HollyFrontier Corp
Form 10-K
February 20, 2019

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

(Mark One)
ý ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended December 31, 2018
OR
¨ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period from ___________ to ____________
Commission File Number 1-3876

HOLLYFRONTIER CORPORATION
(Exact name of registrant as specified in its charter)

Delaware	75-1056913
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
2828 N. Harwood, Suite 1300 Dallas, Texas	75201-1507
(Address of principal executive offices)	(Zip Code)

(214) 871-3555
Registrant’s telephone number, including area code

Securities registered pursuant to Section 12(b) of the Act:
Common Stock, $0.01 par value registered on the New York Stock Exchange.

Securities registered pursuant to 12(g) of the Act:
None.

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ý No ¨
Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15 (d) of the Act. Yes ¨ No ý
Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15 (d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.
Yes ý No ¨
Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for

such shorter period that the registrant was required to submit such files). Yes ý No ¨

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ¨

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer ý Accelerated filer ¨ Non-accelerated filer ¨ Smaller reporting company ¨
Emerging growth company ¨

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ¨

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).
Yes ¨ No ý

On June 30, 2018, the last business day of the registrant's most recently completed second fiscal quarter, the aggregate market value of the Common Stock, par value $0.01 per share, held by non-affiliates of the registrant was approximately $11.0 billion, based upon the closing price on the New York Stock Exchange on such date. (This is not deemed an admission that any person whose shares were not included in the computation of the amount set forth in the preceding sentence necessarily is an "affiliate" of the registrant.)

170,765,526 shares of Common Stock, par value $.01 per share, were outstanding on February 15, 2019.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's proxy statement for its annual meeting of stockholders to be held on May 8, 2019, which proxy statement will be filed with the Securities and Exchange Commission within 120 days after December 31, 2018, are incorporated by reference in Part III.

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PART I

FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10 K contains certain "forward-looking statements" within the meaning of the federal securities laws. All statements, other than statements of historical fact included in this Form 10-K, including, but not limited to, those under "Business and Properties" in Items 1 and 2, "Risk Factors" in Item 1A, "Legal Proceedings" in Item 3 and "Management's Discussion and Analysis of Financial Condition and Results of Operations" in Item 7, are forward-looking statements. Forward-looking statements use words such as "anticipate," "project," "expect," "plan," "goal," "forecast," "intend," "should," "would," "could," "believe," "may," and similar expressions and statements regarding our plans objectives for future operations. These statements are based on management's beliefs and assumptions using currently available information and expectations as of the date hereof, are not guarantees of future performance and involve certain risks and uncertainties. All statements concerning our expectations for future results of operations are based on forecasts for our existing operations and do not include the potential impact of any future acquisitions. Although we believe that the expectations reflected in these forward-looking statements are reasonable, we cannot assure you that our expectations will prove to be correct. Therefore, actual outcomes and results could materially differ from what is expressed, implied or forecast in these statements. Any differences could be caused by a number of factors including, but not limited to:

- risks and uncertainties with respect to the actions of actual or potential competitive suppliers of refined petroleum products in our markets;
- the demand for and supply of crude oil and refined products;
- the spread between market prices for refined products and market prices for crude oil;
- the possibility of constraints on the transportation of refined products;
- the possibility of inefficiencies, curtailments or shutdowns in refinery operations or pipelines;
- effects of governmental and environmental regulations and policies;
- the availability and cost of our financing;
- the effectiveness of our capital investments and marketing strategies;
- our efficiency in carrying out construction projects;
- our ability to acquire refined or lubricant product operations or pipeline and terminal operations on acceptable terms and to integrate any existing or future acquired operations;
- the possibility of terrorist or cyber attacks and the consequences of any such attacks;
- general economic conditions; and
- other financial, operational and legal risks and uncertainties detailed from time to time in our Securities and Exchange Commission filings.

Cautionary statements identifying important factors that could cause actual results to differ materially from our expectations are set forth in this Form 10-K, including without limitation the forward-looking statements that are referred to above. When considering forward-looking statements, you should keep in mind the risk factors and other cautionary statements set forth in this Form 10-K under "Risk Factors" in Item 1A and in conjunction with the discussion in this Form 10-K in "Management's Discussion and Analysis of Financial Condition and Results of Operations" under the heading "Liquidity and Capital Resources." All forward-looking statements included in this Form 10-K and all subsequent written or oral forward-looking statements attributable to us or persons acting on our behalf are expressly qualified in their entirety by these cautionary statements. The forward-looking statements speak only as of the date made and, other than as required by law, we undertake no obligation to publicly update or revise any forward-looking statements, whether as a result of new information, future events or otherwise.

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DEFINITIONS

Within this report, the following terms have these specific meanings:

“Alkylation” means the reaction of propylene or butylene (olefins) with isobutane to form an iso-paraffinic gasoline (inverse of cracking).

“Aromatic oil” is long chain oil that is highly aromatic in nature and is used to manufacture tires and industrial rubber products and in the production of specialty asphalt.

“BPD” means the number of barrels per calendar day of crude oil or petroleum products.

“BPSD” means the number of barrels per stream day (barrels of capacity in a 24 hour period) of crude oil or petroleum products.

“Base oil” is a lubricant grade oil initially produced from refining crude oil or through chemical synthesis that is used in producing lubricant products such as lubricating greases, motor oil and metal processing fluids.

“Biodiesel” means a clean alternative fuel produced from renewable biological resources.

“Black wax crude oil” is a low sulfur, low gravity crude oil produced in the Uintah Basin in Eastern Utah that has certain characteristics that require specific facilities to transport, store and refine into transportation fuels.

“Catalytic reforming” means a refinery process which uses a precious metal (such as platinum) based catalyst to convert low octane naphtha to high octane gasoline blendstock and hydrogen. The hydrogen produced from the reforming process is used to desulfurize other refinery oils and is a primary source of hydrogen for the refinery.

“Cracking” means the process of breaking down larger, heavier and more complex hydrocarbon molecules into simpler and lighter molecules.

“Crude oil distillation” means the process of distilling vapor from liquid crudes, usually by heating, and condensing the vapor slightly above atmospheric pressure turning it back to liquid in order to purify, fractionate or form the desired products.

“Ethanol” means a high octane gasoline blend stock that is used to make various grades of gasoline.

“FCC,” or fluid catalytic cracking, means a refinery process that breaks down large complex hydrocarbon molecules into smaller more useful ones using a circulating bed of catalyst at relatively high temperatures.

“Gas oil” is a group of petroleum distillation products having boiling points between kerosene and lubricating oil and is used as fuel in construction and agricultural machinery.

“Hydrodesulfurization” means to remove sulfur and nitrogen compounds from oil or gas in the presence of hydrogen and a catalyst at relatively high temperatures.

“Hydrogen plant” means a refinery unit that converts natural gas and steam to high purity hydrogen, which is then used in the hydrodesulfurization, hydrocracking and isomerization processes.

“HF alkylation” or hydrofluoric alkylation, means a refinery process which combines isobutane and C3/C4 olefins using HF acid as a catalyst to make high octane gasoline blend stock.

“Isomerization” means a refinery process for rearranging the structure of C5/C6 molecules without changing their size or chemical composition and is used to improve the octane of C5/C6 gasoline blendstocks.

“LPG” means liquid petroleum gases.

“Lubricant” or “lube” means a solvent neutral paraffinic product used in commercial heavy duty engine oils, passenger car oils and specialty products for industrial applications such as heat transfer, metalworking, rubber and other general process oil.

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“MSAT2” means Control of Hazardous Air Pollutants from Mobile Sources, a rule issued by the U.S. Environmental Protection Agency to reduce hazardous emissions from motor vehicles and motor vehicle fuels.

“MEK” means a lube process that separates waxy oil from non-waxy oils using methyl ethyl ketone as a solvent.

“MMBTU” means one million British thermal units.

“Natural gasoline” means a low octane gasoline blend stock that is purchased and used to blend with other high octane stocks produced to make various grades of gasoline.

“Paraffinic oil” is a high paraffinic, high gravity oil produced by extracting aromatic oils and waxes from gas oil and is used in producing high-grade lubricating oils.

“Rack back” represents the portion of our Lubricants and Specialty Products business operations that entails the processing of feedstocks into base oils.

“Rack forward” represents the portion of our Lubricants and Specialty Products business operations that entails the processing of base oils into finished lubricants and the packaging, distribution and sale to customers.

“Refinery gross margin” means the difference between average net sales price and average cost per barrel sold. This does not include the associated depreciation and amortization costs.

“Reforming” means the process of converting gasoline type molecules into aromatic, higher octane gasoline blend stocks while producing hydrogen in the process.

“RINs” means renewable identification numbers and refers to serial numbers assigned to credits generated from renewable fuel production under the Environmental Protection Agency’s Renewable Fuel Standard (“RFS”) regulations, which require blending renewable fuels into the nation's fuel supply. In lieu of blending, refiners may purchase these transferable credits in order to comply with the regulations.

“Roofing flux” is produced from the bottom cut of crude oil and is the base oil used to make roofing shingles for the housing industry.

“ROSE,” or “Solvent deasphalter / residuum oil supercritical extraction,” means a refinery unit that uses a light hydrocarbon like propane or butane to extract non-asphaltene heavy oils from asphalt or atmospheric reduced crude. These deasphalted oils are then further converted to gasoline and diesel in the FCC process. The remaining asphaltenes are either sold, blended to fuel oil or blended with other asphalt as a hardener.

“Scanfiner” is a refinery unit that removes sulfur from gasoline to produce low sulfur gasoline blendstock.

“Sour crude oil” means crude oil containing quantities of sulfur greater than 0.4 percent by weight, while “sweet crude oil” means crude oil containing quantities of sulfur equal to or less than 0.4 percent by weight.

“Vacuum distillation” means the process of distilling vapor from liquid crudes, usually by heating, and condensing the vapor below atmospheric pressure turning it back to a liquid in order to purify, fractionate or form the desired products.

“White oil” is an extremely pure, highly-refined petroleum product that has a wide variety of applications ranging from pharmaceutical to cosmetic products.

“WTI” means West Texas Intermediate and is a grade of crude oil used as a common benchmark in oil pricing. WTI is a sweet crude oil and has a relatively low density.

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Items 1 and 2. Business and Properties

COMPANY OVERVIEW

References herein to HollyFrontier Corporation (“HollyFrontier”) include HollyFrontier and its consolidated subsidiaries. In accordance with the Securities and Exchange Commission's (“SEC”) “Plain English” guidelines, this Annual Report on Form 10-K has been written in the first person. In this document, the words “we,” “our,” “ours” and “us” refer only to HollyFrontier and its consolidated subsidiaries or to HollyFrontier or an individual subsidiary and not to any other person, with certain exceptions. Generally, the words “we,” “our,” “ours” and “us” include Holly Energy Partners, L.P. (“HEP”) and its subsidiaries as consolidated subsidiaries of HollyFrontier, unless when used in disclosures of transactions or obligations between HEP and HollyFrontier or its other subsidiaries. This document contains certain disclosures of agreements that are specific to HEP and its consolidated subsidiaries and do not necessarily represent obligations of HollyFrontier. When used in descriptions of agreements and transactions, “HEP” refers to HEP and its consolidated subsidiaries.

We are principally an independent petroleum refiner that produces high-value light products such as gasoline, diesel fuel, jet fuel, specialty lubricant products, and specialty and modified asphalt. We were incorporated in Delaware in 1947 and maintain our principal corporate offices at 2828 N. Harwood, Suite 1300, Dallas, Texas 75201-1507. Our telephone number is 214-871-3555, and our internet website address is www.hollyfrontier.com. The information contained on our website does not constitute part of this Annual Report on Form 10-K. A print copy of this Annual Report on Form 10-K will be provided without charge upon written request to the Director, Investor Relations at the above address. A direct link to our SEC filings is available on our website under the Investor Relations tab. Also available on our website are copies of our Corporate Governance Guidelines, Audit Committee Charter, Compensation Committee Charter, Nominating / Corporate Governance Committee Charter, Environmental, Health, Safety, and Public Policy Committee Charter and Code of Business Conduct and Ethics, all of which will be provided without charge upon written request to the Director, Investor Relations at the above address. Our Code of Business Conduct and Ethics applies to all of our officers, employees and directors, including our principal executive officer, principal financial officer and principal accounting officer. Our common stock is traded on the New York Stock Exchange under the trading symbol “HFC.”

On November 12, 2018, we entered into an equity purchase agreement to acquire 100% of the issued and outstanding capital stock of Sonneborn US Holdings Inc. and 100% of the membership rights in Sonneborn Coöperatief U.A. (collectively, “Sonneborn”). The acquisition closed on February 1, 2019. Cash consideration paid was $660.0 million. Sonneborn is a producer of specialty hydrocarbon chemicals such as white oils, petrolatums and waxes with manufacturing facilities in the United States and Europe.

On July 10, 2018, we entered into a definitive agreement to acquire Red Giant Oil Company LLC (“Red Giant Oil”), a privately-owned lubricants company. The acquisition closed on August 1, 2018. Cash consideration paid was $54.2 million. Red Giant Oil is one of the largest suppliers of locomotive engine oil in North America and is headquartered in Council Bluffs, Iowa.

On October 29, 2016, we entered into a share purchase agreement with Suncor Energy Inc. (“Suncor”) to acquire 100% of the outstanding capital stock of Petro-Canada Lubricants Inc. (“PCLI”). The acquisition closed on February 1, 2017. Cash consideration paid was $862.1 million, or $1.125 billion Canadian dollars. PCLI is located in Mississauga, Ontario and is the largest producer of base oils in Canada with a plant having 15,600 BPD of lubricant production capacity, and is the largest manufacturer of high margin Group III base oils in North America.

As of December 31, 2018, we:

- owned and operated a petroleum refinery in El Dorado, Kansas (the “El Dorado Refinery”), two refinery facilities located in Tulsa, Oklahoma (collectively, the “Tulsa Refineries”), a refinery in Artesia, New Mexico that is operated in conjunction with crude oil distillation and vacuum distillation and other facilities situated 65 miles away in Lovington, New Mexico (collectively, the “Navajo Refinery”), a refinery located in Cheyenne, Wyoming (the “Cheyenne Refinery”) and a refinery in Woods Cross, Utah (the “Woods Cross Refinery”);
- owned and operated PCLI located in Mississauga, Ontario, which produces base oils and other specialized lubricant products;
- owned and operated Red Giant Oil, which supplies locomotive engine oil and has storage and distribution facilities in Iowa, Kansas, Utah and Wyoming, along with a blending and packaging facility in Texas;
- owned and operated HollyFrontier Asphalt Company LLC (“HFC Asphalt”), which operates various asphalt terminals in Arizona, New Mexico and Oklahoma; and
- owned a 57% limited partner interest and a non-economic general partner interest in HEP. HEP owns and operates logistic assets consisting of petroleum product and crude oil pipelines, terminals, tankage, loading rack facilities and refinery

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processing units that principally support our refining and marketing operations in the Mid-Continent, Southwest and Rocky Mountain regions of the United States.

HEP is a variable interest entity ("VIE") as defined under U.S. generally accepted accounting principles ("GAAP"). Information on HEP's assets and acquisitions completed in the past three years can be found under the "Holly Energy Partners, L.P." section provided later in this discussion of Items 1 and 2, "Business and Properties."

Our operations are currently organized into three reportable segments, Refining, Lubricants and Specialty Products and HEP. The Refining segment includes the operations of our El Dorado, Tulsa, Navajo, Cheyenne and Woods Cross Refineries and HFC Asphalt. The Lubricants and Specialty Products segment includes the operations of our Petro-Canada Lubricants business and Red Giant Oil in addition to specialty lubricant products produced at our Tulsa Refinery. The HEP segment involves all of the operations of HEP. See Note 20 "Segment Information" in the Notes to Consolidated Financial Statements for additional information on our reportable segments.

REFINERY OPERATIONS

Our refinery operations serve the Mid-Continent, Southwest and Rocky Mountain regions of the United States. We own and operate five complex refineries having a combined crude oil processing capacity of 457,000 barrels per stream day. Each of our refineries has the complexity to convert discounted, heavy and sour crude oils into a high percentage of gasoline, diesel and other high-value refined products.

The tables presented below and elsewhere in this discussion of our refinery operations set forth information, including non-GAAP performance measures, about our refinery operations. The cost of products and refinery gross and net operating margins do not include the non-cash effects of lower of cost or market inventory valuation adjustments and depreciation and amortization. Reconciliations to amounts reported under GAAP are provided under "Reconciliations to Amounts Reported Under Generally Accepted Accounting Principles" following Item 7A of Part II of this Form 10-K.

	Years Ended December 31,		
	2018	2017	2016
Consolidated			
Crude charge (BPD) (1)	431,570	438,800	423,910
Refinery throughput (BPD) (2)	463,340	472,010	457,480
Sales of produced refined products (BPD) (3)	452,630	452,270	440,640
Refinery utilization (4)	94.4 %	96.0 %	92.8 %
Average per produced barrel sold (5)			
Refinery gross margin (6)	$17.71	$11.56	$8.16
Refinery operating expenses (7)	6.39	6.11	5.65
Net operating margin	$11.32	$5.45	$2.51
Refinery operating expenses per throughput barrel (8)	$6.24	$5.86	$5.45
Feedstocks:			
Sweet crude oil	43 %	48 %	48 %
Sour crude oil	30 %	25 %	26 %
Heavy sour crude oil	17 %	16 %	16 %
Black wax crude oil	4 %	4 %	3 %
Other feedstocks and blends	6 %	7 %	7 %
Total	100 %	100 %	100 %

(1) Crude charge represents the barrels per day of crude oil processed at our refineries.
(2) Refinery throughput represents the barrels per day of crude and other refinery feedstocks input to the crude units and other conversion units at our refineries.
(3) Represents barrels sold of refined products produced at our refineries (including HFC Asphalt) and does not include volumes of refined products purchased for resale or volumes of excess crude oil sold.
(4) Represents crude charge divided by total crude capacity (BPSD). Our consolidated crude capacity is 457,000 BPSD.

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(5) Represents average amount per produced barrel sold, which is a non-GAAP measure. Reconciliations to amounts reported under GAAP are provided under “Reconciliations to Amounts Reported Under Generally Accepted Accounting Principles” following Item 7A of Part II of this Form 10-K.
(6) Excludes lower of cost or market inventory valuation adjustments.
(7) Represents total refining segment operating expenses, exclusive of depreciation and amortization, divided by sales volumes of refined products produced at our refineries.
(8) Represents total refining segment operating expenses, exclusive of depreciation and amortization, divided by refinery throughput.

Products and Customers

Set forth below is information regarding refined product sales:

	Years Ended December 31,		
	2018	2017	2016
Consolidated			
Sales of refined products:			
Gasolines	52 %	52 %	52 %
Diesel fuels	34 %	34 %	34 %
Jet fuels	3 %	4 %	4 %
Fuel oil	2 %	2 %	2 %
Asphalt	4 %	4 %	3 %
Base oils	2 %	2 %	3 %
LPG and other	3 %	2 %	2 %
Total	100 %	100 %	100 %

Light products are shipped to customers via product pipelines or are available for loading at our refinery truck facilities and terminals. Light products are also made available to customers at various other locations via exchange with other parties.

Our principal customers for gasoline include other refiners, convenience store chains, independent marketers and retailers. Diesel fuel is sold to other refiners, truck stop chains, wholesalers and railroads. Jet fuel is sold for commercial airline use. Base oils are intercompany sales to our Lubricants and Specialty Products segment. LPG's are sold to LPG wholesalers and LPG retailers. We produce and purchase asphalt products that are sold to governmental entities, paving contractors or manufacturers. Asphalt is also blended into fuel oil and is either sold locally or is shipped to the Gulf Coast. See Note 4 “Revenues” in the Notes to Consolidated Financial Statements for additional information on our significant customers.

