Commensurate with the sharp decline in refined product pricing, bond spreads for the refiners have widened since September, more so than for the energy sector index.

Issuer Highlights

- In November, we affirmed the BBB+ corporate credit rating on Valero Energy Corp. and maintained a stable outlook. Our rating reflects Valero's large scale and its cost-advantaged position on the U.S. Gulf Coast, premium branded wholesale outlets, the integration of midstream assets of majority-owned Valero Energy Partners LP or VLP (not rated) with Valero refineries, and the company's low debt leverage. On Oct. 18, Valero announced a $950 million all-cash purchase of the remaining 32% of VLP held by public unitholders, which we believe will close soon. We expect our rating to remain at the current level during the next few years, as any additional free cash flow is likely to be diverted toward shareholder returns rather than to significant debt reduction.
- We affirmed Marathon Petroleum's BBB credit rating with a stable outlook in November. Our rating reflects Marathon's large scale and cost-advantaged refining position enhanced by synergies that will result from the recent acquisition of Andeavor, the inherent cyclicality of the petroleum refining industry, integrated interests in midstream assets that generate higher returns and add earnings stability to petroleum refining operations, extensive retail network of Marathon-brand outlets and Speedway convenience stores, and the company's debt leverage. These attributes are all incorporated in the narrow economic moat assessment assigned to Marathon by Morningstar Equity Research Group, which supports a moderate Business Risk score. We expect the upward migration in the rating to be limited

during the next few years, as any additional free cash flow is likely to be diverted toward shareholder returns rather than significant debt reduction.

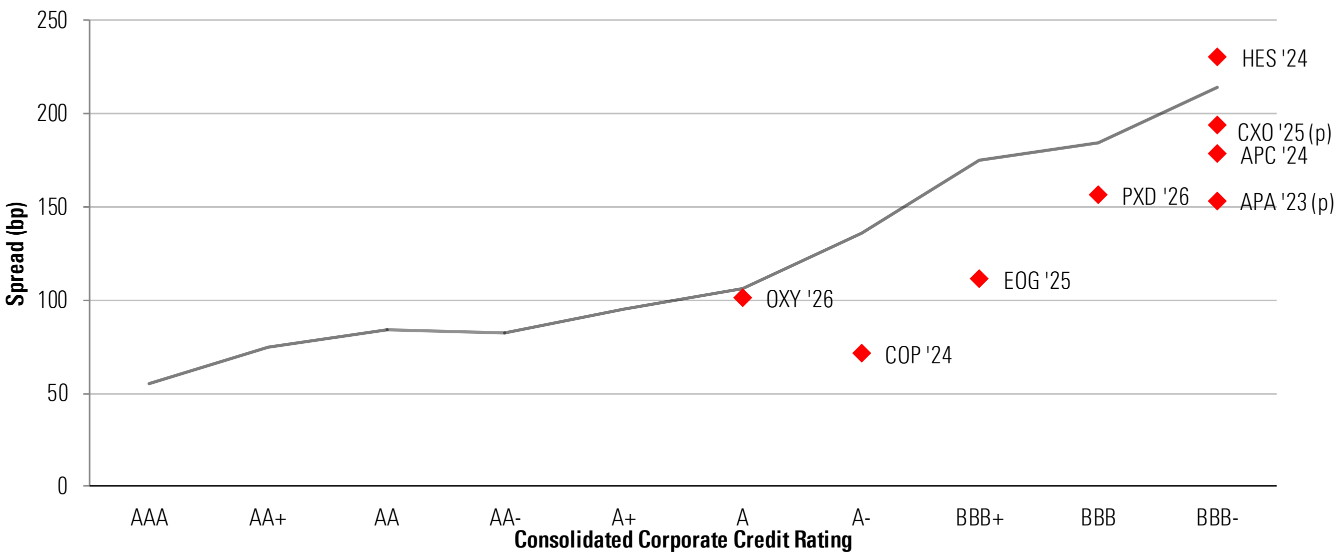
- In November, we affirmed the BBB+ corporate credit rating on Phillips 66 with a stable outlook. Our rating reflects Phillips 66’s large scale and cost-advantaged refining position on the U.S. Gulf Coast, the inherent cyclicality of the petroleum refining industry, integrated interests in chemical and midstream assets that generate higher returns and add earnings stability to petroleum refining operations, premium-branded wholesale outlets, and low debt leverage. These attributes are all incorporated into the narrow economic moat rating assigned to Phillips 66 by Morningstar Equity Research Group, which supports our moderate Business Risk score. We do not expect to see material improvement in credit fundamentals during the next few years, based on our expectation that incremental free cash flow is likely to be allocated toward shareholder returns rather than significant debt reduction.