Mid-Continent Region (El Dorado and Tulsa Refineries)

Facilities

The El Dorado Refinery is a high-complexity coking refinery with a 135,000 barrels per stream day processing capacity and the ability to process significant volumes of heavy and sour crudes. The integrated refining processes at the Tulsa West and East refinery facilities provide us with a highly complex refining operation having a combined crude processing rate of approximately 125,000 barrels per stream day.

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The following table sets forth information about our Mid-Continent region operations, including non-GAAP performance measures.

	Years Ended December 31,		
	2018	2017	2016
Mid-Continent Region (El Dorado and Tulsa Refineries)			
Crude charge (BPD) (1)	249,240	261,380	262,170
Refinery throughput (BPD) (2)	264,730	277,940	280,920
Sales of produced refined products (BPD) (3)	255,800	260,800	262,300
Refinery utilization (4)	95.9 %	100.5 %	100.8 %
Average per produced barrel sold (5)			
Refinery gross margin (6)	$ 14.44	$ 9.91	$ 7.44
Refinery operating expenses (7)	5.51	5.15	4.73
Net operating margin	$ 8.93	$ 4.76	$ 2.71
Refinery operating expenses per throughput barrel (8)	$ 5.32	$ 4.83	$ 4.42

Footnote references are provided under our Consolidated Refinery Operating Data table on page 7.

	Years Ended December 31,		
	2018	2017	2016
Mid-Continent Region (El Dorado and Tulsa Refineries)			
Feedstocks:			
Sweet crude oil	54 %	61 %	58 %
Sour crude oil	24 %	17 %	18 %
Heavy sour crude oil	16 %	16 %	17 %
Other feedstocks and blends	6 %	6 %	7 %
Total	100 %	100 %	100 %

The El Dorado Refinery is located on 1,100 acres south of El Dorado, Kansas and is a fully integrated refinery. The principal processing units at the El Dorado Refinery consist of crude and vacuum distillation; hydrodesulfurization of naphtha, kerosene, diesel, and gas oil streams; isomerization; catalytic reforming; aromatics recovery; catalytic cracking; alkylation; delayed coking; hydrogen production; and sulfur recovery.

The Tulsa West facility is located on a 750-acre site in Tulsa, Oklahoma situated along the Arkansas River. The principal processing units at the Tulsa West facility consist of crude and vacuum distillation (with light ends recovery), naphtha hydrodesulfurization, propane de-asphalting, lubes extraction, MEK dewaxing, delayed coker and butane splitter units.

The Tulsa East facility is located on a 466-acre site also in Tulsa, Oklahoma situated along the Arkansas River. The principal process units at the Tulsa East facility consist of crude and vacuum distillation, naphtha hydrodesulfurization, FCC, isomerization, catalytic reforming, alkylation, scanfiner, diesel hydrodesulfurization and sulfur units.

Markets and Competition

The primary markets for the El Dorado Refinery's refined products are Colorado and the Plains States, which include the Kansas City metropolitan area. The gasoline, diesel and jet fuel produced by the El Dorado Refinery are primarily shipped via pipeline to terminals for distribution by truck or rail. We ship product via the NuStar Pipeline Operating

Partnership L.P. Pipeline to the northern Plains States, via the Magellan Pipeline Company, L.P. (“Magellan”) mountain pipeline to Denver, Colorado, and on the Magellan mid-continent pipeline to the Plains States. Additionally, HEP's on-site truck and rail racks facilitate access to local refined product markets.

The El Dorado Refinery faces competition from other Plains States and Mid-Continent refiners, but the principal competitors for the El Dorado Refinery are Gulf Coast refiners. Our Gulf Coast competitors typically have lower production costs due to greater economies of scale; however, they incur higher refined product transportation costs, which allows the El Dorado Refinery to compete effectively in the Plains States and Rocky Mountain region with Gulf Coast refineries.

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The Tulsa Refineries serve the Mid-Continent region of the United States. Distillates and gasolines are primarily delivered from the Tulsa Refineries to market via pipelines owned and operated by Magellan. These pipelines connect the refinery to distribution channels throughout Colorado, Oklahoma, Kansas, Missouri, Illinois, Iowa, Minnesota, Nebraska and Arkansas. Additionally, HEP's on-site truck and rail racks facilitate access to local refined product markets.

The Tulsa Refineries' principal customers for conventional gasoline include other refiners, convenience store chains, independent marketers and retailers. Truck stop operators and railroads are the primary diesel customers. Jet fuel is sold primarily for commercial use. The refinery's asphalt and roofing flux products are sold via truck or railcar directly from the refineries or to customers throughout the Mid-Continent region primarily to paving contractors and manufacturers of roofing products.

Products

Set forth below is information regarding refined product sales attributable to our Mid-Continent region:

	Years Ended December 31,		
	2018	2017	2016
Mid-Continent Region (El Dorado and Tulsa Refineries)			
Sales of refined products:			
Gasolines	51 %	50 %	50 %
Diesel fuels	33 %	33 %	33 %
Jet fuels	6 %	7 %	7 %
Fuel oil	1 %	1 %	1 %
Asphalt	3 %	3 %	3 %
Base oils	4 %	4 %	4 %
LPG and other	2 %	2 %	2 %
Total	100%	100%	100%

Crude Oil and Feedstock Supplies

Both of our Mid-Continent Refineries are connected via pipeline to Cushing, Oklahoma, a significant crude oil pipeline trading and storage hub. The El Dorado Refinery and the Tulsa Refineries are located approximately 125 miles and 50 miles, respectively, from Cushing, Oklahoma. Local pipelines provide direct access to regional Oklahoma crude production as well as access to United States onshore and Canadian crudes. The proximity of the refineries to the Cushing pipeline and storage hub provides the flexibility to optimize their crude slate with a wide variety of crude oil supply options. Additionally, we have transportation service agreements to transport Canadian crude oil on the Spearhead and Keystone Pipelines, enabling us to transport Canadian crude oil to Cushing for subsequent shipment to either of our Mid-Continent Refineries.

We also purchase isobutane, natural gasoline, butane and other feedstocks for processing at our Mid-Continent Refineries. The El Dorado Refinery is connected to Conway, Kansas, a major gas liquids trading and storage hub, via the Oneok Pipeline. From time to time, other feedstocks such gas oil, naphtha and light cycle oil are purchased from other refiners for use at our refineries.

Southwest Region (Navajo Refinery)

Facilities

The Navajo Refinery has a crude oil processing capacity of 100,000 barrels per stream day and has the ability to process sour crude oils into high-value light products such as gasoline, diesel fuel and jet fuel.

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The following table sets forth information about our Southwest region operations, including non-GAAP performance measures.

	Years Ended December 31,		
	2018	2017	2016
Southwest Region (Navajo Refinery)			
Crude charge (BPD) [1]	109,440	100,040	98,090
Refinery throughput (BPD) [2]	118,630	109,280	107,690
Sales of produced refined products (BPD) [3]	120,520	111,630	111,390
Refinery utilization [4]	109.4 %	100.0 %	98.1 %
Average per produced barrel sold [5]			
Refinery gross margin [6]	$19.05	$12.40	$9.49
Refinery operating expenses [7]	4.81	5.20	5.05
Net operating margin	$14.24	$7.20	$4.44
Refinery operating expenses per throughput barrel [8]	$4.89	$5.31	$5.23

Footnote references are provided under our Consolidated Refinery Operating Data table on page 7.

	Years Ended December 31,		
	2018	2017	2016
Southwest Region (Navajo Refinery)			
Feedstocks:			
Sweet crude oil	27 %	25 %	28 %
Sour crude oil	65 %	66 %	63 %
Other feedstocks and blends	8 %	9 %	9 %
Total	100%	100%	100%

The Navajo Refinery's Artesia, New Mexico facility is located on a 561-acre site and is a fully integrated refinery with crude distillation, vacuum distillation, FCC, ROSE (solvent deasphalter), HF alkylation, catalytic reforming, hydrodesulfurization, mild hydrocracking, isomerization, sulfur recovery and product blending units.

The Artesia facility is operated in conjunction with a refining facility located in Lovington, New Mexico, approximately 65 miles east of Artesia. The principal equipment at the Lovington facility consists of a crude distillation unit and associated vacuum distillation units. The Lovington facility processes crude oil into intermediate products that are transported to Artesia by means of three intermediate pipelines owned by HEP. These products are then upgraded into finished products at the Artesia facility. The combined crude oil capacity of the Navajo Refinery facilities is 100,000 BPSD and it typically processes or blends an additional 10,000 BPSD of natural gasoline, butane, gas oil and naphtha.

Markets and Competition

The Navajo Refinery primarily serves the southwestern United States market, including the metropolitan areas of El Paso, Texas; Albuquerque, Moriarty and Bloomfield, New Mexico; Phoenix and Tucson, Arizona; and portions of northern Mexico. Our products are shipped through HEP's pipelines from Artesia, New Mexico to El Paso, Texas and from El Paso to Albuquerque and to Mexico via products pipeline systems owned by Magellan and from El Paso to Tucson and Phoenix via a products pipeline system owned by Kinder Morgan's subsidiary, SFPP, L.P. (“SFPP”). In addition, petroleum products from the Navajo Refinery are transported to markets in northwest New Mexico, to Moriarty, New Mexico, near Albuquerque, via HEP's pipelines running from Artesia to San Juan County, New

Mexico, and to Bloomfield, New Mexico. We have refined product storage through our pipelines and terminals agreement with HEP at terminals in Artesia and Moriarty, New Mexico.

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Products

Set forth below is information regarding refined product sales attributable to our Southwest region:

	Years Ended December 31,		
	2018	2017	2016
Southwest Region (Navajo Refinery)			
Sales of refined products:			
Gasolines	50 %	51 %	52 %
Diesel fuels	40 %	39 %	39 %
Fuel oil	3 %	3 %	3 %
Asphalt	4 %	4 %	3 %
LPG and other	3 %	3 %	3 %
Total	100%	100%	100%

Crude Oil and Feedstock Supplies

The Navajo Refinery is situated near the Permian Basin, an area that has historically, and continues to have, abundant supplies of crude oil available both for regional users and for export to other areas. We purchase crude oil from independent producers in southeastern New Mexico and west Texas as well as from major oil companies. The crude oil is gathered through HEP's pipelines and through third-party tank trucks and crude oil pipeline systems for delivery to the Navajo Refinery.

We also purchase volumes of isobutane, natural gasoline and other feedstocks to supply the Navajo Refinery from sources in Texas and the Mid-Continent area that are delivered to our region on a common carrier pipeline owned by Enterprise Products, L.P. Ultimately all volumes of these products are shipped to the Artesia refining facilities on HEP's intermediate pipelines running from Lovington to Artesia. From time to time, we purchase gas oil, naphtha and light cycle oil from other refiners for use as feedstock.

Rocky Mountain Region (Cheyenne and Woods Cross Refineries)

Facilities

The Cheyenne and the Woods Cross Refineries have crude oil processing capacities of 52,000 and 45,000 barrels per stream day, respectively. The Cheyenne Refinery processes heavy Canadian crudes as well as local sweet crudes such as that produced from the Bakken shale and similar resources. The Woods Cross Refinery processes regional sweet and black wax crude as well as Canadian sour crude oils into high-value light products.

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The following tables set forth information about our Rocky Mountain region operations, including non-GAAP performance measures.

	Years Ended December 31,		
	2018	2017	2016
Rocky Mountain Region (Cheyenne and Woods Cross Refineries)			
Crude charge (BPD) [1]	72,890	77,380	63,650
Refinery throughput (BPD) [2]	79,980	84,790	68,870
Sales of produced refined products (BPD) [3]	76,300	79,840	66,950
Refinery utilization [4]	75.1 %	79.8 %	65.6 %
Average per produced barrel sold [5]			
Refinery gross margin [6]	$26.55	$15.78	$8.80
Refinery operating expenses [7]	11.83	10.46	10.17
Net operating margin	$14.72	$5.32	$(1.37)
Refinery operating expenses per throughput barrel [8]	$11.28	$9.85	$9.89

Feedstocks:			
Sweet crude oil	28 %	34 %	39 %
Heavy sour crude oil	42 %	35 %	35 %
Black wax crude oil	21 %	22 %	18 %
Other feedstocks and blends	9 %	9 %	8 %
Total	100%	100%	100%

Footnote references are provided under our Consolidated Refinery Operating Data table on page 7.

The Cheyenne Refinery facility is located on a 255-acre site and is a fully integrated refinery with crude distillation, vacuum distillation, coking, FCC, HF alkylation, catalytic reforming, hydrodesulfurization of naphtha and distillates, butane isomerization, hydrogen production, sulfur recovery and product blending units.

The Woods Cross Refinery facility is located on a 200-acre site and is a fully integrated refinery with crude distillation, solvent deasphalter, FCC, HF alkylation, catalytic reforming, hydrodesulfurization, isomerization, sulfur recovery and product blending units. The facility typically processes or blends an additional 2,000 BPSD of natural gasoline, butane and gas oil over its 45,000 BPSD capacity.

Markets and Competition

The Cheyenne Refinery primarily markets its products in eastern Colorado, including metropolitan Denver, eastern Wyoming and western Nebraska. Because of the location of the Cheyenne Refinery, we are able to sell a significant portion of its diesel directly from the truck rack at the refinery, therefore, eliminating transportation costs. The Cheyenne Refinery ships refined products via the Magellan pipeline serving Denver and Colorado Springs, Colorado.

The Woods Cross Refinery's primary market is Utah, which is currently supplied by a number of local refiners and the Pioneer Pipeline. It also supplies a small percentage of the refined products consumed in the combined Idaho, Wyoming, eastern Washington and Nevada markets. Our Woods Cross Refinery ships refined products over a common carrier pipeline system owned by Andeavor Logistics Northwest Pipelines LLC to numerous terminals, including HEP's terminal at Spokane, Washington and to third-party terminals at Pocatello and Boise, Idaho and Pasco, Washington as well as to Cedar City, Utah and Las Vegas, Nevada via the UNEV Pipeline.

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Products

Set forth below is information regarding refined product sales attributable to our Rocky Mountain region:

	Years Ended December 31,		
	2018	2017	2016
Rocky Mountain Region (Cheyenne and Woods Cross Refineries)			
Sales of refined products:			
Gasolines	55 %	58 %	59 %
Diesel fuels	33 %	32 %	32 %
Fuel oil	3 %	3 %	2 %
Asphalt	5 %	4 %	4 %
LPG and other	4 %	3 %	3 %
Total	100%	100%	100%

Crude Oil and Feedstock Supplies

Crude oil is transported to the Cheyenne Refinery from suppliers in Canada, Colorado, Nebraska, North Dakota and Wyoming via common carrier pipelines owned by Enbridge, Plains and HEP, as well as by truck. The Woods Cross Refinery currently obtains crude oil from suppliers in Canada, Wyoming and Utah as delivered via common carrier pipelines, including the SLC Pipeline and Frontier Pipeline owned by HEP. Supplies of black wax crude oil are shipped via truck.

HollyFrontier Asphalt Company

We manufacture commodity and modified asphalt products at our manufacturing facilities located in Glendale, Arizona; Albuquerque, New Mexico; Artesia, New Mexico and Catoosa, Oklahoma. Our Albuquerque and Artesia facilities manufacture modified hot asphalt products and commodity and modified asphalt emulsions from base asphalt materials provided by our refineries and third-party suppliers. Our Glendale facility manufactures modified hot asphalt products from base asphalt materials provided by our refineries and third-party suppliers. Our Catoosa facility manufactures specialty modified asphalt and commodity asphalt products. We market these asphalt products in Arizona, California, Colorado, New Mexico, Oklahoma, Kansas, Missouri, Texas, Arkansas and northern Mexico. Our products are shipped via third-party trucking companies to commercial customers that provide asphalt based materials for commercial and government projects.

LUBRICANTS AND SPECIALTY PRODUCTS OPERATIONS

Our lubricants and specialty products operations consist of our Petro-Canada Lubricants, Red Giant Oil and Tulsa rack forward businesses.

Our Petro-Canada Lubricants business produces automotive, industrial and food grade lubricants and greases, base and process oils and specialty fluids. It is the largest manufacturer of high margin Group III base oils in North America as well as the world's largest producer of pharmaceutical white oils. Products are marketed in 80 countries worldwide to a diverse customer base through a global sales force and distributor network.

Our Red Giant Oil business provides high quality lubricants to the railroad industry, which represents a market of a small number of high-value customers who associate the Red Giant Oil name with a niche suite of products.

Our Tulsa Refinery produces high quality base oils, process oils, waxes, horticultural oils and asphalt performance products. Products are marketed worldwide through strategically located terminals in the United States and selected distributors internationally.

The following table sets forth information about our lubricants and specialty products operations and includes our Petro-Canada Lubricants business for the period February 1, 2017 (date of acquisition) through December 31, 2018. Red Giant Oil is included for the period August 1, 2018 (date of acquisition) through December 31, 2018.

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Lubricants and Specialty Products	Years Ended December 31, 2018	2017	2016
Throughput (BPD)	19,590	21,710	—
Sales of produced refined products (BPD)	30,510	32,910	12,030
Sales of produced refined products:			
Finished products	48 %	45 %	50 %
Base oils	31 %	31 %	50 %
Other	21 %	24 %	— %
Total	100 %	100 %	100 %

PCLI owns and operates a refinery located in Mississauga, Ontario having lubricant production capacity of 15,600 BPD and has the flexibility to match unique lubricant product formulations. The primary operating units include a hydrogen plant and hydrotreating, solvent dewaxing, hydrodentrification, catalytic dewaxing and hydrobon/platformer units. The Mississauga plant also includes packaging facilities and has extensive distribution capabilities with marine, truck and rail access.

Red Giant Oil, headquartered in Council Bluffs, Iowa, owns and operates blending and distribution facilities in Council Bluffs, Iowa; Joshua, TX; Newcastle, Wyoming; Ogden, Utah and Pittsburg, Kansas.

HOLLY ENERGY PARTNERS, L.P.

HEP is a Delaware limited partnership that trades on the New York Stock Exchange under the trading symbol “HEP.” HEP owns and operates logistic assets consisting of petroleum product and crude oil pipelines, terminals, tankage, loading rack facilities and refinery processing units that principally support our refining and marketing operations in the Mid-Continent, Southwest and Rocky Mountain regions of the United States and Delek's refinery in Big Spring, Texas. Additionally, HEP owns a 75% interest in UNEV Pipeline, LLC (“UNEV”), the owner of a pipeline running from Woods Cross, Utah to Las Vegas, Nevada (the “UNEV Pipeline”) and associated product terminals, and a 50% ownership interest in each of Osage Pipe Line Company, LLC, the owner of a pipeline running from Cushing, Oklahoma to El Dorado, Kansas (the “Osage Pipeline”) and Cheyenne Pipeline, LLC, the owner of a pipeline running from Fort Laramie, Wyoming to Cheyenne, Wyoming (the “Cheyenne Pipeline”).

HEP generates revenues by charging tariffs for transporting petroleum products and crude oil through its pipelines, by leasing certain pipeline capacity to Delek, by charging fees for terminalling and storing refined products and other hydrocarbons and providing other services at its storage tanks, terminals and refinery processing units. HEP does not take ownership of products that it transports, terminals, stores or refines; therefore, it is not directly exposed to changes in commodity prices.

HEP's recent acquisitions (2016 through present) are summarized below:

SLC Pipeline and Frontier Aspen
On October 31, 2017, HEP acquired the remaining 75% interest in SLC Pipeline LLC, the owner of a pipeline that serves refineries in the Salt Lake City, Utah area (the “SLC Pipeline”), and the remaining 50% interest in Frontier Aspen LLC, the owner of a pipeline running from Wyoming to Frontier Station, Utah (the “Frontier Pipeline”), from subsidiaries of Plains All American Pipeline, L.P. (“Plains”) for cash consideration of $250.0 million.

Woods Cross Assets

On October 3, 2016, HEP acquired from us all the membership interests of Woods Cross Operating LLC, which owns the crude unit, FCCU and polymerization unit of the first phase of our Woods Cross Refinery expansion project that was completed in the second quarter of 2016, for cash consideration of approximately $278.0 million.

Cheyenne Pipeline

On June 3, 2016, HEP acquired a 50% interest in Cheyenne Pipeline LLC, owner of the Cheyenne Pipeline, in exchange for a contribution of $42.6 million in cash to Cheyenne Pipeline LLC. The 87-mile crude oil pipeline runs from Fort Laramie, Wyoming to Cheyenne, Wyoming and has an 80,000 BPD capacity.

Tulsa Tanks

On March 31, 2016, HEP acquired crude oil tanks located at our Tulsa Refineries from Plains for $39.5 million.

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Magellan Asset Exchange
On February 22, 2016, we obtained a 50% membership interest in Osage Pipe Line Company, LLC (“Osage”) in exchange for a 20-year terminalling services agreement, whereby, a subsidiary of Magellan Midstream Partners (“Magellan Midstream”) will provide terminalling services for all of our products originating in Artesia, New Mexico that require terminalling in or through El Paso, Texas. Osage is the owner of the Osage pipeline, a 135-mile pipeline that transports crude oil from Cushing, Oklahoma to our El Dorado Refinery in Kansas and also has a connection to the Jayhawk pipeline that services the CHS refinery in McPherson, Kansas. The Osage pipeline is the primary pipeline that supplies our El Dorado Refinery with crude oil. Also on February 22, 2016, we contributed the 50% membership interest in Osage to HEP, and in exchange received HEP's El Paso terminal. Pursuant to this exchange, HEP agreed to build two connections to Magellan Midstream's El Paso terminal. In addition, HEP agreed to become operator of the Osage Pipeline.

Transportation Agreements

Agreements with HEP
HEP serves our refineries under long-term pipeline, terminal and tankage throughput agreements and refinery processing tolling agreements expiring from 2020 through 2036. Under these agreements, we pay HEP fees to transport, store and process throughput volumes of refined products, crude oil and feedstocks on HEP's pipelines, terminals, tankage, loading rack facilities and refinery processing units that result in minimum annual payments to HEP, including UNEV (a consolidated subsidiary of HEP). Under these agreements, the agreed upon tariff rates are subject to annual tariff rate adjustments on July 1 at a rate based upon the percentage change in Producer Price Index (“PPI”) or Federal Energy Regulatory Commission index. As of December 31, 2018, these agreements result in minimum annualized payments to HEP of $314.2 million.

Our transactions with HEP including the transactions discussed above and fees paid under our transportation agreements with HEP and UNEV are eliminated and have no impact on our consolidated financial statements.

Agreement with Delek
HEP has a 15-year pipelines and terminals agreement with Delek expiring in 2020, under which Delek has agreed to transport on HEP's pipelines and throughput through its terminals, volumes of refined products that results in a minimum level of annual revenue. The agreed upon tariff rates are increased or decreased annually at a rate equal to the percentage change in PPI, but will not decrease below the initial tariff rate. Also, HEP has a capacity lease agreement with Delek under which Delek leases space on HEP's Orla to El Paso pipeline for the shipment of up to 15,000 barrels of refined product per day. The terms under this agreement expire in 2020 through 2022.

As of December 31, 2018, HEP's assets included:

Pipelines

- approximately 810 miles of refined product pipelines, including 340 miles of leased pipelines, that transport gasoline, diesel and jet fuel principally from our Navajo Refinery in New Mexico to our customers in the metropolitan and rural areas of Texas, New Mexico, Arizona, Colorado, Utah and northern Mexico;
- approximately 510 miles of refined product pipelines that transport refined products from Delek's Big Spring refinery in Texas to its customers in Texas and Oklahoma;
- two 65-mile pipelines that transport intermediate feedstocks and crude oil from our Navajo Refinery crude oil distillation and vacuum facilities in Lovington, New Mexico to our petroleum refinery facilities in Artesia, New Mexico;
- one 65-mile intermediate pipeline that is used for the shipment of crude oil from the gathering systems in Barnsdall and Beeson, New Mexico to our Navajo Refinery;
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the SLC Pipeline, a 95-mile intrastate crude oil pipeline system that transports crude oil into the Salt Lake City, Utah area from the Utah terminus of the Frontier Pipeline, as well as crude oil flowing from Wyoming and Utah via Plains Rocky Mountain Pipeline;

- the Frontier Pipeline, a 289-mile crude oil pipeline running from Casper, Wyoming to Frontier Station, Utah through a connection to the SLC Pipeline;
- approximately 940 miles of crude oil trunk, gathering and connection pipelines located in west Texas, New Mexico and Oklahoma that primarily deliver crude oil to our Navajo Refinery;
- approximately 8 miles of refined product pipelines that support our Woods Cross Refinery located near Salt Lake City, Utah;
- gasoline and diesel connecting pipelines that support our Tulsa East facility;
- five intermediate product and gas pipelines between our Tulsa East and Tulsa West facilities;
- crude receiving assets located at our Cheyenne Refinery;
- a 75% interest in the UNEV Pipeline, a 427-mile, 12-inch refined products pipeline running from Woods Cross, Utah to Las Vegas, Nevada;

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- a 50% interest in the Osage Pipeline, a 135-mile pipeline that transports crude oil from Cushing, Oklahoma to our El Dorado Refinery and also has a connection to the Jayhawk pipeline that services the CHS refinery in McPherson, Kansas; and
- a 50% interest in the Cheyenne Pipeline, an 87-mile crude oil pipeline running from Fort Laramie, Wyoming to Cheyenne, Wyoming.

Refined Product Terminals and Refinery Tankage

- two refined product terminals located in Moriarty and Bloomfield, New Mexico, with an aggregate capacity of approximately 414,000 barrels, that are integrated with HEP's refined product pipeline system that serves our Navajo Refinery;
- one refined product terminal located in Spokane, Washington, with a capacity of approximately 400,000 barrels, that serves third-party common carrier pipelines;
- one refined product terminal near Mountain Home, Idaho, with a capacity of 120,000 barrels, that serves a nearby United States Air Force Base;
- two refined product terminals, located in Wichita Falls and Abilene, Texas, and one tank farm in Orla, Texas with aggregate capacity of approximately 500,000 barrels, that are integrated with HEP's refined product pipelines that serve Delek's Big Spring, Texas refinery;
- a refined product terminal in Catoosa, Oklahoma that stores specialty lubricant products and is utilized by our Tulsa Refineries;
- a refined product loading rack facility at each of our El Dorado, Tulsa, Navajo, Cheyenne and Woods Cross Refineries, heavy product / asphalt loading rack facilities at our Tulsa East facility, Navajo Refinery Lovington facility and Cheyenne Refinery, LPG loading rack facilities at our El Dorado Refinery, Tulsa West facility and Cheyenne Refinery, lube oil loading racks at our Tulsa West facility and crude oil Leased Automatic Custody Transfer units located at our Cheyenne Refinery;
- on-site crude oil tankage at our Tulsa, El Dorado, Navajo, Cheyenne and Woods Cross Refineries having an aggregate storage capacity of approximately 1,350,000 barrels;
- on-site refined and intermediate product tankage at our El Dorado, Tulsa and Cheyenne Refineries having an aggregate storage capacity of approximately 8,800,000 barrels;
- eleven crude oil tanks adjacent to our El Dorado Refinery with a capacity of approximately 1,200,000 barrels that primarily serve our El Dorado Refinery;
- Frontier Pipeline's tankage with an aggregate capacity of approximately 72,000 barrels; and
- a 75% interest in UNEV Pipeline's product terminals near Cedar City, Utah and Las Vegas, Nevada with an aggregate capacity of approximately 615,000 barrels.

Refinery Processing Units

- a naphtha fractionation tower at our El Dorado Refinery, with a capacity of 50,000 BPD of desulfurized naphtha;
- a hydrogen generation unit at our El Dorado Refinery, with a capacity of 6.1 million standard cubic feet per day of natural gas.
- a crude unit, which is primarily an atmospheric distillation tower, a desalter and heat exchangers, at our Woods Cross Refinery, with a feedstock capacity of 15,000 BPD of crude oil;
- a FCC unit at our Woods Cross Refinery, which converts crude oil to high-value refined products such as gasoline, diesel and liquefied petroleum gases, with a capacity of 8,000 BPD; and
- a polymerization unit at our Woods Cross Refinery, that uses the output of the fluid cracking unit and converts them into gasoline blendstock, with a capacity of 2,500 BPD.

ADDITIONAL OPERATIONS AND OTHER INFORMATION

Corporate Offices

Our principal corporate offices are leased and located in Dallas, Texas. Functions performed in our Dallas office include overall corporate management, refinery and HEP management, planning and strategy, corporate finance, crude acquisition, logistics, contract administration, marketing, investor relations, governmental affairs, accounting, tax, treasury, information technology, legal and human resources support functions.

Employees and Labor Relations

As of December 31, 2018, we had 3,622 employees, of which 1,158 are currently covered by collective bargaining agreements having various expiration dates between 2019 and 2020. We consider our employee relations to be good.

Environmental Regulation

We are subject to numerous international, federal, state, provincial and local laws regulating worker health and safety, the discharge of substances into the environment, or otherwise relating to the protection of the environment and natural resources. Permits or other authorizations are required under these laws for the operation of our refineries, pipelines and related facilities, which can result in the imposition of costly reporting, installation of pollution control equipment and maintenance obligations. Moreover, these permits and authorizations are subject to revocation, modification and renewal, as well as challenges from third parties.

Failure to comply with these laws and regulations may result in the assessment of sanctions, including administrative, civil and criminal penalties; the imposition of investigatory, remedial or corrective action obligations or the incurrence of capital expenditures; the occurrence of delays in the permitting, development or expansion of projects; and the issuance of injunctive relief limiting or prohibiting certain operations. Compliance with applicable environmental laws, regulations and permits will continue to have an impact on our operations, the results of our operations and our capital expenditures.

Clean Air Act - Our operations are subject to certain requirements of the Federal Clean Air Act (“CAA”) as well as related state and local laws and regulations. Certain CAA regulatory programs applicable to our refineries require capital expenditures for the installation of certain air pollution control devices, operational procedures to minimize emissions, and monitoring and reporting of emissions. Additionally, the Environmental Protection Agency (“EPA”) has the authority under the CAA to modify the formulation of the refined transportation fuel products we manufacture in order to limit the emissions associated with their final use. Also, in October 2015, the EPA lowered the National Ambient Air Quality Standard (“NAAQS”) for ozone from 75 to 70 parts per billion, and state implementation of the revised NAAQS could result in stricter permitting requirements, delay or the inability to obtain such permits, and increased expenditures for pollution control equipment, the costs of which could be significant. Moreover, in February 2016, a new EPA rule became effective that requires, among other things, benzene monitoring at the refinery fence line beginning in January 2018 and submittal of fence line monitoring data to the EPA on a quarterly basis; upgraded storage tank controls requirements, including new applicability thresholds; enhanced performance requirements for flares, continuous monitoring of flares and pressure release devices, and analysis and remedy of flare release events; compliance with emissions standards for delayed coking units; and requirements related to air emissions resulting from startup, shutdown and maintenance events. These new rules, as well as subsequent rulemaking under the CAA or similar laws, or new agency interpretations of existing laws and regulations, may necessitate additional expenditures in future years and result in increased costs on our operations.

Fuel Quality Regulation - We are subject to the EPA’s Control of Hazardous Air Pollutants from Mobile Sources (also known as the Mobile Source Air Toxics rule, or “MSAT2”) regulations that impose reductions in the benzene content of our produced gasoline. In addition to reducing benzene concentration in our gasoline, our refineries currently purchase benzene credits to meet these requirements. If economically justified or otherwise determined to be beneficial, we may implement additional benzene reduction projects to eliminate or reduce the need to purchase benzene credits.

Pursuant to the Energy Independence and Security Act of 2007 (“EISA”), and the EPA’s corresponding Renewable Fuel Standard (“RFS”) regulations, most refiners are required to blend increasing amounts of biofuels with refined products through 2022 or purchase Renewable Identification Numbers (“RINs”) in lieu of blending. Under the RFS, the percentage of renewable fuels that refineries are obligated to blend into their finished petroleum products is adjusted annually. In November 2018, the EPA finalized the RFS targets for 2019, which maintained the volume required for conventional (i.e., corn ethanol) renewable fuel, increased the volume required for advanced biofuels, and increased the volume required for cellulosic biofuel compared to the 2018 RFS requirements. The EPA also increased the biomass-based diesel volume for 2020 compared to 2019. Because the EISA requires specified volumes of biofuels, if the demand for motor fuels decreases in future years, even higher percentages of biofuels may be required.

The EPA has historically used its waiver authority to establish volumes lower than the statutory volumes required by EISA, but the EPA’s interpretation of its waiver authority, as well as its implementation of the RFS, has been subject to numerous court challenges. Lawsuits have been filed by the renewable fuel industry challenging the EPA's grant of small refinery exemptions. Additionally, in November 2017, the EPA denied petitions requesting to change the point of obligation for compliance under the RFS program to the terminal rack. Legal challenges of the EPA's decision may be expected. We cannot predict the outcome of these matters or whether they may result in increased RFS compliance costs. There also continues to be a shortage of advanced biofuel production resulting in increased difficulties meeting RFS mandates. As a result, we may be unable to blend sufficient quantities of renewable fuel to meet our requirements and, therefore, may have to purchase an increasing number of RINs. It is not possible at this time to predict with certainty what those volumes or costs may be, but given the potential increase in volumes and the volatile price of RINs, increases in renewable volume requirements could have an adverse impact on our results of operations.

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Finally, while there is no current regulatory standard that authenticates RINs that may be purchased on the open market from third parties, we believe that the RINs we purchase are from reputable sources, are valid and serve to demonstrate compliance with applicable RFS requirements. However, if any of the RINs purchased by us on the open market are subsequently found by the EPA to be invalid, we could secure significant costs, penalties, or other liabilities in connection with replacing any invalid RINs and resolving any enforcement action brought by the EPA.

In April 2014, the EPA promulgated the Tier 3 Motor Vehicle Emission and Fuel Standards, which requires a reduction in annual average gasoline sulfur content from 30 ppm to 10 ppm. These new requirements, other CAA requirements, and other presently existing or future environmental regulations may cause us to make substantial capital expenditures and purchase sulfur credits at significant cost to enable our refineries to produce products that meet applicable requirements.

Climate Change - In recent years, various legislative and regulatory measures to address climate change and greenhouse gas (“GHG”) emissions (including carbon dioxide, methane and nitrous oxides) have been discussed or implemented. They include proposed and enacted federal regulation and state actions to develop statewide, regional or nationwide programs designed to control and reduce GHG emissions from fixed sources, such as our refineries, as well as power plants, mobile transportation sources and fuels. Measures to date have included cap and trade programs, carbon taxes, vehicle efficiency standards and low carbon fuel standards. Although it is not possible to predict the requirements of any GHG legislation that may be enacted, any laws or regulations that may be adopted to restrict or reduce GHG emissions will likely require us to incur increased operating and capital costs. In August 2015, the EPA finalized the “Clean Power Plan” requiring states to reduce carbon dioxide emissions from coal fired power plants that will likely result in a combination of plant closures, switching to renewable energy and natural gas, and demand reduction. However, the Clean Power Plan was challenged in various courts, and the U.S. Supreme Court has stayed implementation of the rule. The U.S. Court of Appeals for the District of Columbia has held the litigation in abeyance. In October 2017, the EPA proposed to repeal the Clean Power Plan, and on August 21, 2018, the EPA proposed a replacement rule titled the Affordable Clean Energy Rule. Neither the Clean Power Plan nor the Affordable Clean Energy Rule would directly affect our operations. To the extent the EPA fully implements a rule that imposes higher costs on electricity generating units it could result in increased power costs for our refineries in future years.

EPA rules require us to report GHG emissions from our refinery operations and consumer use of fuel products produced at our refineries on an annual basis. While the cost of compliance with the reporting rule is not material, data gathered under the rule may be used in the future to support additional regulation of GHG. Moreover, the EPA directly regulates GHG emissions from refineries and other major sources through the Prevention of Significant Deterioration (“PSD”) and Federal Operating Permit programs and may require Best Available Control Technology (“BACT”) for GHG emissions above a certain threshold if emissions of other pollutants would otherwise require PSD permitting. While this does not impose any limits or controls on GHG emissions from current operations, future projects or operational changes that increase GHG emissions, such as capacity increases, may be subject to emission limits or technological requirements pertaining to GHG emissions, such as BACT.

Severe limitations on GHG emissions could also adversely affect demand for the gasoline that we produce. Recently, activists concerned about the potential effects of climate change have directed their attention at sources of funding for fossil-fuel energy companies, which has resulted in certain financial institutions, funds and other sources of capital restricting or eliminating their investment in oil and natural gas activities. Ultimately, this could make it more difficult to secure funding for exploration and production activities and result in decreased production of oil, which indirectly could have an adverse impact on our operations. Notwithstanding potential risks related to climate change, the International Energy Agency estimates that global energy demand will continue to rise and will not peak until after 2040 and that oil and natural gas will continue to represent a substantial percentage of global energy use over that time. Finally, it should be noted that some scientists have concluded that increasing concentrations of GHGs in the Earth’s atmosphere may produce climate changes that have significant physical effects, such as increased frequency and severity of storms, floods and other extreme weather events; if any such effects were to occur, they could have an adverse effect on our operations.

Water Discharges - Our operations are also subject to the Federal Clean Water Act (“CWA”), the Federal Safe Drinking Water Act (“SDWA”) and comparable state and local requirements. The CWA, the SDWA and analogous laws prohibit any discharge into surface waters, ground waters, injection wells and publicly-owned treatment works except in conformance with legal authorization, such as pre-treatment permits and National Pollutant Discharge Elimination System (“NPDES”) permits, issued by federal, state and local governmental agencies. The EPA commenced a study from 2015-2017 related to the discharges of metals and dioxin from petroleum refining operations and wastewater discharges from refineries in connection with the consideration of new effluent limitation guidelines that would be incorporated into refinery sector NPDES permits. To date, the EPA has not proposed any new effluent limitation guidelines applicable to our operations, but future rulemakings related to this issue could require us to incur increased costs related to the treatment of wastewater resulting from our operations.

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The CWA also regulates filling or discharges to wetlands and other “waters of the United States.” In 2015, the EPA, in conjunction with the U.S. Army Corps of Engineers (the “Corps”), issued a final rule regarding the definition of “waters of the United States,” which expanded the regulatory reach of the existing CWA regulations. The final rule is currently stayed in 28 states as a result of litigation, but remains in effect in the District of Columbia as well as in 22 states and the U.S. territories. On February 28, 2017, the President of the United States issued an Executive Order directing the EPA and the Corps to rescind or revise the rule. On December 11, 2018, the EPA and the Corps proposed a revised definition of “waters of the United States,” but has not finalized the rulemaking process. If the rule expands the scope of the CWA’s jurisdiction, we could face increased costs and delays with respect to obtaining permits for discharges resulting from our operations.

Hazardous Substances and Wastes - We generate wastes that may be subject to the Resource Conservation and Recovery Act and comparable state and local requirements. The EPA and various state agencies have limited the approved methods of disposal for certain hazardous and non-hazardous wastes. Although the EPA is currently working on several rulemakings that could impact how our refineries manage various waste streams, it does not appear that these rules will significantly impact our refineries.