Recent Headlines

- Since the OPEC and non-OPEC cut agreement initially took effect Jan. 1, 2017 (renewed six-month cut agreement signed in November 2018 begins on Jan. 1), the global availability of medium and heavy sour crude has been reduced, as Saudi Aramco emphasizes production of pricier sweet light crude. The worsening economic crisis plus U.S. sanctions further hindered the availability of Venezuelan heavy sour crude to refiners. As the price discount for medium and heavy sour crude narrowed, the economics favored U.S. Gulf Coast refiners to run domestic light sweet crude. However, the situation appears to be changing. An increasing desire by U.S. producers to export light sweet crude, the improving economics for and availability of waterborne crudes, and increasing use of discounted Canadian crude is shifting Gulf Coast refiners back to medium and heavy sour crudes.
- Since the end of the ban on U.S. crude-oil exports in late 2015, the wide spread between U.S. crude prices and Brent (as well as other international benchmarks) had narrowed to $1-$2 per barrel for 2016 and for most of 2017 relative to about $5 per barrel before late 2015. The export ban, originally enacted in 1975, had helped pad U.S. refiners' margins by bottling up surging domestic output of shale-oil-derived light crude. Since early 2018, the inability of pipeline transportation capacity to keep up with surging U.S. shale oil output combined with increased demand for North Sea crude to replace OPEC cuts has resulted in the U.S. discount to Brent sharply widening out again, currently $7-$9 per barrel. The domestic crude price discount provides U.S. refiners with a competitive advantage, positioning them lower on the global cost curve and enhancing refined product exports. Furthermore, access to lower-priced natural gas should help support U.S. refiners' cost advantage relative to global peers.
- The International Maritime Organization has set a global limit for sulfur in fuel oil used on board ships of 0.50% m/m (mass by mass) beginning Jan. 1, 2020. This will significantly reduce the amount of sulfur oxide emanating from ships. Currently, the global sulfur cap is 3.5%, while the average sulfur content of today's heavy fuel oil bunkers—the most common type of marine fuel burned—is around 2.7%. The replacement fuel is likely to be marine gasoil (distillate), which should benefit U.S. refiners. We expect more detailed plans by individual refiners to address IMO 2020 in the next several months.

Exploration and Production

Exhibit 7 E&P Sector vs. Morningstar Corporate Bond Index



Source: Morningstar Credit Ratings, LLC, Morningstar, Inc., and Bloomberg as of Dec. 19, 2018
(UR) = rating under review / (p) = positive outlook / (n) = negative outlook

E&P Sector Trends

The exploration and production subsector consists of companies that focus on the high-risk, high-reward area of finding, augmenting, producing, and merchandising different types of oil and gas. The largest North America-based E&Ps include Occidental Petroleum (A, stable) and ConocoPhillips (A-, stable), both U.S.-centric with foreign operating interests, onshore and offshore. More-regional E&Ps with competitive niche positions in the United States include EOG Resources (BBB+, stable) with low-cost shale oil and gas holdings in the Eagle Ford Shale (Texas), Permian Basin (Texas and New Mexico), and Bakken Formation (North Dakota), and Pioneer Natural Resources (BBB, stable), also with low-cost shale holdings in the Permian.

Since the oil price hit an interim peak of $76 in October, it has sharply dropped to the mid-$40s, currently, pressuring all E&Ps. Simultaneously, however, the U.S. natural gas price surged to $4.85 per mmBTU in November from about $2.90 per mmBtu over the summer, driven higher by low inventories and earlier-than-usual cold winter temperatures. For some producers, a higher gas price has provided a modest offset to lower crude pricing. Since peaking, the gas price has declined to $3.50 per mmBtu, currently. Despite aggressive cuts to capital and operating costs the past few years, lower pricing will pressure free cash flow generation for all producers. For some, oil price hedging will help to mitigate the negative, near-term impact. After hitting a peak in early October, E&P bond spreads have moderately widened as energy prices dropped, more so than for the energy sector index. Assuming energy pricing gradually cycles higher, we expect the E&P credit trend to be stable. However, if pricing continues to languish, the E&P credit trend could potentially deteriorate.