The Comprehensive Environmental Response, Compensation and Liability Act (“CERCLA”), also known as “Superfund,” imposes strict, and under certain circumstances, joint and several liability on certain classes of persons who are considered to be responsible for the cost of cleaning up hazardous substances that have been released into the environment and for damages to natural resources. These persons include current and former owners or operators of property where a release has occurred, and any persons who disposed of, or arranged for the transport or disposal of, hazardous substances at the property. In the course of our historical operations, as well as in our current operations, we have generated waste, some of which falls within the statutory definition of a “hazardous substance” and some of which may have been disposed of at sites that may be subject to cleanup and cost recovery actions under CERCLA in the future. Similarly, locations now owned or operated by us, where third parties have disposed such hazardous substances in the past, may also be subject to cleanup and cost recovery actions under CERCLA. Some states have enacted laws similar to CERCLA which impose similar responsibilities and liabilities on responsible parties. It is also not uncommon for neighboring landowners and other third parties to file claims under state law for personal injury and property damage allegedly caused by hazardous substances or other pollutants released into the environment.

Oil Pollution Act - The Oil Pollution Act of 1990 (“OPA”) and regulations thereunder generally subject owners and operators of facilities to strict, joint and several liability for all containment and cleanup costs, natural resource damages, and potential governmental oversight costs arising from oil spills into the waters of the U.S. The OPA also imposes ongoing requirements on a responsible party, including the preparation of oil spill response plans and proof of financial responsibility to cover environmental cleanup and restoration costs that could be incurred in connection with an oil spill.

Our Canadian assets and operations are also required to comply with various Canadian federal, provincial and municipal regulations. The regulations are in many cases conceptually similar to those described above for our U.S. operations. The principal legislation affecting our Canadian operations is the Canadian Environmental Protection Act and its regulations at a federal level and various provincial statutes and regulations such as the Ontario Environmental Protection Act, the Ontario Occupational Health and Safety Act and the Ontario Water Resources Act. All these laws contain broad prohibitions against causing harm to air, land, water, people or any other living organism and in many cases contain detailed prescriptive rules governing many aspects of our operations.

As is the case with all companies engaged in industries similar to ours, we face potential exposure to future claims and lawsuits involving environmental matters. These matters include soil and water contamination, air pollution, GHG emissions, personal injury and property damage allegedly caused by substances that we manufactured, handled, used, released or disposed. We currently have environmental remediation projects that relate to recovery, treatment and monitoring activities resulting from past releases of refined product and crude oil into the environment. As of December 31, 2018, we had an accrual of $110.2 million related to such environmental liabilities.

We are and have been the subject of various local, state, provincial, federal and private proceedings and inquiries relating to compliance with environmental laws and regulations and conditions, including those discussed above. Compliance with current and future environmental regulations is expected to require additional expenditures, including expenditures for investigation and remediation, which may be significant, at our refineries and at pipeline transportation facilities. To the extent that future expenditures for these purposes are material and can be reasonably determined, these costs are disclosed and accrued, if applicable.

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Occupational Health and Safety - Our operations are subject to various laws and regulations relating to occupational health and safety, including the Occupational Safety and Health Act (“OSHA”) and comparable state statutes. We maintain a comprehensive safety program, including mechanical integrity and safety-related maintenance programs and training, to ensure compliance with all applicable laws and regulations to protect the safety of our workers and the public. Some of our operations are also subject to OSHA Process Safety Management (“PSM”) regulations and EPA Risk Management Plan (“RMP”) regulations, both of which are designed to prevent or minimize the consequences of catastrophic releases of toxic, reactive, flammable or explosive chemicals. In January 2017, the EPA revised the RMP requirements for incident investigation and accident history reporting, emergency preparedness, and the performance of process hazard analyses and third party compliance audits. However, many of the revised requirements do not become effective until 2021, but the EPA is engaged in an active rulemaking to rescind or amend significant elements of the RMP amendments. Also in January 2017, OSHA announced changes to its National Emphasis Program, which specifically identified oil refineries as facilities for increased inspections and instructed inspectors to use data gathered from EPA RMP inspections to identify refiners for additional PSM inspections. Compliance with applicable state and federal occupational health and safety laws and regulations, as well as environmental regulations, has required, and continues to require, substantial expenditures.

Occupational health and environmental legislation, regulations and regulatory programs change frequently. We cannot predict what additional occupational health and environmental legislation or regulations will be enacted or become effective in the future or how existing or future laws or regulations will be administered or interpreted with respect to our operations. Compliance with more stringent laws or regulations or adverse changes in the interpretation of existing laws or regulations by government agencies could have an adverse effect on our financial position and the results of our operations and could require substantial expenditures for the installation and operation of systems and equipment that we do not currently possess.

Insurance

Our operations are subject to hazards of operations, including fire, explosion and weather-related perils. We maintain various insurance coverages, including business interruption insurance, subject to certain deductibles. We are not fully insured against certain risks because such risks are not fully insurable, coverage is unavailable, or premium costs, in our judgment, do not justify such expenditures.

We have a risk management oversight committee consisting of members from our senior management. This committee oversees our risk enterprise program, monitors our risk environment and provides direction for activities to mitigate identified risks that may adversely affect the achievement of our goals.

Item 1A. Risk Factors

Investing in us involves a degree of risk, including the risks described below. Our operating results have been, and will continue to be, affected by a wide variety of risk factors, many of which are beyond our control, that could have adverse effects on profitability during any particular period. You should carefully consider the following risk factors together with all of the other information included in this Annual Report on Form 10-K, including the financial statements and related notes, when deciding to invest in us. Additional risks and uncertainties not currently known to us or that we currently deem to be immaterial may also materially and adversely affect our business operations. If any of the following risks were to actually occur, our business, financial condition or results of operations could be materially and adversely affected.

The headings provided in this Item 1A. are for convenience and reference purposes only and shall not affect or limit the extent or interpretation of the risk factors.

The availability and cost of renewable identification numbers and other required credits could have an adverse effect on our financial condition and results of operations.

Pursuant to the 2007 Energy Independence and Security Act, the EPA promulgated the RFS regulations reflecting the increased volume of renewable fuels mandated to be blended into the nation's fuel supply. The regulations, in part, require refiners to add annually increasing amounts of “renewable fuels” to their petroleum products or purchase credits, known as RINs, in lieu of such blending. We currently purchase RINs for some fuel categories on the open market in order to comply with the quantity of renewable fuels we are required to blend under the RFS regulations. Since the EPA first began mandating biofuels in excess of the “blend wall” (the 10% ethanol limit prescribed by most automobile warranties), the price of RINs has been extremely volatile. While we cannot predict the future prices of RINs, the costs to obtain the necessary number of RINs could be material. If we are unable to pass the costs of compliance with the RFS regulations on to our customers, if sufficient RINs are unavailable for purchase, if we have to pay a significantly higher price for RINs or if we are otherwise unable to meet the RFS mandates, our financial condition and results of operations could be adversely affected.

In addition, the RFS regulations are highly complex and evolving, requiring us to periodically update our compliance systems. The RFS regulations require the EPA to determine and publish the applicable annual volume and percentage standards for each compliance year by November 30 for the forthcoming year, and such blending percentages could be higher or lower than amounts estimated and accrued for in our consolidated financial statements. The future cost of RINs is difficult to estimate until such time as the EPA finalizes the applicable standards for the forthcoming compliance year. Moreover, in addition to increased price volatility in the RIN market, there have been multiple instances of RINs fraud occurring in the marketplace over the past several years. The EPA has initiated several enforcement actions against refiners who purchase fraudulent RINs, resulting in substantial costs to the refiner. We cannot predict with certainty our exposure to increased RINs costs in the future, nor can we predict the extent by which costs associated with RFS regulations will impact our future results of operations.

The prices of crude oil and refined and finished lubricant products materially affect our profitability, and are dependent upon many factors that are beyond our control, including general market demand and economic conditions, seasonal and weather-related factors, regional and grade differentials and governmental regulations and policies.

Among these factors is the demand for crude oil and refined and finished lubricant products, which is largely driven by the conditions of local and worldwide economies as well as by weather patterns and the taxation of these products relative to other energy sources. Governmental regulations and policies, particularly in the areas of taxation, energy and the environment, also have a significant impact on our activities. Operating results can be affected by these industry factors, product and crude pipeline capacities, crude oil differentials (including regional and grade differentials), changes in transportation costs, accidents or interruptions in transportation, competition in the particular geographic areas that we serve, and factors that are specific to us, such as the success of particular marketing programs and the efficiency of our refinery operations. The demand for crude oil and refined and finished lubricant products can also be reduced due to a local or national recession or other adverse economic condition, which results in lower spending by businesses and consumers on gasoline and diesel fuel, higher gasoline prices due to higher crude oil prices, a shift by consumers to more fuel-efficient vehicles or alternative fuel vehicles (such as ethanol or wider adoption of gas/electric hybrid vehicles), or an increase in vehicle fuel economy, whether as a result of technological advances by manufacturers, legislation mandating or encouraging higher fuel economy or the use of alternative fuel.

We do not produce crude oil and must purchase all our crude oil, the price of which fluctuates based upon worldwide and local market conditions. Our profitability depends largely on the spread between market prices for refined petroleum products and crude oil prices. This margin is continually changing and may fluctuate significantly from time to time. Crude oil and refined products are commodities whose price levels are determined by market forces beyond our control. For example, the reversal of certain existing pipelines or the construction of certain new pipelines transporting additional crude oil or refined products to markets that serve competing refineries could affect the market dynamic that has allowed us to take advantage of favorable pricing. Also, in December 2015, the U.S. Congress lifted the ban on the ability of producers to export domestic crude oil. This could potentially impact crack spreads and price differentials between domestic and foreign crude oils. A deterioration of crack spreads or price differentials between domestic and foreign crude oils could have a material adverse effect on our business, financial condition, results of operations and cash flows.

Additionally, due to the seasonality of refined products markets and refinery maintenance schedules, results of operations for any particular quarter of a fiscal year are not necessarily indicative of results for the full year and can vary year to year in the event of unseasonably cool weather in the summer months and / or unseasonably warm weather in the winter months in the markets in which we sell our petroleum products. In general, prices for refined products are influenced by the price of crude oil. Although an increase or decrease in the price for crude oil may result in a similar increase or decrease in prices for refined products, there may be a time lag in the realization of the similar increase or decrease in prices for refined products. The effect of changes in crude oil prices on operating results, therefore, depends in part on how quickly refined product prices adjust to reflect these changes. A substantial or prolonged increase in crude oil prices without a corresponding increase in refined product prices, a substantial or prolonged decrease in refined product prices without a corresponding decrease in crude oil prices, or a substantial or prolonged decrease in demand for refined products could have a significant negative effect on our earnings and cash flow. Also, crude oil supply contracts are generally short-term contracts with market-responsive pricing provisions. We purchase our refinery feedstocks weeks before manufacturing and selling the refined products. Price level changes during the period between purchasing feedstocks and selling the manufactured refined products from these feedstocks could have a significant effect on our financial condition and results of operations. Also, our crude oil and refined products inventories are valued at the lower of cost or market under the last-in, first-out (“LIFO”) inventory valuation methodology. If the market value of our inventory were to decline to an amount less than our LIFO cost, we would record a write-down of inventory and a non-cash charge to cost of products sold even when there is no underlying economic impact at that point in time. Continued volatility in crude oil and refined products prices could result in lower of cost or market inventory charges in the future, or in reversals reducing cost of products sold in subsequent periods should prices recover. For example, we recorded a non-cash increase to cost of products sold in the amount of $136.3 million and a decrease of $108.7 million for the years ended December 31, 2018 and 2017, respectively.

A material decrease in the supply of crude oil or other raw materials available to our refineries and other facilities could significantly reduce our production levels and negatively affect our operations.

To maintain or increase production levels at our refineries, we must continually contract for crude oil supplies from third parties. A material decrease in crude oil production from the fields that supply our refineries, as a result of depressed commodity prices, lack of drilling activity, natural production declines or otherwise, could result in a decline in the volume of crude oil available to our refineries. In addition, any prolonged disruption of a significant pipeline that is used in supplying crude oil to our refineries or the potential operation of a new, converted or expanded crude oil pipeline that transports crude oil to other markets could result in a decline in the volume of crude oil available to our refineries. Such an event could result in an overall decline in volumes of refined products processed at our refineries and therefore a corresponding reduction in our cash flow. In addition, the future growth of our operations will depend in part upon whether we can contract for additional supplies of crude oil at a greater rate than the rate of natural decline in our currently connected supplies. If we are unable to secure additional crude oil supplies of sufficient quality or crude pipeline expansion to our refineries, we will be unable to take full advantage of current and future expansion of our refineries' production capacities.

For certain raw materials and utilities used by our refineries and other facilities, there are a limited number of suppliers and, in some cases, we source from a single supplier and/or suppliers in economies that have experienced instability or the supplies are specific to the particular geographic region in which a facility is located. Any significant disruption in supply could affect our ability to obtain raw materials, or increase the cost of such raw materials, which could significantly reduce our production levels or have a material adverse effect on our business, financial condition and results of operations. In addition, certain raw materials that we use are subject to various regulatory laws, and a change in the ability to legally use such raw materials may impact our liquidity, financial position and results of operations.

It is also common in the refining industry for a facility to have a sole, dedicated source for its utilities, such as steam, electricity, water and gas. Having a sole or limited number of suppliers may limit our negotiating power, particularly in the case of rising raw material costs. Any new supply agreements we enter into may not have terms as favorable as those contained in our current supply agreements.

Additionally, there is growing concern over the reliability of water sources. The decreased availability or less favorable pricing for water as a result of population growth, drought or regulation could negatively impact our operations.

If our raw material, utility or water supplies were disrupted, our businesses may incur increased costs to procure alternative supplies or incur excessive downtime, which would have a direct negative impact on our operations.

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We may not be able to successfully execute our business strategies to grow our business. Further, if we are unable to complete capital projects at their expected costs or in a timely manner, if we are unsuccessful in integrating the operations of assets we acquire, or if the market conditions assumed in our project economics deteriorate, our financial condition, results of operations, or cash flows could be materially and adversely affected.

One of the ways we may grow our business is through the construction of new refinery processing units (or the purchase and refurbishment of used units from another refinery) and the expansion of existing ones. Projects are generally initiated to increase the yields of higher-value products, increase the amount of lower cost crude oils that can be processed, increase refinery production capacity, meet new governmental requirements, or maintain the operations of our existing assets. Additionally, our growth strategy includes projects that permit access to new and/or more profitable markets. The construction process involves numerous regulatory, environmental, political, and legal uncertainties, most of which are not fully within our control, including:

- third party challenges to, denials, or delays with respect to the issuance of requisite regulatory approvals and/or obtaining or renewing permits, licenses, registrations and other authorizations;
- societal and political pressures and other forms of opposition;
- compliance with or liability under environmental regulations;
- unplanned increases in the cost of construction materials or labor;
- disruptions in transportation of modular components and/or construction materials;
- severe adverse weather conditions, natural disasters, or other events (such as equipment malfunctions, explosions, fires, spills) affecting our facilities, or those of vendors and suppliers;
- shortages of sufficiently skilled labor, or labor disagreements resulting in unplanned work stoppages;
- market-related increases in a project's debt or equity financing costs; and/or
- nonperformance or force majeure by, or disputes with, vendors, suppliers, contractors, or sub-contractors involved with a project.

If we are unable to complete capital projects at their expected costs or in a timely manner our financial condition, results of operations, or cash flows could be materially and adversely affected. Delays in making required changes or upgrades to our facilities could subject us to fines or penalties as well as affect our ability to supply certain products we make. In addition, our revenues may not increase immediately upon the expenditure of funds on a particular project. For instance, if we build a new refinery processing unit, the construction will occur over an extended period of time and we will not receive any material increases in revenues until after completion of the project. Moreover, we may construct facilities to capture anticipated future growth in demand for refined products in a region in which such growth does not materialize. As a result, new capital investments may not achieve our expected investment return, which could adversely affect our financial condition or results of operations.

Our forecasted internal rates of return are also based upon our projections of future market fundamentals which are not within our control, including changes in general economic conditions, available alternative supply and customer demand.

An additional component of our growth strategy is to selectively acquire complementary assets or businesses for our refining operations in order to increase earnings and cash flow. Our ability to do so will be dependent upon a number of factors, including our ability to identify attractive acquisition candidates, consummate acquisitions on favorable terms, successfully integrate acquired assets and obtain financing to fund acquisitions and to support our growth, and other factors beyond our control. Risks associated with acquisitions include those relating to:

- diversion of management time and attention from our existing business;
- challenges in managing the increased scope, geographic diversity and complexity of operations and inefficiencies that may result therefrom;

- difficulties in integrating the financial, technological and management standards, processes, procedures and controls of an acquired business with those of our existing operations;
- liability for known or unknown environmental conditions or other contingent liabilities not covered by indemnification or insurance;
- greater than anticipated expenditures required for compliance with environmental or other regulatory standards or for investments to improve operating results;
- difficulties or delays in achieving anticipated operational improvements or benefits or inaccurate assumptions about future synergies or revenues;
- incurrence of additional indebtedness to finance acquisitions or capital expenditures relating to acquired assets; and
- issuance of additional equity, which could result in further dilution of the ownership interest of existing stockholders.

Any acquisitions that we do consummate may have adverse effects on our business and operating results.

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Our ability to grow our Lubricants and Specialty Products segment depends, in part, on our ability to continuously develop, manufacture and introduce new products and product enhancements on a timely and cost-effective basis, in response to customers’ demands for higher performance process lubricants, coatings, greases and other product offerings. Our competitors may develop new products or enhancements to their products that offer performance, features and lower prices that may render our products less competitive or obsolete, and, as a consequence, we may lose business and/or significant market share. Our efforts to respond to changes in consumer demand in a timely and cost-efficient manner to drive growth could be adversely affected by unfavorable margins or difficulties or delays in product development and service innovation, including the inability to identify viable new products, successfully complete research and development, obtain regulatory approvals, obtain intellectual property protection or gain market acceptance of new products or service techniques. The development and commercialization of new products require significant expenditures over an extended period of time, and some products that we seek to develop may never become profitable, and we could be required to write-off our investments related to a new product that does not reach commercial viability.

Currency fluctuations or devaluations may impact our operating results.

Fluctuations or devaluations in foreign currencies relative to the U.S. dollar can impact our revenue and our costs of doing business. Most of our products and services are sold through contracts denominated in U.S. dollars; however, some of our revenue, local expenses and manufacturing costs are incurred in local currencies and, therefore, changes in the exchange rates between the U.S. dollar and foreign currencies can increase or decrease our revenue and expenses reported in U.S. dollars and may impact our results of operations. We recognize foreign currency transaction gains and losses arising from our operations in the period incurred. As a result, currency fluctuations between the U.S. dollar and the currencies in which we do business have caused and will continue to cause foreign currency transaction and translation gains and losses, which could be material. Any significant change in the value of the currencies of the countries in which we do business against the U.S. dollar could affect our competitiveness and control of our cost structure, which could have a material adverse effect on our business, financial condition and results of operations.

Our business is subject to the risks of international operations.

We derive a portion of our revenue and earnings from international operations. Compliance with applicable U.S. and foreign laws and regulations, such as import and export requirements, anti-corruption laws, foreign exchange controls and cash repatriation restrictions, environmental laws, labor laws and anti-competition regulations, increases the cost of doing business in foreign jurisdictions. Although we have implemented policies and procedures to comply with these laws and regulations, a violation by any of our employees, contractors or agents could nevertheless occur. In some cases, compliance with the laws and regulations of one country could violate the laws and regulations of another country. Violations of these laws and regulations could materially adversely affect our company's brand, international growth efforts and business.

We may incur significant costs to comply with new or changing environmental, energy, health and safety laws and regulations, and face potential exposure for environmental matters.

Our refinery and pipeline operations are subject to international, federal, state, provincial and local laws regulating, among other things, the generation, storage, handling, use, transportation and distribution of petroleum and hazardous substances by pipeline, truck, rail and barge, the emission and discharge of materials into the environment, waste management, and characteristics and composition of gasoline and diesel fuels, and other matters otherwise relating to the protection of the environment. In addition, as a result of recent acquisitions, we have manufacturing and distribution operations in foreign countries that are subject to environmental laws and regulations of such foreign countries. Permits or other authorizations are required under these laws for the operation of our refineries, pipelines and related operations, and these permits and authorizations are subject to revocation, modification and renewal or may require operational changes, which may involve significant costs. Furthermore, a violation of permit conditions or other legal or regulatory requirements could result in substantial fines, criminal sanctions, permit revocations, injunctions, and/or refinery shutdowns. In addition, major modifications of our operations due to changes in the law could require changes to our existing permits or expensive upgrades to our existing pollution control equipment, which could have a material adverse effect on our business, financial condition, or results of operations. For example, in October 2015, the EPA lowered the NAAQS for ozone from 75 to 70 parts per billion for both the 8-hour primary and secondary standards. The EPA published a final rule in November 2017 that issued area designations with respect to ground level ozone for approximately 85% of the U.S. counties as either “attainment/unclassifiable” or “unclassifiable.” By final rulemakings published in June and July 2018, the EPA established ozone air quality designations for the areas not addressed in its November 2017 rulemaking. State implementation of the revised NAAQS could result in stricter permitting requirements, delay or prohibit our ability to obtain such permits, and result in increased expenditures for pollution control equipment, the costs of which could be significant. Also, in February 2016, a new EPA rule became effective that amends three refinery standards already in effect, imposing additional or, in some cases, new emission control requirements on subject refineries. The final rule requires, among other things, benzene monitoring at the refinery fence line and submittal of fence line monitoring data to the EPA on a quarterly basis; upgraded storage tank controls requirements, including new applicability thresholds; enhanced performance requirements for flares, continuous monitoring of flares and pressure release devices and analysis and remedy of flare release events; and compliance with emissions standards for delayed coking units. Refineries have up to three years from the effective date of the final rule to come into compliance with certain requirements of the rule, such as the performance requirements for flares, while other aspects of the rule require compliance to be achieved at a sooner date. For example, the rule's fence line monitoring requirements became effective January 31, 2018. In July 2016, the EPA issued a final rule providing refiners an additional 18 months to comply with a small subset of the rules related to air emissions resulting from startup, shutdown and maintenance events. In December 2016, the EPA granted petitions for reconsideration from industry and environmental organizations on aspects of the rule related to work practice standards for certain process units and equipment, as well as fence line monitoring requirements. In November 2018, the EPA published amendments to the new rules to clarify and correct certain requirements. These new rules, as well as subsequent rulemaking under the CAA or similar laws, or new agency interpretations of existing laws and regulations, may necessitate additional expenditures in future years and result in increased costs on our operations. Compliance with applicable environmental laws, regulations and permits will continue to have an impact on our operations, results of our operations and capital requirements.

As is the case with all companies engaged in industries similar to ours, we face potential exposure to future claims and lawsuits involving environmental matters. The matters include, but are not limited to, soil, groundwater and waterway contamination, air pollution, personal injury and property damage allegedly caused by substances which we manufactured, handled, used, released or disposed.

We are and have been the subject of various local, state, provincial, federal, international and private proceedings relating to environmental regulations, conditions and inquiries. Current and future environmental regulations are expected to require additional expenditures, including expenditures for investigation and remediation, which may be significant, at our facilities. To the extent that future expenditures for these purposes are material and can be reasonably determined, these costs are disclosed and accrued.

Our operations are also subject to various laws and regulations relating to occupational health and safety. We maintain safety, training and maintenance programs as part of our ongoing efforts to ensure compliance with applicable laws and regulations but cannot guarantee that these efforts will always be successful. Compliance with applicable health and safety laws and regulations has required and continues to require substantial expenditures. Failure to appropriately manage occupational health and safety risks associated with our business could also adversely impact our employees, communities, stakeholders, reputation and results of operations.

The costs of environmental and safety regulations are already significant and compliance with more stringent laws or regulations or adverse changes in the interpretation of existing regulations by government agencies could have an adverse effect on the financial position and the results of our operations and could require substantial expenditures for the installation and operation of systems and equipment that we do not currently possess.

From time to time, new federal energy policy legislation is enacted by the U.S. Congress or the governments of other foreign countries in which we operate. For example, in December 2007, the U.S. Congress passed the Energy Independence and Security Act, which, among other provisions, mandates annually increasing levels for the use of renewable fuels such as ethanol, commencing in 2008 and escalating for 15 years, as well as increasing energy efficiency goals, including higher fuel economy standards for motor vehicles, among other steps. In Canada, fuel content legislation also exists at the federal and provincial level. These statutory mandates may have the impact over time of offsetting projected increases in the demand for refined petroleum products in certain markets, particularly gasoline. In the near term, the new renewable fuel standard presents ethanol production and logistics challenges for both the ethanol and refining industries and may require additional capital expenditures or expenses by us to accommodate increased ethanol use. Other legislative changes may similarly alter the expected demand and supply projections for refined petroleum products in ways that cannot be predicted.

For additional information on regulations and related liabilities or potential liabilities affecting our business, see “Regulation” under Items 1 and 2, “Business and Properties,” and Item 3, “Legal Proceedings.”

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The adoption of climate change legislation or regulations could result in increased operating costs and reduced demand for the refined products we produce.

The EPA has determined that emissions of carbon dioxide, methane and other greenhouse gas emissions, or “GHGs,” present an endangerment to public health and the environment because emissions of such gases are, according to the EPA, contributing to warming of the earth's atmosphere and other climatic changes. Based on these findings, the EPA has begun adopting and implementing regulations to restrict emissions of GHGs under existing provisions of the federal CAA. For example, the EPA adopted rules that require certain large stationary sources to obtain permits to authorize emissions of GHGs. The EPA has also adopted rules requiring the reporting of GHG emissions from specified large GHG emission sources in the United States, including petroleum refineries, on an annual basis. Both the EPA and Environment and Climate Change Canada have adopted regulations that limit GHG emissions from automobiles and light-duty trucks, which may result in a reduction in demand for the refined products that we produce. Similar regulations may exist or be enacted in other foreign countries in which we operate.

Although the U.S. Congress has previously considered legislation to reduce GHG emissions, federal legislative action appears unlikely at this time. Meanwhile, many states have pursued or are considering their own initiatives designed to reduce GHG emissions, such as cap and trade programs, carbon taxes, low carbon fuel standards, and vehicle efficiency standards. Similar measures are being pursued in Canada at the federal and provincial level, and the provinces of Quebec, Ontario, and Alberta have all implemented either cap and trade programs or levied carbon taxes.

The adoption of legislation or regulatory programs to reduce emissions of GHGs could require us to incur increased operating costs, such as costs to purchase and operate emissions control systems, to acquire emissions allowances or comply with new regulatory or reporting requirements. Any such legislation or regulatory programs could also increase the cost of consuming, and thereby reduce demand for, the refined products that we produce. Consequently, legislation and regulatory programs to reduce emissions of GHGs could have an adverse effect on our business, financial condition and results of operations.

Our operations are subject to catastrophic losses, operational hazards and unforeseen interruptions and other disruptive risks for which we may not be adequately insured.

Our operations are subject to catastrophic losses, operational hazards, unforeseen interruptions and other disruptive risks such as natural disasters, adverse weather, accidents, maritime disasters (including those involving marine vessels/terminals), fires, explosions, hazardous materials releases, cyber-attacks, power failures, mechanical failures and other events beyond our control. These events could result in an injury, loss of life, property damage or destruction, as well as a curtailment or an interruption in our operations and may affect our ability to meet marketing commitments.

We may not be able to maintain or obtain insurance of the type and amount we desire at reasonable rates and exclusions from coverage may limit our ability to recover the amount of the full loss in all situations. As a result of market conditions, premiums and deductibles for certain of our insurance policies could increase. In some instances, certain insurance could become unavailable or available only for reduced amounts of coverage. We are not fully insured against all risks incident to our business and therefore, we self-insure certain risks. If any refinery were to experience an interruption in operations, earnings from the refinery could be materially adversely affected (to the extent not recoverable through insurance) because of lost production and repair costs.

The energy industry is highly capital intensive, and the entire or partial loss of individual facilities can result in significant costs to both industry companies, such as us, and their insurance carriers. In recent years, several large energy industry claims have resulted in significant increases in the level of premium costs and deductible periods for participants in the energy industry. As a result of large energy industry claims, insurance companies that have historically participated in underwriting energy-related facilities may discontinue that practice or demand significantly higher premiums or deductible periods to cover these facilities. If significant changes in the number or financial solvency of insurance underwriters for the energy industry occur, or if other adverse conditions over which we have no control prevail in the insurance market, we may be unable to obtain and maintain adequate insurance at reasonable cost. In addition, we cannot assure you that our insurers will renew our insurance coverage on acceptable terms, if at all, or that we will be able to arrange for adequate alternative coverage in the event of non-renewal. Further, our underwriters could have credit issues that affect their ability to pay claims. If a significant accident or event occurs that is self-insured or not fully insured, it could have a material adverse effect on our business, financial condition and results of operations.

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An impairment of our long-lived assets or goodwill could reduce our earnings or negatively impact our financial condition and results of operations.

An impairment of our long-lived assets or goodwill could reduce our earnings or negatively impact our results of operations and financial condition. We continually monitor our business, the business environment and the performance of our operations to determine if an event has occurred that indicates that a long-lived asset or goodwill may be impaired. If a triggering event occurs, which is a determination that involves judgment, we may be required to utilize cash flow projections to assess our ability to recover the carrying value based on the ability to generate future cash flows. We may also conduct impairment testing based on both the guideline public company and guideline transaction methods. Our long-lived assets and goodwill impairment analyses are sensitive to changes in key assumptions used in our analysis, estimates of future crack spreads, forecasted production levels, operating costs and capital expenditures. If the assumptions used in our analysis are not realized, it is possible a material impairment charge may need to be recorded in the future. We cannot accurately predict the amount and timing of any additional impairments of long-lived assets or goodwill in the future.

As market prices for refined products and market prices for crude oil continue to fluctuate, we will need to continue to evaluate the carrying value of our refinery reporting units. During the year ended December 31, 2016, we recorded goodwill and long-lived asset impairment charges of $309.3 million and $344.8 million, respectively, on the carrying value of our Cheyenne Refinery. A reasonable expectation exists that future deterioration in gross margins could result in an impairment of goodwill and the long-lived assets of the El Dorado reporting unit at some point in the future. Any additional impairment charges that we may take in the future could be material to our results of operations and financial condition.

Competition in the refining and marketing industry is intense, and an increase in competition in the markets in which we sell our products could adversely affect our earnings and profitability.

We compete with a broad range of refining and marketing companies, including certain multinational oil companies. Because of their geographic diversity, larger and more complex refineries, integrated operations and greater resources, some of our competitors may be better able to withstand volatile market conditions, to obtain crude oil in times of shortage and to bear the economic risks inherent in all areas of the refining industry.

We are not engaged in petroleum exploration and production activities and do not produce any of the crude oil feedstocks used at our refineries. We do not have a retail business and therefore are dependent upon others for outlets for our refined products. Certain of our competitors, however, obtain a portion of their feedstocks from company-owned production and have retail outlets. Competitors that have their own production or extensive retail outlets, with brand-name recognition, are at times able to offset losses from refining operations with profits from producing or retailing operations, and may be better positioned to withstand periods of depressed refining margins or feedstock shortages.

In recent years there have been several refining and marketing consolidations or acquisitions between entities competing in our geographic market. These transactions could increase the future competitive pressures on us.

The markets in which we compete may be impacted by competitors' plans for expansion projects and refinery improvements that could increase the production of refined products in our areas of operation and significantly affect our profitability.

Also, the potential operation of new or expanded refined product transportation pipelines, or the conversion of existing pipelines into refined product transportation pipelines, could impact the supply of refined products to our existing markets and negatively affect our profitability.

In addition, we compete with other industries that provide alternative means to satisfy the energy and fuel requirements of our industrial, commercial and individual consumers. The more successful these alternatives become as a result of governmental regulations, technological advances, consumer demand, improved pricing or otherwise, the greater the impact on pricing and demand for our products and our profitability. There are presently significant governmental and consumer pressures to increase the use of alternative fuels in the United States.

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A disruption to or proration of the refined product distribution systems or manufacturing facilities we utilize could negatively impact our profitability.

We utilize various common carrier or other third party pipeline systems to deliver our products to market. The key systems utilized by the Cheyenne, El Dorado, Navajo, Woods Cross, and Tulsa Refineries are Rocky Mountain, NuStar Energy and Magellan, SFPP and Plains, Chevron and UNEV, and Magellan, respectively.

All five refineries also utilize systems owned by HEP. If these key pipelines or their associated tanks and terminals become inoperative or decrease the capacity available to us, we may not be able to sell our product, or we may be required to hold our product in inventory or supply products to our customers through an alternative pipeline or by rail or additional tanker trucks from the refinery, all of which could increase our costs and result in a decline in profitability.

We have manufacturing facilities in foreign countries that support the Lubricants and Specialty Products segment. If one of our facilities is damaged or disrupted, resulting in production being halted for an extended period, we may not be able to timely supply our customers. We take steps to mitigate this risk, including business continuity and contingency planning and procuring property and casualty insurance (including business interruption insurance). Nevertheless, the loss of sales in any one region over an extended period of time could have a material adverse effect on our business, financial condition and results of operations.

We may be subject to information technology system failures, network disruptions and breaches in data security. In addition, our business is subject to increasingly stringent data protection requirements.

Information technology system failures, network disruptions (whether intentional by a third party or due to natural disaster), breaches of network or data security, or disruption or failure of the network system used to monitor and control pipeline operations could disrupt our operations by impeding our processing of transactions, our ability to protect customer or company information and our financial reporting. Our computer systems, including our back-up systems, could be damaged or interrupted by power outages, computer and telecommunications failures, computer viruses, internal or external security breaches, events such as fires, earthquakes, floods, tornadoes and hurricanes, and/or errors by our employees. There can be no assurance that a system failure or data security breach will not have a material adverse effect on our financial condition and results of operations.

We are subject to laws, directives, and regulations relating to the collection, use, retention, disclosure, security and transfer of personal data relating to our customers and employees. These laws, directives and regulations, and their interpretation and enforcement continue to evolve and may be inconsistent from jurisdiction to jurisdiction. For example, the General Data Protection Regulation, which went into effect in the European Union on May 25, 2018, applies to all of our activities conducted in the European Union and may also apply to related products and services that we offer to customers in the European Union. Noncompliance with these legal obligations relating to privacy and data protection could result in penalties, legal proceedings by governmental entities or others, and significant legal and financial exposure and could affect our ability to retain and attract customers.

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We may not be able to obtain funding on acceptable terms or at all because of volatility and uncertainty in the credit and capital markets. This may hinder or prevent us from meeting our future capital needs.

The domestic and global financial markets and economic conditions are disrupted and volatile from time to time due to a variety of factors, including low consumer confidence, high unemployment, geoeconomic and geopolitical issues, weak economic conditions and uncertainty in the financial services sector. In addition, the fixed-income markets have experienced periods of extreme volatility, which negatively impacted market liquidity conditions. Recently, the equity and debt markets for many energy industry companies have been adversely affected by low oil prices. As a result, the cost of raising money in the debt and equity capital markets has increased substantially at times while the availability of funds from these markets diminished significantly. In particular, as a result of concerns about the stability of financial markets generally and the solvency of lending counterparties specifically, the cost of obtaining money from the credit markets may increase as many lenders and institutional investors increase interest rates, enact tighter lending standards, refuse to refinance existing debt on similar terms or at all and reduce, or in some cases cease to provide, funding to borrowers. In addition, lending counterparties under any existing revolving credit facility and other debt instruments may be unwilling or unable to meet their funding obligations, or we may experience a decrease in our capacity to issue debt or obtain commercial credit or a deterioration in our credit profile, including a rating agency lowering or withdrawing of our credit ratings if, in its judgment, the circumstances warrant. Due to these factors, we cannot be certain that new debt or equity financing will be available on acceptable terms. If funding is not available when needed, or is available only on unfavorable terms, we may be unable to meet our obligations as they come due or we may be required to sell assets. Moreover, without adequate funding, we may be unable to execute our growth strategy, complete future acquisitions or construction projects, take advantage of other business opportunities or respond to competitive pressures, comply with regulatory requirements, or meet our short-term or long-term working capital requirements, any of which could have a material adverse effect on our revenues and results of operations. Failure to comply with regulatory requirements in a timely manner or meet our short-term or long-term working capital requirements could subject us to regulatory action.

We depend upon HEP for a substantial portion of the crude supply and distribution network that serve our refineries, and we own a significant equity interest in HEP.

At December 31, 2018, we owned a 57% limited partner interest and a non-economic general partner interest in HEP. HEP operates a system of crude oil and petroleum product pipelines; distribution terminals and refinery tankage in Idaho, Kansas, Nevada, New Mexico, Oklahoma, Texas, Utah, Washington and Wyoming and refinery units in Kansas and Utah. HEP generates revenues by charging tariffs for transporting petroleum products and crude oil through its pipelines, leasing certain pipeline capacity to Delek, charging fees for terminalling refined products and other hydrocarbons and storing and providing other services at its terminals. HEP serves the Cheyenne, El Dorado, Navajo, Woods Cross and Tulsa Refineries under several long-term pipeline and terminal, tankage and throughput agreements expiring in 2020 through 2036, serves the El Dorado Refinery under long-term tolling agreements expiring in 2030 and serves the Woods Cross Refinery under long-term tolling agreements expiring in 2031. Furthermore, our financial statements include the consolidated results of HEP. HEP is subject to its own operating and regulatory risks, including, but not limited to:

- its reliance on its significant customers, including us;
- competition from other pipelines;
- environmental regulations affecting pipeline operations;
- operational hazards and risks;
- pipeline tariff regulations affecting the rates HEP can charge;
- limitations on additional borrowings and other restrictions due to HEP's debt covenants; and
- other financial, operational and legal risks.

The occurrence of any of these risks could directly or indirectly affect HEP's as well as our financial condition, results of operations and cash flows as HEP is a consolidated VIE. Additionally, these risks could affect HEP's ability to continue operations which could affect their ability to serve our supply and distribution network needs.

For additional information about HEP, see “Holly Energy Partners, L.P.” under Items 1 and 2, “Business and Properties.” For risks related to HEP's business, see Item 1A of HEP's Annual Report on Form 10-K for the fiscal year ended December 31, 2018.

We are exposed to the credit risks, and certain other risks, of our key customers and vendors.

We are subject to risks of loss resulting from nonpayment or nonperformance by our customers. We derive a significant portion of our revenues from contracts with key customers.

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If any of our key customers default on their obligations to us, our financial results could be adversely affected. Furthermore, some of our customers may be highly leveraged and subject to their own operating and regulatory risks. In addition, nonperformance by vendors who have committed to provide us with products or services could result in higher costs or interfere with our ability to successfully conduct our business.

Any substantial increase in the nonpayment and/or nonperformance by our customers or vendors could have a material adverse effect on our results of operations and cash flows.

Terrorist attacks (including cyber-attacks), and the threat of terrorist attacks or domestic vandalism, have resulted in increased costs to our business. Continued global hostilities or other sustained military campaigns may adversely impact our results of operations.

The long-term impacts of terrorist attacks and the threat of future terrorist attacks (including cyber-attacks) on the energy transportation industry in general, and on us in particular, are unknown. Increased security measures taken by us as a precaution against possible terrorist attacks or vandalism have resulted in increased costs to our business. Uncertainty surrounding continued global hostilities or other sustained military campaigns, and the possibility that infrastructure facilities could be direct targets of, or indirect casualties of, an act of terror, may affect our operations in unpredictable ways, including disruptions of crude oil supplies and markets for refined products. In addition, disruption or significant increases in energy prices could result in government-imposed price controls. Any one of, or a combination of, these occurrences could have a material adverse effect on our business, financial condition and results of operations.