Issuer Highlights

- In September, we affirmed the BBB- corporate credit rating of Hess Corporation with a stable outlook. Our affirmation incorporates our updated oil and gas price forecasts, our estimate for companywide, organic oil-equivalent production growth at a low-double-digit percentage rate per year, and gradually improving company performance for the next few years. The stable outlook reflects Hess' excellent progress in lowering its overall cost structure and its growth strategy, with lower-risk U.S. onshore production providing balance to the company's global offshore E&P activities.
    - On Dec. 10, Hess announced a 2019 E&P capital and exploratory budget of $2.9 billion, a sharp increase from $2.1 billion the company estimates for 2018, with the rise mostly driven by a major new development, located offshore Guyana, and higher investment in the North Dakota Bakken.
- In mid-November, Anadarko Petroleum (BBB-, stable) announced a 2019 capital investment program range of $4.3 billion-$4.7 billion (excludes Western Gas Equity Partners, not rated) that it believes will deliver 10% year-over-year oil growth. The 2019 capital budget midpoint is 3% lower than 2018 guidance of $4.5 billion-$4.8 billion. Of the total 2019 budget, 70% is planned to be spent on existing U.S. onshore operations.
- On Dec. 10, ConocoPhillips (A-, stable) announced a $6.1 billion capital budget for 2019, unchanged from 2018. The company estimates that 70% of 2019's capital budget will be spent on development of oil-weighted resources located in the United States, about the same as in 2018.

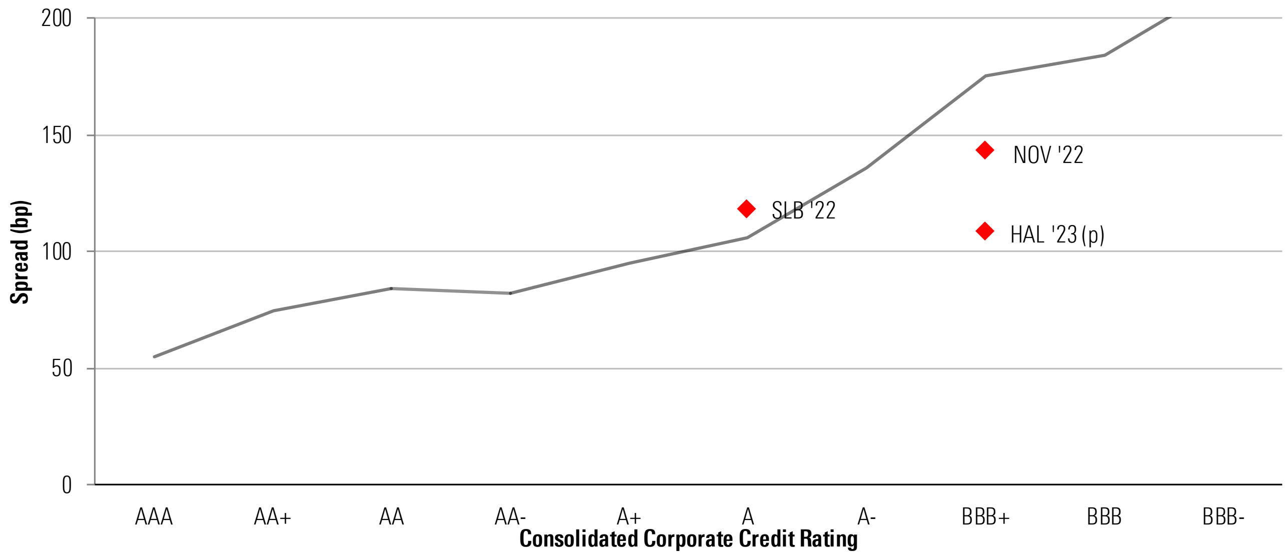
Recent Headlines

- In response to a 40% drop in the crude price from $76 peak in October, we expect capital expenditures for the E&P segment next year to be flat to lower versus 2018. Several large producers have already communicated plans; most companies will report 2019 capital budgets early in the new year. For the past few years, aggressive cost-cutting has resulted in the oil breakeven price for new, offshore developments to significantly decline. Since early 2018, the offshore rig market had been slowly increasing commensurate with an improving economic return on offshore E&P projects. However, in view of the current abrupt price drop, we would expect offshore E&P activity to slacken next year.
- Production from the Permian Basin in Texas and New Mexico has nearly doubled to about 6 million barrels of oil-equivalent per day (boepd), currently, from 3 million boepd in 2015 and, during this time, has accounted for the majority of total U.S. production growth. However, as widely chronicled, pipeline and labor constraints are hindering growth in Permian output. The midstream bottlenecks have caused the nearby price discount for WTI-Midland crude relative to Gulf Coast quotes to widen out to $10-$12 per barrel, currently, from $3-$5 earlier this year, negatively impacting many Permian producers. The bottlenecks and Midland price discount will likely linger for a while longer, generally affecting small producers without secure pipeline transportation space.
- As of Aug. 31, 144 North American oil and gas producers have filed for bankruptcy—including chapters 7, 11, and 15 and Canadian cases—since the beginning of 2015. Filings reached a crescendo (16) in