Changes in the insurance markets attributable to terrorist attacks could make certain types of insurance more difficult for us to obtain. Moreover, the insurance that may be available to us may be significantly more expensive than our existing insurance coverage. Instability in the financial markets as a result of terrorism or war could also affect our ability to raise capital including our ability to repay or refinance debt.

Increases in required fuel economy and regulation of CO_2 emissions from motor vehicles may reduce demand for transportation fuels.

In 2010, the EPA and the National Highway Traffic Safety Administration (“NHTSA”) finalized new standards, raising the required Corporate Average Fuel Economy (“CAFE”) of the nation's passenger fleet by 40% to approximately 35 miles per gallon (“m.p.g.”) by 2016 and imposing the first-ever federal GHG emissions standards on cars and light trucks. In September 2011, the EPA and the Department of Transportation finalized first-time standards for fuel economy of medium and heavy duty trucks. On August 28, 2012, the EPA and NHTSA adopted standards through model year 2025 in two phases. The first phase establishes final standards for 2017-2021 model year vehicles that are projected to require 40.3 - 41.0 m.p.g. in model year 2021 on an average industry fleet-wide basis. The second phase of the CAFE program represents non-final “augural” standards for 2022-2025 model year vehicles that are projected to require 48.7 - 49.7 m.p.g. in model year 2025, on an average industry fleet-wide basis. In 2017, the EPA and NHTSA announced that the agencies were reconsidering the second phase CAFE standards, which could result in maintaining the first phase standards for the 2022-2025 model years. On August 2, 2018, the EPA and NHTSA proposed the Safer Affordable Fuel Economy Rule which amended the existing CAFE standards and proposed new standards covering model years through 2026. A final rule is expected in 2019. Any increases in fuel economy standards, along with mandated increases in use of renewable fuels discussed above, could result in decreasing demand for petroleum fuels. Decreasing demand for petroleum fuels could have a material effect on our financial condition and results of operation.

To successfully operate our petroleum refining facilities, we are required to expend significant amounts for capital outlays and operating expenditures.

The refining business is characterized by high fixed costs resulting from the significant capital outlays associated with refineries, terminals, pipelines and related facilities. We are dependent on the production and sale of quantities of refined products at refined product margins sufficient to cover operating costs, including any increases in costs resulting from future inflationary pressures or market conditions and increases in costs of fuel and power necessary in operating our facilities. Furthermore, future major capital investment, various environmental compliance related projects, regulatory requirements or competitive pressures could result in additional capital expenditures, which may not produce a return on investment. Such capital expenditures may require significant financial resources that may be contingent on our access to capital markets and commercial bank loans. Additionally, other matters, such as regulatory requirements or legal actions, may restrict our access to funds for capital expenditures.

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Our refineries consist of many processing units, a number of which have been in operation for many years. One or more of the units may require unscheduled downtime for unanticipated maintenance or repairs that are more frequent than our scheduled turnaround for such units. Scheduled and unscheduled maintenance could reduce our revenues during the period of time that the units are not operating. We have taken significant measures to expand and upgrade units in our refineries by installing new equipment and redesigning older equipment to improve refinery capacity. The installation and redesign of key equipment at our refineries involves significant uncertainties, including the following: our upgraded equipment may not perform at expected throughput levels; operating costs of the upgraded equipment may be higher than expected; the yield and product quality of new equipment may differ from design and/or specifications and redesign, modification or replacement of the equipment may be required to correct equipment that does not perform as expected, which could require facility shutdowns until the equipment has been redesigned or modified. Any of these risks associated with new equipment, redesigned older equipment, or repaired equipment could lead to lower revenues or higher costs or otherwise have a negative impact on our future financial condition and results of operations.

In addition, we expect to execute turnarounds at our refineries, which involve numerous risks and uncertainties. These risks include delays and incurrence of additional and unforeseen costs. The turnarounds allow us to perform maintenance, upgrades, overhaul and repair of process equipment and materials, during which time all or a portion of the refinery will be under scheduled downtime.

We may be unable to pay future dividends.

We will only be able to pay dividends from our available cash on hand, cash from operations or borrowings under our credit agreement. The declaration of future dividends on our common stock will be at the discretion of our board of directors and will depend upon many factors, including our results of operations, financial condition, earnings, capital requirements, and restrictions in our debt agreements and legal requirements. We cannot assure you that any dividends will be paid or the frequency or amounts of such payments.

Potential product, service or other related liability claims and litigation could adversely affect our business, reputation and results of operations.

A significant portion of our operating responsibility on refined product pipelines is to insure the quality and purity of the products loaded at our loading racks. If our quality control measures were to fail, we may have contaminated or off-specification commingled pipelines and storage tanks or off-specification product could be sent to public gasoline stations. The development, manufacture and sale of specialty lubricant products also involves an inherent risk of exposure to potential product liability claims. These types of incidents could result in product liability claims from our customers. Our Lubricants and Specialty Products segment could also be subject to false advertising claims, product recalls, workplace exposure, product seizures and related adverse publicity.

Any of these incidents is a significant commercial risk. Substantial damage awards have been made in certain jurisdictions against manufacturers and resellers based upon claims for injuries caused by the use of or exposure to various products. There can be no assurance that product liability claims against us would not have a material adverse effect on our business, reputation or results of operations or our ability to maintain existing customers or retain new customers. Although we maintain product and other general liability insurance, there can be no assurance that the types or levels of coverage maintained are adequate to cover these potential risks, or that we will be able to continue to maintain existing insurance or obtain comparable insurance at a reasonable cost, if at all.

In addition, if any party with whom we have a sponsorship relationship were to generate adverse publicity, our company could be harmed. A negative public perception of our company, whether justified or not, could impair our reputation, expose us to litigation, damage our brand equity and have a material adverse effect on our business.

We may be unable to adequately protect our intellectual property, which may limit our ability to compete in our markets.

We have trademarks and patents issued, applied for, or acquired in the United States and in various foreign countries, some of which may prove to be material to our business. Despite our efforts to protect such intellectual property, it is possible that competitors or other unauthorized third parties may obtain, copy, use or disclose our technologies, products, and processes. In addition, the laws and/or judicial systems of foreign countries in which we design, manufacture, market and sell our products may afford little or no effective protection of our intellectual property. These potential risks to our intellectual property could subject us to increased competition and negatively impact our liquidity, financial position and results of operations.

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Our hedging transactions may limit our gains and expose us to other risks.

We periodically enter into derivative transactions as it relates to inventory levels and/or future production to manage the risks from changes in the prices of crude oil, refined products and other feedstocks. These transactions limit our potential gains if commodity prices move above or below the certain price levels established by our hedging instruments. We hedge price risk on inventories above our target levels to minimize the impact these price fluctuations have on our earnings and cash flows. Consequently, our hedging results may fluctuate significantly from one reporting period to the next depending on commodity price fluctuations and our relative physical inventory positions. These transactions may also expose us to risks of financial losses; for example, if our production is less than we anticipated at the time we entered into a hedge agreement or if a counterparty to our hedge agreements fails to perform its obligations under the agreements.

Changes in our credit profile, or a significant increase in the price of crude oil, may affect our relationship with our suppliers, which could have a material adverse effect on our liquidity and limit our ability to purchase sufficient quantities of crude oil to operate our refineries at desired capacity.

An unfavorable credit profile, or a significant increase in the price of crude oil, could affect the way crude oil suppliers view our ability to make payments and induce them to shorten the payment terms of their invoices with us or require credit enhancement. Due to the large dollar amounts and volume of our crude oil and other feedstock purchases, any imposition by our suppliers of more burdensome payment terms or credit enhancement requirements on us may have a material adverse effect on our liquidity and our ability to make payments to our suppliers. This in turn could cause us to be unable to operate our refineries at desired capacity. A failure to operate our refineries at desired capacity could adversely affect our profitability and cash flow.

Our credit facility contains certain covenants and restrictions that may constrain our business and financing activities.

The operating and financial restrictions and covenants in our credit facility and any future financing agreements could adversely affect our ability to finance future operations or capital needs or to engage, expand or pursue our business activities. For example, our revolving credit facility imposes usual and customary requirements for this type of credit facility, including: (i) limitations on liens and indebtedness; (ii) a prohibition on changes in control and (iii) restrictions on engaging in mergers and consolidations. If we fail to satisfy the covenants set forth in the credit facility or another event of default occurs under the credit facility, the maturity of the loan could be accelerated or we could be prohibited from borrowing for our future working capital needs and issuing letters of credit. We might not have, or be able to obtain, sufficient funds to make these immediate payments. If we desire to undertake a transaction that is prohibited by the covenants in our credit facility, we will need to obtain consent under our credit facility. Such refinancing may not be possible or may not be available on commercially acceptable terms.

Our business may suffer due to a departure of any of our key senior executives or other key employees. Furthermore, a shortage of skilled labor or disruptions in our labor force may make it difficult for us to maintain labor productivity.

Our future performance depends to a significant degree upon the continued contributions of our senior management team and key technical personnel. We do not currently maintain key man life insurance, non-compete agreements, or employment agreements with respect to any member of our senior management team. The loss or unavailability to us of any member of our senior management team or a key technical employee could significantly harm us. We face competition for these professionals from our competitors, our customers and other companies operating in our industry. To the extent that the services of members of our senior management team and key technical personnel would be unavailable to us for any reason, we may be required to hire other personnel to manage and operate our company. We may not be able to locate or employ such qualified personnel on acceptable terms, or at all.

Furthermore, our operations require skilled and experienced laborers with proficiency in multiple tasks. A shortage of trained workers due to retirements or otherwise could have an adverse impact on our labor productivity and costs and our ability to expand production in the event there is an increase in the demand for our products and services, which could adversely affect our operations.

As of December 31, 2018, approximately 32% of our employees were represented by labor unions under collective bargaining agreements with various expiration dates. We may not be able to renegotiate our collective bargaining agreements when they expire on satisfactory terms or at all. A failure to do so may increase our costs. In addition, our existing labor agreements may not prevent a strike or work stoppage at any of our facilities in the future, and any work stoppage could negatively affect our results of operations and financial condition.

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The market price of our common stock may fluctuate significantly, and the value of a stockholder's investment could be impacted.

The market price of our common stock may be influenced by many factors, some of which are beyond our control, including:

- our quarterly or annual earnings or those of other companies in our industry;
- changes in accounting standards, policies, guidance, interpretations or principles;
- general economic, industry and stock market conditions;
- the failure of securities analysts to cover our common stock or changes in financial estimates by analysts;
- future sales of our common stock;
- announcements by us or our competitors of significant contracts or acquisitions;
- sales of common stock by us, our senior officers or our affiliates; and/or
- the other factors described in these Risk Factors.

In recent years, the stock market has experienced extreme price and volume fluctuations. This volatility has had a significant impact on the market price of securities issued by many companies, including companies in our industry. The price of our common stock could fluctuate based upon factors that have little or nothing to do with our company, and these fluctuations could materially reduce our stock price.

Item 1B. Unresolved Staff Comments

We do not have any unresolved staff comments.

Item 3. Legal Proceedings

Commitment and Contingency Reserves

We periodically establish reserves for certain legal proceedings. The establishment of a reserve involves an estimation process that includes the advice of legal counsel and subjective judgment of management. While management believes these reserves to be adequate, future changes in the facts and circumstances could result in the actual liability exceeding the estimated ranges of loss and amounts accrued.

While the outcome and impact on us cannot be predicted with certainty, based on advice of counsel, management believes that the resolution of these proceedings through settlement or adverse judgment will not either individually or in the aggregate have a materially adverse effect on our financial condition, results of operations or cash flows.

Environmental Matters

We are reporting the following proceedings to comply with SEC regulations which require us to disclose proceedings arising under provisions regulating the discharge of materials into the environment or protecting the environment if we reasonably believe that such proceedings may result in monetary sanctions of $100,000 or more. Our respective subsidiaries have or will develop corrective action plans regarding these disclosures that will be implemented in consultation with the respective federal and state agencies. It is not possible to predict the ultimate outcome of these proceedings, although none are currently expected to have a material effect on our financial condition, results of operations or cash flows.

Cheyenne

HollyFrontier Cheyenne Refining LLC (“HFCR”) has been engaged in discussions with the Wyoming Department of Environmental Quality (“WDEQ”) relating to Notices of Violations issued in late 2016 and 2018 for possible violations of air quality standards related to operation of certain refinery units at the Cheyenne Refinery in 2016 and 2017. HFCR and the WDEQ are working towards settlement of these matters.

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El Dorado

HollyFrontier El Dorado Refining LLC (“HFEDR”) is engaged in discussions with, and has responded to document requests from, the EPA and the U.S. Department of Justice (“DOJ”) regarding potential Clean Air Act violations relating to flaring devices and other equipment at the refinery. Topics of the discussions include (a) three information requests for activities occurring January 1, 2009 through May 31, 2014 and a September 2017 incident, (b) Risk Management Program compliance issues relating to a November 2014 inspection and (c) a Notice of Violation issued by the EPA in August 2017. HFEDR will continue to work with the EPA and DOJ to resolve these matters.

Tulsa

HollyFrontier Tulsa Refining LLC (“HFTR”) operates under two Consent Decrees with the EPA and the Oklahoma Department of Environmental Quality (“ODEQ”). On December 13, 2017, during a meeting between the parties, ODEQ proposed stipulated penalties related to violations of the two Consent Decrees. The violations relate to Clean Air Act regulated fuel gas and flare operations. HFTR is working with the ODEQ and the EPA to document a settlement agreement.

Other

We are a party to various other litigation and proceedings that we believe, based on advice of counsel, will not either individually or in the aggregate have a materially adverse impact on our financial condition, results of operations or cash flows.

Item 4. Mine Safety Disclosures

Not Applicable.

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PART II

Item 5. Market for the Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities

Our common stock is traded on the New York Stock Exchange under the trading symbol "HFC."

In September 2018, our Board of Directors approved a $1 billion share repurchase program, which replaced all existing share repurchase programs, authorizing us to repurchase common stock in the open market or through privately negotiated transactions. The timing and amount of stock repurchases will depend on market conditions and corporate, regulatory and other relevant considerations. This program may be discontinued at any time by the Board of Directors. The following table includes repurchases made under this program during the fourth quarter of 2018.

Period	Total Number of Shares Purchased	Average Price Paid Per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs	Maximum Dollar Value of Shares that May Yet Be Purchased under the Plans or Programs
October 2018	1,360,987	$ 66.34	1,360,987	$ 859,039,458
November 2018	450,000	$ 61.36	450,000	$ 831,427,985
December 2018	912,360	$ 53.93	810,000	$ 787,613,605
Total for October to December 2018	2,723,347		2,620,987	

During the quarter ended December 31, 2018, 102,360 shares were withheld from certain executives and employees under the terms of our share-based compensation agreements to provide funds for the payment of payroll and income taxes due at vesting of restricted stock awards.

As of February 13, 2019, we had approximately 97,419 stockholders, including beneficial owners holding shares in street name.

We intend to consider the declaration of a dividend on a quarterly basis, although there is no assurance as to future dividends since they are dependent upon future earnings, capital requirements, our financial condition and other factors.

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Item 6. Selected Financial Data

The following table shows our selected financial information as of the dates or for the periods indicated. This table should be read in conjunction with Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our consolidated financial statements and related notes thereto included elsewhere in this Annual Report on Form 10-K.

	Years Ended December 31,				
	2018	2017	2016	2015	2014
	(In thousands, except per share data)				
FINANCIAL DATA					
For the period					
Sales and other revenues	$17,714,666	$14,251,299	$10,535,700	$13,237,920	$19,764,327
Income (loss) before income taxes	1,524,467	868,863	(171,534)	1,208,568	467,500
Income tax expense (benefit)	347,243	(12,379)	19,411	406,060	141,172
Net income (loss)	1,177,224	881,242	(190,945)	802,508	326,328
Less net income attributable to noncontrolling interest	79,264	75,847	69,508	62,407	45,036
Net income (loss) attributable to HollyFrontier stockholders	$1,097,960	$805,395	$(260,453)	$740,101	$281,292
Earnings (loss) per share attributable to HollyFrontier stockholders - basic	$6.25	$4.54	$(1.48)	$3.91	$1.42
Earnings (loss) per share attributable to HollyFrontier stockholders - diluted	$6.19	$4.52	$(1.48)	$3.90	$1.42
Cash dividends declared per common share	$1.32	$1.32	$1.32	$1.31	$3.26
Average number of common shares outstanding:					
Basic	175,009	176,174	176,101	188,731	197,243
Diluted	176,661	177,196	176,101	188,940	197,428
Net cash provided by operating activities	$1,554,416	$951,390	$606,948	$985,868	$758,596
Net cash used for investing activities	$(360,520)	$(959,670)	$(801,597)	$(381,748)	$(292,322)
Net cash provided by (used for) financing activities	$(664,328)	$(72,630)	$838,695	$(1,105,572)	$(838,392)
At end of period					
Cash, cash equivalents and investments in marketable securities	$1,154,752	$630,757	$1,134,727	$210,552	$1,042,095
Working capital	$2,128,224	$1,640,118	$1,767,780	$587,450	$1,549,004
Total assets	$10,994,601	$10,692,154	$9,435,661	$8,388,299	$9,230,047
Total debt	$2,411,540	$2,498,993	$2,235,137	$1,040,040	$1,054,297
Total equity	$6,459,059	$5,896,940	$5,301,985	$5,809,773	$6,100,719

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Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

This Item 7 contains "forward-looking" statements. See "Forward-Looking Statements" at the beginning of this Annual Report on Form 10-K. In this document, the words "we," "our," "ours" and "us" refer only to HollyFrontier and its consolidated subsidiaries or to HollyFrontier or an individual subsidiary and not to any other person with certain exceptions. Generally, the words "we," "our," "ours" and "us" include HEP and its subsidiaries as consolidated subsidiaries of HollyFrontier, unless when used in disclosures of transactions or obligations between HEP and HollyFrontier or its other subsidiaries. This document contains certain disclosures of agreements that are specific to HEP and its consolidated subsidiaries and do not necessarily represent obligations of HollyFrontier. When used in descriptions of agreements and transactions, "HEP" refers to HEP and its consolidated subsidiaries.

Overview

We are an independent petroleum refiner and marketer that produces high-value light products such as gasoline, diesel fuel, jet fuel and other specialty products. We own and operate refineries located in Kansas, Oklahoma, New Mexico, Wyoming and Utah and market our refined products principally in the Southwest U.S., the Rocky Mountains extending into the Pacific Northwest and in other neighboring Plains states. In addition, we produce base oils and other specialized lubricants in the U.S., Canada and the Netherlands, and export products to more than 80 countries. We also own a 57% limited partner interest and a non-economic general partner interest in HEP, a master limited partnership that provides petroleum product and crude oil transportation, terminalling, storage and throughput services to the petroleum industry, including HollyFrontier Corporation subsidiaries.

On November 12, 2018, we entered into an equity purchase agreement to acquire 100% of the issued and outstanding capital stock of Sonneborn. The acquisition closed on February 1, 2019. Cash consideration paid was $660.0 million. Sonneborn is a producer of specialty hydrocarbon chemicals such as white oils, petrolatums and waxes with manufacturing facilities in the United States and Europe.

On July 10, 2018, we entered into a definitive agreement to acquire Red Giant Oil, a privately-owned lubricants company. The acquisition closed on August 1, 2018. Cash consideration paid was $54.2 million. Red Giant Oil is one of the largest suppliers of locomotive engine oil in North America and is headquartered in Council Bluffs, Iowa with storage and distribution facilities in Iowa, Kansas, Utah and Wyoming, along with a blending and packaging facility in Texas.

On October 29, 2016, we entered into a share purchase agreement with Suncor to acquire 100% of the outstanding capital stock of PCLI. The acquisition closed on February 1, 2017. Cash consideration paid was $862.1 million, or $1.125 billion Canadian dollars. PCLI is a Canadian-based producer of base oils with a plant having 15,600 BPD of lubricant production capacity that is located in Mississauga, Ontario. The facility is downstream integrated from base oils to finished lubricants and produces a broad spectrum of specialty lubricants and white oils that are distributed to end customers worldwide through a global sales network with locations in Canada, the United States, Europe and China.

For the year ended December 31, 2018, net income attributable to HollyFrontier stockholders was $1,098.0 million compared to net income of $805.4 million and a net loss of $260.5 million for the years ended December 31, 2017, and 2016, respectively. Overall gross refining margins per produced barrel sold for 2018 increased 53% over the year ended December 31, 2017 due to higher crack spreads and crude oil basis differentials.

Pursuant to the 2007 Energy Independence and Security Act, the EPA promulgated the RFS regulations, which increased the volume of renewable fuels mandated to be blended into the nation's fuel supply. The regulations, in part, require refiners to add annually increasing amounts of “renewable fuels” to their petroleum products or purchase credits, known as RINs, in lieu of such blending. Compliance with RFS regulations significantly increases our cost of products sold, with RINs costs totaling $184.0 million for the year ended December 31, 2018, which is net of the $97.0 million cost reduction resulting from small refinery RINs waivers granted by the EPA in 2018 as described in Note 8 “Inventories” in the Notes to Consolidated Financial Statements.

OUTLOOK

Going into 2019, despite tightening crude differentials, we are optimistic that strength in the diesel markets will continue, and we expect to see a seasonal rebound in gasoline markets. For the first quarter 2019, we expect to run between 400,000 and 410,000 barrels per day of crude oil, primarily driven by the scheduled turnaround in mid-February at our Tulsa refinery.

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In our Lubricants and Specialty Products segment, the Rack Forward business continues to perform well based on strong macroeconomic conditions that support healthy demand and pricing for finished products. We expect this to be offset somewhat by further cyclical weakness and oversupply in the base oil markets which will depress Rack Back earnings in 2019.

At HEP, we anticipate an annual distribution growth rate of 2% and coverage to average 1.0x for the full year of 2019 with higher coverage ratios expected in the second half of the year due to contractual tariff escalators.

A more detailed discussion of our financial and operating results for the years ended December 31, 2018, 2017 and 2016 is presented in the following sections.

Results Of Operations

Financial Data

	Years Ended December 31,		
	2018	2017	2016
	(In thousands, except per share data)		
Sales and other revenues	$17,714,666	$14,251,299	$10,535,700
Operating costs and expenses:			
Cost of products sold (exclusive of depreciation and amortization):			
Cost of products sold (exclusive of lower of cost or market inventory valuation adjustment)	13,940,782	11,467,873	8,766,027
Lower of cost or market inventory valuation adjustment	136,305	(108,685)	(291,938)
	14,077,087	11,359,188	8,474,089
Operating expenses (exclusive of depreciation and amortization)	1,285,838	1,296,669	1,021,152
Selling, general and administrative expenses (exclusive of depreciation and amortization)	290,424	265,721	125,930
Depreciation and amortization	437,324	409,937	363,027
Goodwill and asset impairment	—	19,247	654,084
Total operating costs and expenses	16,090,673	13,350,762	10,638,282
Income (loss) from operations	1,623,993	900,537	(102,582)
Other income (expense):			
Earnings of equity method investments	5,825	12,510	14,213
Interest income	16,892	3,736	2,491
Interest expense	(131,363)	(117,597)	(72,192)
Loss on early extinguishment of debt	—	(12,225)	(8,718)
Gain on foreign currency transactions	6,197	16,921	—
Gain (loss) on foreign currency swap	—	24,545	(6,520)
Remeasurement gain on HEP pipeline interest acquisitions	—	36,254	—
Other, net	2,923	4,182	1,774
	(99,526)	(31,674)	(68,952)
Income (loss) before income taxes	1,524,467	868,863	(171,534)
Income tax expense (benefit)	347,243	(12,379)	19,411
Net income (loss)	1,177,224	881,242	(190,945)
Less net income attributable to noncontrolling interest	79,264	75,847	69,508
Net income (loss) attributable to HollyFrontier stockholders	$1,097,960	$805,395	$(260,453)
Earnings (loss) per share attributable to HollyFrontier stockholders:			
Basic	$6.25	$4.54	$(1.48)

Diluted	$6.19	$4.52	$(1.48)
Cash dividends declared per common share	$1.32	$1.32	$1.32
Average number of common shares outstanding:			
Basic	175,009	176,174	176,101
Diluted	176,661	177,196	176,101

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Other Financial Data

	Years Ended December 31,		
	2018	2017	2016
	(In thousands)		
Net cash provided by operating activities	$1,554,416	$951,390	$606,948
Net cash used for investing activities	$(360,520)	$(959,670)	$(801,597)
Net cash provided by (used for) financing activities	$(664,328)	$(72,630)	$838,695
Capital expenditures	$311,029	$272,259	$479,790
EBITDA (1)	$1,996,998	$1,316,814	$191,686

(1) Earnings before interest, taxes, depreciation and amortization, which we refer to as "EBITDA," is calculated as net income (loss) attributable to HollyFrontier stockholders plus (i) interest expense, net of interest income, (ii) income tax provision, and (iii) depreciation and amortization. EBITDA is not a calculation provided for under GAAP; however, the amounts included in the EBITDA calculation are derived from amounts included in our consolidated financial statements. EBITDA should not be considered as an alternative to net income or operating income as an indication of our operating performance or as an alternative to operating cash flow as a measure of liquidity. EBITDA is not necessarily comparable to similarly titled measures of other companies. EBITDA is presented here because it is a widely used financial indicator used by investors and analysts to measure performance. EBITDA is also used by our management for internal analysis and as a basis for financial covenants. EBITDA presented above is reconciled to net income under "Reconciliations to Amounts Reported Under Generally Accepted Accounting Principles" following Item 7A of Part II of this Form 10-K.

Supplemental Segment Operating Data

Our operations are organized into three reportable segments, Refining, Lubricants and Specialty Products and HEP. See Note 20 "Segment Information" in the Notes to Consolidated Financial Statements for additional information on our reportable segments.

Refining Segment Operating Data

Our refinery operations include the El Dorado, Tulsa, Navajo, Cheyenne and Woods Cross Refineries. The following tables set forth information, including non-GAAP performance measures, about our consolidated refinery operations. The cost of products and refinery gross and net operating margins do not include the non-cash effects of goodwill and asset impairments charges, lower of cost or market inventory valuation adjustments and depreciation and amortization. Reconciliations to amounts reported under GAAP are provided under "Reconciliations to Amounts Reported Under Generally Accepted Accounting Principles" following Item 7A of Part II of this Form 10-K.

	Years Ended December 31,		
	2018	2017	2016
Consolidated			
Crude charge (BPD) (1)	431,570	438,800	423,910
Refinery throughput (BPD) (2)	463,340	472,010	457,480
Sales of produced refined products (BPD) (3)	452,630	452,270	440,640
Refinery utilization (4)	94.4 %	96.0 %	92.8 %
Average per produced barrel sold (5)			
Refinery gross margin (6)	$17.71	$11.56	$8.16
Refinery operating expenses (7)	6.39	6.11	5.65
Net operating margin	$11.32	$5.45	$2.51
Refinery operating expenses per throughput barrel (8)	$6.24	$5.86	$5.45

(1) Crude charge represents the barrels per day of crude oil processed at our refineries.

(2) Refinery throughput represents the barrels per day of crude and other refinery feedstocks input to the crude units and other conversion units at our refineries.

(3) Represents barrels sold of refined products produced at our refineries (including HFC Asphalt) and does not include volumes of refined products purchased for resale or volumes of excess crude oil sold.

(4) Represents crude charge divided by total crude capacity (BPSD). Our consolidated crude capacity is 457,000 BPSD.

(5) Represents average amount per produced barrel sold, which is a non-GAAP measure. Reconciliations to amounts reported under GAAP are provided under "Reconciliations to Amounts Reported Under Generally Accepted Accounting Principles" following Item 7A of Part II of this Form 10-K.

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(6) Excludes lower of cost or market inventory valuation adjustments.

(7) Represents total refining segment operating expenses, exclusive of depreciation and amortization, divided by sales volumes of refined products produced at our refineries.

(8) Represents total refining segment operating expenses, exclusive of depreciation and amortization, divided by refinery throughput.

Lubricants and Specialty Products Segment Operating Data

The following table sets forth information about our lubricants and specialty products operations and includes our Petro-Canada Lubricants business for the period February 1, 2017 (date of acquisition) through December 31, 2017. Red Giant Oil is included for the period August 1, 2018 (date of acquisition) through December 31, 2018.

	Years Ended December 31,		
Lubricants and Specialty Products	2018	2017	2016
Throughput (BPD)	19,590	21,710	—
Barrels sold (BPD)	30,510	32,910	12,030

Our Lubricants and Specialty Products segment includes base oil production activities, by-product sales to third parties and intra-segment base oil sales to rack forward referred to as “rack back.” “Rack forward” includes the purchase of base oils and the blending, packaging, marketing and distribution and sales of finished lubricants and specialty products to third parties. Supplemental financial data attributable to our Lubricants and Specialty Products segment is presented below:

	Rack Back (1)	Rack Forward (2)	Eliminations (3)	Total Lubricants and Specialty Products
	(In thousands)			
Year Ended December 31, 2018				
Sales and other revenues	$682,892	$1,650,056	$(520,245)	$1,812,703
Cost of products sold	633,459	1,268,326	(520,245)	1,381,540
Operating expenses	111,155	56,665	—	167,820
Selling, general and administrative expenses	32,086	111,664	—	143,750
Depreciation and amortization	26,955	16,300	—	43,255
Income (loss) from operations	$(120,763)	$197,101	$—	$76,338
Year Ended December 31, 2017				
Sales and other revenues	$621,153	$1,415,842	$(442,959)	$1,594,036
Cost of products sold (exclusive of lower of cost or market inventory valuation adjustment)	504,782	1,032,161	(442,959)	1,093,984
Lower of cost or market inventory valuation adjustment	—	(1,206)	—	(1,206)
Operating expenses	95,303	127,158	—	222,461
Selling, general and administrative expenses	27,764	77,902	—	105,666
Depreciation and amortization	23,471	8,423	—	31,894
Income (loss) from operations	$(30,167)	$171,404	$—	$141,237
Year Ended December 31, 2016				
Sales and other revenues	$—	$464,359	$—	$464,359
	—	377,136	—	377,136

Cost of products sold (exclusive of lower of cost or market inventory valuation adjustment)				
Lower of cost or market inventory valuation adjustment	—	(4,090)	—	
Operating expenses	—	13,867	—	13,867
Selling, general and administrative expenses	—	2,899	—	2,899
Depreciation and amortization	—	620	—	620
Income from operations	$—	$73,927	$—	$73,927

(1) Rack back consists of our PCLI base oil production activities, by-product sales to third parties and intra-segment base oil sales to rack forward.

(2) Rack forward activities include the purchase of base oils from rack back and the blending, packaging, marketing and distribution and sales of finished lubricants and specialty products to third parties.

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(3) Intra-segment sales of rack back produced base oils to rack forward are eliminated under the “Eliminations” column.

Results of Operations – Year Ended December 31, 2018 Compared to Year Ended December 31, 2017

Summary
Net income attributable to HollyFrontier stockholders for the year ended December 31, 2018 was $1,098.0 million ($6.25 per basic and $6.19 per diluted share), a $292.6 million increase compared to net income attributable to HollyFrontier stockholders of $805.4 million ($4.54 per basic and $4.52 per diluted share) for the year ended December 31, 2017. Net income increased due principally to an increase in gross refining margins. For the year ended December 31, 2018, lower of cost or market inventory reserve adjustments decreased pre-tax earnings by $136.3 million compared to an increase of $108.7 million for the year ended December 31, 2017. Refinery gross margins for the year ended December 31, 2018 increased to $17.71 per produced barrel from $11.56 for the year ended December 31, 2017. During 2018, our Cheyenne Refinery was granted a one-year small refinery exemption from the EPA for the 2015 and 2017 calendar years and our Woods Cross Refinery was granted a one-year small refinery exemption for 2017. As a result of these exemptions, we recorded reductions totaling $97.0 million to our cost of products sold. During 2017, our Cheyenne Refinery and Woods Cross Refinery were each granted a one-year small refinery exemption from the EPA at which time we recorded a $57.8 million decrease to our cost of products sold, reflecting the reinstatement of RINs previously expensed in 2016.

Sales and Other Revenues
Sales and other revenues increased 24% from $14,251.3 million for the year ended December 31, 2017 to $17,714.7 million for the year ended December 31, 2018 due to a year-over-year increase in sales prices. Sales and other revenues for the years ended December 31, 2018 and 2017 include $108.4 million and $77.2 million, respectively, in HEP revenues attributable to pipeline and transportation services provided to unaffiliated parties. Additionally, sales and other revenues included $1,799.5 million and $1,594.0 million in unaffiliated revenues related to our Lubricants and Specialty Products segment for the years ended December 31, 2018 and 2017.

Cost of Products Sold
Total cost of products sold increased 24% from $11,359.2 million for the year ended December 31, 2017 to $14,077.1 million for the year ended December 31, 2018, due principally to higher crude oil costs. Additionally, for the year ended December 31, 2018, we recognized a $136.3 million lower of cost or market inventory valuation charge compared to a benefit of $108.7 million for the same period of 2017, resulting in a new $360.1 million inventory reserve at December 31, 2018. The reserve at December 31, 2018 is based on market conditions and prices at that time. During the years ended December 31, 2018 and 2017, we recorded $97.0 million and $57.8 million, respectively, RINs cost reduction as a result of our Cheyenne Refinery and Woods Cross Refinery small refinery exemptions.

Gross Refinery Margins
Gross refinery margin per barrel sold increased 53% from $11.56 for the year ended December 31, 2017 to $17.71 for the year ended December 31, 2018. This was due to the effects of an increase in the average per barrel sold sales price, partially offset by increased crude oil and feedstock prices during the current year. Gross refinery margin does not include the non-cash effects of lower of cost or market inventory valuation adjustments, asset impairment charges or depreciation and amortization. See “Reconciliations to Amounts Reported Under Generally Accepted Accounting Principles” following Item 7A of Part II of this Form 10-K for a reconciliation to the income statement of sale prices of products sold and cost of products purchased.

Operating Expenses

Operating expenses, exclusive of depreciation and amortization, decreased 1% from $1,296.7 million for the year ended December 31, 2017 to $1,285.8 million for the year ended December 31, 2018 due principally to lower purchased fuel costs, partially offset by higher repair and maintenance costs as a result of a fire and resulting damage at our Woods Cross Refinery in March 2018.

Selling, General and Administrative Expenses

Selling, general and administrative expenses increased 9% from $265.7 million for the year ended December 31, 2017 to $290.4 million for the year ended December 31, 2018, due principally to higher legal and professional fees, salary costs and enterprise system initiatives. Additionally, we incurred $3.6 million in integration costs of our Petro-Canada Lubricants business during the year ended December 31, 2018 compared to $27.9 million during the year ended December 31, 2017.

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Depreciation and Amortization Expenses
Depreciation and amortization increased 7% from $409.9 million for the year ended December 31, 2017 to $437.3 million for the year ended December 31, 2018. This increase was due principally to depreciation and amortization attributable to capitalized improvement projects and capitalized refinery turnaround costs.

Asset Impairment
During the year ended December 31, 2017, we recorded a $19.2 million long-lived asset impairment charge resulting from management's plan to cease further expansion of our Woods Cross Refinery to add lubricants production. See Note 10 “Goodwill, Long-lived Assets and Intangibles” in the Notes to Consolidated Financial Statements for additional information on this impairment.

Interest Income
Interest income for the year ended December 31, 2018 was $16.9 million compared to $3.7 million for the year ended December 31, 2017. This increase was due to higher interest rates and higher cash balances during 2018.

Interest Expense
Interest expense was $131.4 million for the year ended December 31, 2018 compared to $117.6 million for the year ended December 31, 2017. This increase was due to interest attributable to higher debt levels and market interest rate increases during the current year relative to 2017. For the years ended December 31, 2018 and 2017, interest expense included $71.9 million and $58.4 million, respectively, in interest costs attributable to HEP operations.

Loss on Early Extinguishment of Debt
For the year ended December 31, 2017, a $12.2 million loss was recorded upon HEP's redemption of its $300 million aggregate principal amount of 6.5% senior notes maturing March 2020 at a cost of $309.8 million.

Gain on Foreign Currency Transactions
Remeasurement adjustments resulting from the conversion of the intercompany financing structure on our PCLI acquisition from local currencies to the U.S. dollar resulted in $6.2 million and $16.9 million gains for the years ended December 31, 2018 and 2017, respectively. The $6.2 million gain for 2018 consists of a $41.8 million gain on foreign exchange forward contracts (utilized as an economic hedge), net of a $35.6 million remeasurement loss on our intercompany financing structure.

Gain on Foreign Currency Swap
During the year ended December 31, 2017, we recorded a $24.5 million gain on currency swap contracts that effectively fixed the conversion rate on $1.125 billion Canadian dollars (the PCLI purchase price), which were settled on February 1, 2017, in connection with the closing of the PCLI acquisition.

Income Taxes
For the year ended December 31, 2018, we recorded an income tax expense of $347.2 million compared to an income tax benefit of $12.4 million for the year ended December 31, 2017. Our effective tax rates, before consideration of earnings attributable to the noncontrolling interest, were 22.8% and (1.4)% for the years ended December 31, 2018 and 2017, respectively. During the year ended December 31, 2017, we recorded a tax benefit of $307.1 million as a result of the Tax Cut and Jobs Act which was enacted on December 22, 2017.

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Results of Operations – Year Ended December 31, 2017 Compared to Year Ended December 31, 2016

Summary

Net income attributable to HollyFrontier stockholders for the year ended December 31, 2017 was $805.4 million ($4.54 per basic and $4.52 per diluted share), a $1,065.8 million increase compared to a net loss attributable to HollyFrontier stockholders of $260.5 million ($1.48 per basic and diluted share) for the year ended December 31, 2016. Net income increased due principally to an increase in refining segment sales volumes and gross refining margins and the inclusion of earnings attributable to the operations of our Petro-Canada Lubricants business acquired in 2017. Additionally, we recorded long-lived asset impairment charges totaling $23.2 million for the year ended December 31, 2017 compared to goodwill and long-lived asset impairment charges totaling $654.1 million for the year ended December 31, 2016. For the year ended December 31, 2017, lower of cost or market inventory reserve adjustments increased pre-tax earnings by $108.7 million compared to $291.9 million for the year ended December 31, 2016. Refinery gross margins for the year ended December 31, 2017 increased to $11.56 per barrel sold from $8.16 for the year ended December 31, 2016. During 2017, our Cheyenne Refinery and Woods Cross Refinery were each granted a one-year small refinery exemption from the EPA at which time we recorded a $30.5 million and $27.3 million, respectively, decrease to our cost of products sold, reflecting the reinstatement of RINs previously expensed in 2016. The Tax Cut and Jobs Act was enacted on December 22, 2017, resulting in a tax benefit of $307.1 million for the year ended December 31, 2017.

Sales and Other Revenues

Sales and other revenues increased 35% from $10,535.7 million for the year ended December 31, 2016 to $14,251.3 million for the year ended December 31, 2017 due to a year-over-year increase in sales prices and higher product sales volumes. Sales and other revenues for the years ended December 31, 2017 and 2016 include $77.2 million and $68.9 million, respectively, in HEP revenues attributable to pipeline and transportation services provided to unaffiliated parties. Additionally, the operations of our Petro-Canada Lubricants business contributed $1,125.3 million in sales and other revenues to our Lubricants and Specialty Products segment for the year ended December 31, 2017.