May 2016, sharply tailing off since then. There have been 22 energy producers file for bankruptcy year to date. (Source: Oil Patch Bankruptcy Monitor, Haynes and Boone, Aug. 31 most recent update.)

Oilfield Services

Exhibit 8 Oilfield Services vs. Morningstar Corporate Bond Index



Source: Morningstar Credit Ratings, LLC, Morningstar, Inc., and Bloomberg as of Dec. 19, 2018
(UR) = rating under review / (p) = positive outlook / (n) = negative outlook

Oilfield-Services Sector Trends

Globally, E&P investment cuts totaled more than 40% in 2015 and 2016, collectively, relative to 2014 (see Exhibit 3). Since then, a rebound in upstream spending has helped resuscitate demand for oilfield services and equipment. For year-to-date 2018, global oilfield service activity has increased relative to the same period last year. However, given the recent, sharp oil price decline and reduction in visibility, we expect a more conservative capital spending approach by producers in the first half of 2019, possibly longer. We expect the broader-based recovery in international and offshore segment demand for oilfield products and services that began earlier this year to continue but at a slower pace than we previously forecast.

After hitting a peak in early October, oilfield-services bond spreads have widened as energy prices dropped, much more so than for the energy sector index. Assuming energy pricing gradually cycles higher, we expect the oilfield services credit trend to be stable. However, if pricing continues to languish, the oilfield services credit trend could potentially deteriorate.

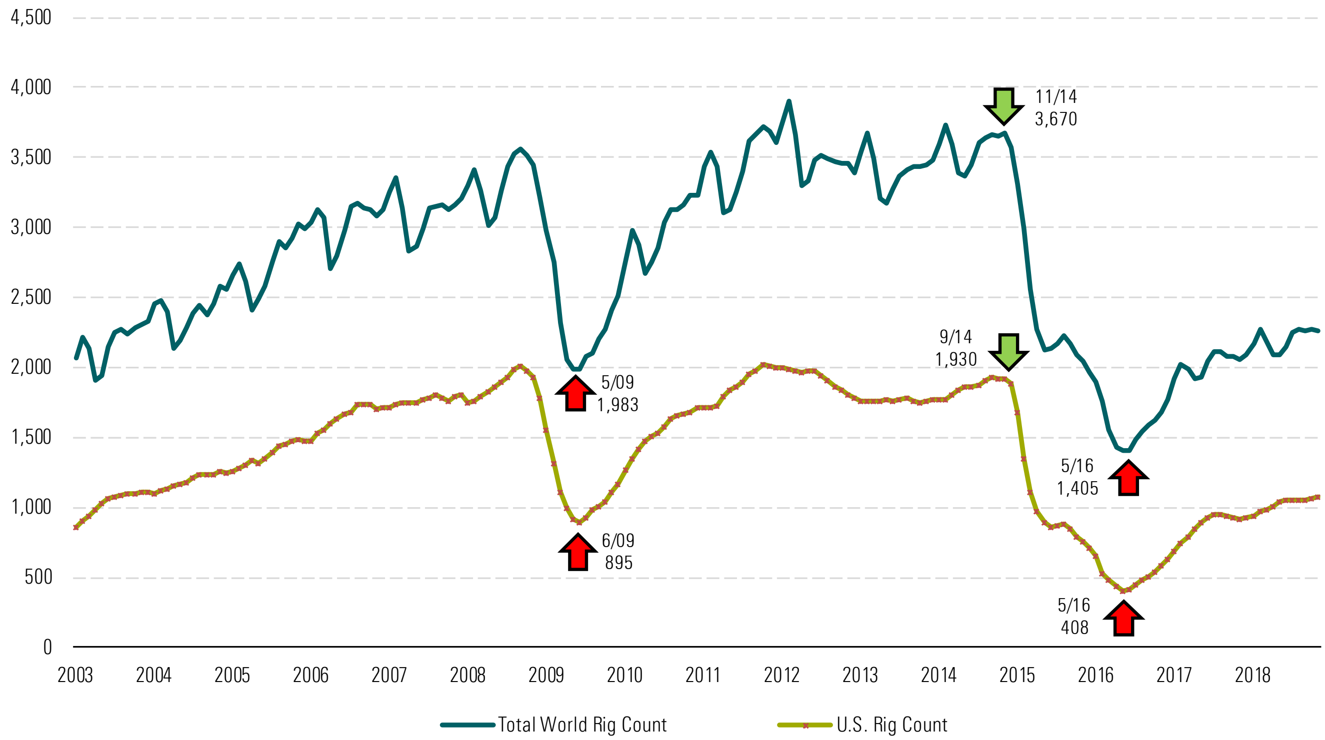
Issuer Highlights

- In December, we downgraded Schlumberger's credit rating by one notch to A and revised the outlook to stable from negative. The stable outlook reflects our new demand forecast for oilfield products and services, ongoing portfolio optimization by Schlumberger, and our forecast for steadily increasing company cash flow. Our rating reflects Schlumberger's large scale and number-one position as an innovator and global technology leader in oilfield services. The company’s moderate Business Risk score reflects the cyclicality of the oilfield-services industry and Schlumberger’s concentrated product line, partly offset by a geographically diverse end market and our forecast for positive free cash flow generation, which lessens the company’s need to tap capital markets. Business Risk also reflects Morningstar Equity Research Group’s view that Schlumberger benefits from a narrow economic moat, with a return on invested capital generally expected to remain above its weighted average cost of capital. After capital expenditures, production management investments, and multiclient seismic expenditures, we forecast free cash flow of $2.5 billion in 2018, increasing to $4.5 billion in 2019.

Recent Headlines

- Although tendering activity for offshore work had been gradually increasing from depressed levels for the year to date, the sharp decline in the oil price is likely to reduce demand for offshore activity next year, deferring some projects in to the future.
- According to data provided by Baker Hughes, a GE Co., 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 10). Since then, about 860 rigs have been added to the worldwide rig count, as North American land-based E&P activity has surged. Within the total, the rig count for the U.S. has rebounded by 670 and for Canada by about 50 (seasonally adjusted, the Canadian rig count typically peaks in December-February). Simultaneously, the rig count in Europe has slightly declined and for Latin America is nearly unchanged. In the U.S., the rebound in E&P activity 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).
- With the surge in North American, land-based E&P activity, the investment in pipelines and related infrastructure for hydrocarbon development, transportation, and storage is on a strong upswing there. Construction of new or expanded pipelines typically lags E&P (drilling) activity by 9-12 months.
- As of Aug. 31, 172 North American oilfield-services companies have filed for bankruptcy, including 88 in Texas, 18 in Louisiana, 10 in New York, and seven in Canada, since the beginning of 2015. Filings reached a crescendo in May and June 2016 (nine each), tailing off since then. So far, nine oilfield-services companies have filed for bankruptcy in 2018. (Source: Oilfield Services Bankruptcy Tracker, Haynes and Boone, Aug. 31 most recent update.)

Exhibit 9 Since May 2016 Bottom, Total World Rig Count Rebound Largely Led by Sharp Rebound in North American Land-Based Activity



Source: Baker Hughes, a GE Co. as of Dec. 19, 2018

Exhibit 10 Morningstar Credit Ratings Sector Coverage: Energy

Issuer	Ticker	Credit Rating	Rating Outlook	Moat*	Moat Trend*	Uncertainty*
Integrated Companies						
Exxon Mobil Corp	XOM	AA+	Stable	Narrow	Stable	Low
Chevron Corp	CVX	AA-	Stable	Narrow	Stable	Medium
Exploration & Production						
Occidental Petroleum Corp	OXY	A	Stable	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-	Positive	NA	NA	NA
Concho Resources Inc	CXO	BBB-	Positive	Narrow	Stable	High
Hess Corp	HES	BBB-	Stable	None	Stable	High
Anadarko Petroleum Corp	APC	BBB-	Stable	None	Stable	High
Oilfield Services						
Schlumberger Ltd	SLB	A	Stable	Narrow	Stable	High
Halliburton Co	HAL	BBB+	Positive	Narrow	Negative	High
National Oilwell Varco Inc	NOV	BBB+	Stable	None	Stable	Very High
Refining, Marketing & Transportation						
Phillips 66	PSX	BBB+	Stable	Narrow	Stable	High
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 Dec. 19, 2018. 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