Cost of Products Sold

Total cost of products sold increased 34% from $8,474.1 million for the year ended December 31, 2016 to $11,359.2 million for the year ended December 31, 2017, due principally to higher crude oil costs and higher sales volumes of products. Additionally, cost of products sold reflects a $108.7 million benefit that is attributable to a decrease in the lower of cost or market reserve for the year ended December 31, 2017, a $183.3 million decrease compared to $291.9 million for the same period in 2016. The reserve at December 31, 2017 is based on market conditions and prices at that time. Additionally, we recorded a $30.5 million and $27.3 million RINs cost reduction during 2017 as a result of the reinstatement of previously utilized RINs following our Cheyenne Refinery and Woods Cross Refinery, respectively, small refinery exemptions.

Gross Refinery Margins

Gross refinery margin per barrel sold increased 42% from $8.16 for the year ended December 31, 2016 to $11.56 for the year ended December 31, 2017. This was due to the effects of an increase in the average per barrel sold sales price, partially offset by increased crude oil and feedstock prices during 2017. Gross refinery margin does not include the non-cash effects of lower of cost or market inventory valuation adjustments, goodwill and asset impairment charges or depreciation and amortization. See “Reconciliations to Amounts Reported Under Generally Accepted Accounting Principles” following Item 7A of Part II of this Form 10-K for a reconciliation to the income statement of sale prices of products sold and cost of products purchased.

Operating Expenses

Operating expenses, exclusive of depreciation and amortization, increased 27% from $1,021.2 million for the year ended December 31, 2016 to $1,296.7 million for the year ended December 31, 2017 due principally to $208.7 million in costs attributable to the operations of our Petro-Canada Lubricants business and higher purchased fuel costs compared to 2016.

Selling, General and Administrative Expenses

Selling, general and administrative expenses increased 111% from $125.9 million for the year ended December 31, 2016 to $265.7 million for the year ended December 31, 2017, due principally to $128.3 million in costs attributable to the operations of our Petro-Canada Lubricants business and related acquisition and integration costs. Incremental direct acquisition and integration costs of our Petro-Canada Lubricants business totaled $27.9 million and $13.4 million for the years ended December 31, 2017 and 2016, respectively.

Depreciation and Amortization Expenses

Depreciation and amortization increased 13% from $363.0 million for the year ended December 31, 2016 to $409.9 million for the year ended December 31, 2017. This increase was due principally to $30.9 million in depreciation and amortization expenses attributable to the operations of our Petro-Canada Lubricants business and capitalized improvement projects and capitalized refinery turnaround costs.

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Goodwill and Asset Impairment
During the year ended December 31, 2017, we recorded a $19.2 million long-lived asset impairment charge resulting from management's plan to cease further expansion of our Woods Cross Refinery to add lubricants production compared to goodwill and long-lived asset impairment charges of $309.3 million and $344.8 million, respectively, for the year ended December 31, 2016 that related to our Cheyenne Refinery. See Note 10 “Goodwill, Long-lived Assets and Intangibles” in the Notes to Consolidated Financial Statements for additional information on these impairments.

Interest Income
Interest income for the year ended December 31, 2017 was $3.7 million compared to $2.5 million for the year ended December 31, 2016. This increase was due to higher interest rates received on cash balances during 2017.

Interest Expense
Interest expense was $117.6 million for the year ended December 31, 2017 compared to $72.2 million for the year ended December 31, 2016. This increase was due to interest attributable to higher debt levels during 2017 relative to 2016. For the years ended December 31, 2017 and 2016, interest expense included $58.4 million and $52.6 million, respectively, in interest costs attributable to HEP operations.

Loss on Early Extinguishment of Debt
For the year ended December 31, 2017, a $12.2 million loss was recorded upon HEP's redemption of its $300 million aggregate principal amount of 6.5% senior notes maturing March 2020 at a cost of $309.8 million.

For the year ended December 31, 2016, we recognized an $8.7 million loss on the early retirement of a financing arrangement, a component of outstanding debt, upon HEP's purchase of crude oil tanks from an affiliate of Plains. See Note 12 "Debt" in the Notes to Consolidated Financial Statements for additional information on this financing arrangement.

Gain on Foreign Currency Transactions
Remeasurement adjustments resulting from the conversion of the intercompany financing structure on our PCLI acquisition from local currencies to the U.S. dollar resulted in a $16.9 million gain for the year ended December 31, 2017.

Gain (Loss) on Foreign Currency Swap
During the years ended December 31, 2017 and 2016, we recorded a $24.5 million gain and a $6.5 million loss, respectively, on currency swap contracts that effectively fixed the conversion rate on $1.125 billion Canadian dollars (the PCLI purchase price), which were settled on February 1, 2017, in connection with the closing of the PCLI acquisition.

Income Taxes
For the year ended December 31, 2017, we recorded a net income tax benefit of $12.4 million compared to an income tax expense of $19.4 million for the year ended December 31, 2016. Our effective tax rates, before consideration of earnings attributable to the noncontrolling interest, were (1.4)% and (11.3)% for the years ended December 31, 2017 and 2016, respectively. During the year ended December 31, 2017, we recorded a tax benefit of $307.1 million as a result of the Tax Cut and Jobs Act which was enacted on December 22, 2017. During the year ended December 31, 2016, we recorded a $309.3 million goodwill impairment charge, a significant driver of our $171.5 million loss before income taxes for the year ended December 31, 2016, that is not deductible for income tax purposes.

LIQUIDITY AND CAPITAL RESOURCES

HollyFrontier Credit Agreement
We have a $1.35 billion senior unsecured revolving credit facility maturing in February 2022 (the “HollyFrontier Credit Agreement”). The HollyFrontier Credit Agreement may be used for revolving credit loans and letters of credit from time to time and is available to fund general corporate purposes. At December 31, 2018, we were in compliance with all covenants, had no outstanding borrowings and had outstanding letters of credit totaling $2.2 million under the HollyFrontier Credit Agreement.

HollyFrontier Financing Arrangements
In December 2018, certain of our wholly-owned subsidiaries entered into financing arrangements whereby such subsidiaries sold a portion of their precious metals catalyst to a financial institution and then leased back the precious metals catalyst in exchange for total cash received of $32.5 million. The volume of the precious metals catalyst and the lease rate are fixed over the one-year term of each lease, and the lease payments are recorded as interest expense. At maturity, we must repurchase the precious metals catalyst at its then fair market value.

HEP Credit Agreement
HEP has a $1.4 billion senior secured revolving credit facility maturing in July 2022 (the “HEP Credit Agreement”) and is available to fund capital expenditures, investments, acquisitions, distribution payments, working capital and for general partnership purposes. It is also available to fund letters of credit up to a $50 million sub-limit and has a $300 million accordion. During the year ended December 31, 2018, HEP received advances totaling $337.0 million and repaid $426.0 million under the HEP Credit Agreement. At December 31, 2018, HEP was in compliance with all of its covenants, had outstanding borrowings of $923.0 million and no outstanding letters of credit under the HEP Credit Agreement.

See Note 12 "Debt" in the Notes to Consolidated Financial Statements for additional information on our debt instruments.

HEP Common Unit Continuous Offering Program
In May 2016, HEP established a continuous offering program under which HEP may issue and sell common units from time to time, representing limited partner interests, up to an aggregate gross sales amount of $200 million. During the year ended December 31, 2018, HEP issued 171,246 common units under this program, providing $5.2 million in gross proceeds. As of December 31, 2018, HEP has issued 2,413,153 common units under this program, providing $82.3 million in gross proceeds.

HEP intends to use the net proceeds for general partnership purposes, which may include funding working capital, repayment of debt, acquisitions and capital expenditures. Amounts repaid under HEP’s credit facility may be reborrowed from time to time.

HEP Private Placement Agreement
On January 25, 2018, HEP entered into a common unit purchase agreement in which certain purchasers agreed to purchase in a private placement 3,700,000 HEP common units, representing limited partner interests, at a price of $29.73 per common unit. The private placement closed on February 6, 2018, at which time HEP received proceeds of approximately $110.0 million, which were used to repay indebtedness under the HEP Credit Agreement.

Liquidity
We believe our current cash and cash equivalents, along with future internally generated cash flow and funds available under our credit facilities will provide sufficient resources to fund currently planned capital projects and our liquidity needs for the foreseeable future. In addition, components of our growth strategy include the expansion of existing units at our facilities and selective acquisition of complementary assets for our refining operations intended to increase earnings and cash flow.

As of December 31, 2018, our cash and cash equivalents totaled $1,154.8 million. We consider all highly-liquid instruments with a maturity of three months or less at the time of purchase to be cash equivalents. Cash equivalents are stated at cost, which approximates market value. These primarily consist of investments in conservative, highly-rated instruments issued by financial institutions, government and corporate entities with strong credit standings and money market funds.

In September 2018, our Board of Directors approved a $1 billion share repurchase program, which replaced all existing share repurchase programs, authorizing us to repurchase common stock in the open market or through privately negotiated transactions. The timing and amount of stock repurchases will depend on market conditions and corporate, regulatory and other relevant considerations. This program may be discontinued at any time by our Board of Directors. As of December 31, 2018, we had remaining authorization to repurchase up to $787.6 million under this stock repurchase program. In addition, we are authorized by our Board of Directors to repurchase shares in an amount sufficient to offset shares issued under our compensation programs.

Cash and cash equivalents increased $524.0 million for the year ended December 31, 2018. Net cash provided by operating activities of $1,554.4 million exceeded net cash used by investing and financing activities of $360.5 million and $664.3 million, respectively.

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Cash Flows – Operating Activities

Year Ended December 31, 2018 Compared to Year Ended December 31, 2017
Net cash flows provided by operating activities were $1,554.4 million for the year ended December 31, 2018 compared to $951.4 million for the year ended December 31, 2017, an increase of $603.0 million. Net income for the year ended December 31, 2018 was $1,177.2 million, an increase of $296.0 million compared to $881.2 million for the year ended December 31, 2017. Non-cash adjustments to net income consisting of depreciation and amortization, long-lived asset impairment charges, lower of cost or market inventory valuation adjustment, earnings of equity method investments, inclusive of distributions, loss on extinguishment of debt, remeasurement gain on pipeline interest acquisitions, loss on sale of assets, deferred income taxes, equity-based compensation expense and fair value changes to derivative instruments totaled $663.3 million for the year ended December 31, 2018 compared to $189.2 million for the same period in 2017. Changes in working capital items decreased operating cash flows by $87.7 million and $6.1 million for the years ended December 31, 2018 and 2017, respectively. For the year ended December 31, 2018, turnaround expenditures increased to $217.2 million from $135.1 million for the same period of 2017.

Year Ended December 31, 2017 Compared to Year Ended December 31, 2016
Net cash flows provided by operating activities were $951.4 million for the year ended December 31, 2017 compared to $606.9 million for the year ended December 31, 2016, an increase of $344.4 million. Net income for the year ended December 31, 2017 was $881.2 million, an increase of $1,072.2 million compared to net loss of $190.9 million for the year ended December 31, 2016. Non-cash adjustments to net income consisting of depreciation and amortization, goodwill and long-lived asset impairment charges, lower of cost or market inventory valuation adjustment, earnings of equity method investments, inclusive of distributions, loss on extinguishment of debt, remeasurement gain on pipeline interest acquisitions, gain or loss on sale of assets, deferred income taxes, equity-based compensation expense, fair value changes to derivative instruments and excess tax expense from equity-based compensation totaled $189.2 million for the year ended December 31, 2017 compared to $842.6 million for the same period in 2016. Changes in working capital items decreased cash flows by $6.1 million for the year ended December 31, 2017 and increased cash flows by $74.7 million for the year ended December 31, 2016. For the year ended December 31, 2017, turnaround expenditures increased to $135.1 million from $125.3 million for the same period of 2016.

Cash Flows – Investing Activities and Planned Capital Expenditures

Year Ended December 31, 2018 Compared to Year Ended December 31, 2017
Net cash flows used for investing activities were $360.5 million for the year ended December 31, 2018 compared to $959.7 million for the year ended December 31, 2017, a decrease of $599.2 million. Current year investing activities reflect a net cash outflow of $54.2 million upon the acquisition of Red Giant Oil. Prior year investing activities reflect a net cash outflow of $870.6 million upon the acquisition of PCLI. Cash expenditures for properties, plants and equipment for 2018 increased to $311.0 million from $272.3 million for the same period in 2017. These include HEP capital expenditures of $54.1 million and $44.8 million for the years ended December 31, 2018 and 2017, respectively. In addition, in 2017, HEP purchased the remaining interests in SLC Pipeline and Frontier Pipeline for $245.4 million. We received proceeds of $3.1 million and $1.4 million from the sale of assets during the years ended December 31, 2018 and 2017, respectively. For the year ended December 31, 2017, we invested $41.6 million, in marketable securities and received proceeds of $465.7 million, from the sale or maturity of marketable securities.

Year Ended December 31, 2017 Compared to Year Ended December 31, 2016
Net cash flows used for investing activities were $959.7 million for the year ended December 31, 2017 compared to $801.6 million for the year ended December 31, 2016, an increase of $158.1 million. Investing activities in 2017 reflect a net cash outflow of $870.6 million upon the acquisition of PCLI. Cash expenditures for properties, plants and equipment for 2017 decreased to $272.3 million from $479.8 million for the same period in 2016. These include HEP

capital expenditures of $44.8 million and $107.6 million for the years ended December 31, 2017 and 2016, respectively. In addition, in 2017, HEP purchased the remaining interests in SLC Pipeline and Frontier Pipeline for $245.4 million. In 2016, HEP purchased a 50% interest in Cheyenne Pipeline for $42.6 million. We received proceeds of $1.4 million and $0.8 million from the sale of assets during the years ended December 31, 2017 and 2016, respectively. For the years ended December 31, 2017 and 2016, we invested $41.6 million and $546.6 million, respectively, in marketable securities and received proceeds of $465.7 million and $266.6 million, respectively, from the sale or maturity of marketable securities.

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Planned Capital Expenditures

HollyFrontier Corporation

Each year our Board of Directors approves our annual capital budget which includes specific projects that management is authorized to undertake. Additionally, when conditions warrant or as new opportunities arise, additional projects may be approved. The funds appropriated for a particular capital project may be expended over a period of several years, depending on the time required to complete the project. Therefore, our planned capital expenditures for a given year consist of expenditures appropriated in that year's capital budget plus expenditures for projects appropriated in prior years which have not yet been completed. During 2019, we expect to spend approximately $510.0 million to $560.0 million in cash for capital projects and refinery turnarounds appropriated in 2019 and prior years. Refinery turnaround spending is amortized over the useful life of the turnaround. Our expected capital and turnaround cash spending for 2019 is as follows:

	Expected Cash Spending Range (In millions)	
Type:		
Capital	$275.0	$300.0
Turnarounds	235.0	260.0
Total	$510.0	$560.0

The refining industry is capital intensive and requires on-going investments to sustain our refining operations. This includes replacement of, or rebuilding, refinery units and components that extend the useful life. We also invest in projects that improve operational reliability and profitability via enhancements that improve refinery processing capabilities as well as production yield and flexibility. Our capital expenditures also include projects related to environmental, health and safety compliance and include initiatives as a result of federal and state mandates.

Our refinery operations and related emissions are highly regulated at both federal and state levels, and we invest in our facilities as needed to remain in compliance with these standards. Additionally, when faced with new emissions or fuels standards, we seek to execute projects that facilitate compliance and also improve the operating costs and / or yields of associated refining processes.

HEP

Each year the Holly Logistic Services, L.L.C. board of directors approves HEP's annual capital budget, which specifies capital projects that HEP management is authorized to undertake. Additionally, at times when conditions warrant or as new opportunities arise, special projects may be approved. The funds allocated for a particular capital project may be expended over a period in excess of a year, depending on the time required to complete the project. Therefore, HEP's planned capital expenditures for a given year consist of expenditures approved for capital projects included in its current year capital budget as well as, in certain cases, expenditures approved for capital projects in capital budgets for prior years. The 2019 HEP capital budget is comprised of $10.0 million for maintenance capital expenditures and $20.0 million to $25.0 million for expansion capital expenditures. HEP expects the majority of the expansion capital budget to be invested in refined product pipeline expansions, crude system enhancements, new storage tanks, and enhanced blending capabilities at our racks. In addition, HEP may spend funds periodically to perform capital upgrades or additions to its assets where a customer reimburses HEP for such costs. The upgrades or additions would generally benefit the customer over the remaining life of the related service agreements.

Cash Flows – Financing Activities

Year Ended December 31, 2018 Compared to Year Ended December 31, 2017

Net cash flows used for financing activities were $664.3 million for the year ended December 31, 2018 compared to $72.6 million for the year ended December 31, 2017, an increase of $591.7 million. During the year ended December 31, 2018, we received $32.5 million in proceeds from our financing arrangement related to precious metals, purchased $363.4 million of treasury stock and paid $233.5 million in dividends. Also during this period, HEP received $337.0 million and repaid $426.0 million under the HEP Credit Agreement, received $114.8 million in net proceeds from the issuance of its common units and paid distributions of $125.7 million to noncontrolling interests. During the year ended December 31, 2017, we received $26.0 million and repaid $26.0 million under the HollyFrontier Credit Agreement, paid $235.5 million in dividends and purchased $15.9 million of treasury stock. Also during 2017, HEP received $969.0 million and repaid $510.0 million under the HEP Credit Agreement, paid $309.8 million upon the redemption of HEP's 6.5% senior notes, received $101.8 million in net proceeds from issuance of HEP's 6.0% senior notes, received $52.1 million in net proceeds from the issuance of its common units and paid distributions of $110.4 million to noncontrolling interests.

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Year Ended December 31, 2017 Compared to Year Ended December 31, 2016

Net cash flows used for financing activities were $72.6 million for the year ended December 31, 2017 compared to cash flows provided by financing activities of $838.7 million for the year ended December 31, 2016, an increase of $911.3 million. During the year ended December 31, 2017, we received $26.0 million and repaid $26.0 million under the HollyFrontier Credit Agreement, paid $235.5 million in dividends and purchased $15.9 million of treasury stock. Also during this period, HEP received $969.0 million and repaid $510.0 million under the HEP Credit Agreement, received $101.8 million in net proceeds from issuance of HEP's 6.0% senior notes, paid $309.8 million upon the redemption of HEP's 6.5% senior notes, received $52.1 million in net proceeds from the issuance of its common units and paid distributions of $110.4 million to noncontrolling interests. During the year ended December 31, 2016, we received $992.6 million in net proceeds upon issuance of our 5.875% senior notes, received $350.0 million and repaid $350.0 million under a term loan, received $315.0 million and repaid $315.0 million under the HollyFrontier Credit Agreement, purchased $138.1 million of treasury stock and paid $234.0 million in dividends. In addition, we extinguished our financing arrangement with Plains for $39.5 million. Also during this period, HEP received $554.0 million and repaid $713.0 million under the HEP Credit Agreement, received $394.0 million in net proceeds from issuance of HEP's 6.0% senior notes, received $125.9 million in net proceeds from the issuance of its common units and paid distributions of $92.6 million to noncontrolling interests.

Contractual Obligations and Commitments

The following table presents our long-term contractual obligations as of December 31, 2018 in total and by period due beginning in 2019. The table below does not include our contractual obligations to HEP under our long-term transportation agreements as these related-party transactions are eliminated in the Consolidated Financial Statements. A description of these agreements is provided under “Holly Energy Partners, L.P.” under Items 1 and 2, “Business and Properties.” Also, the table below does not reflect renewal options on our operating leases that are likely to be exercised.

		Payments Due by Period			
Contractual Obligations and Commitments	Total	2019	2020 & 2021	2022 & 2023	Thereafter
	(In thousands)				
HollyFrontier Corporation					
Long-term debt - principal	$1,000,000	$—	$—	$—	$1,000,000
Long-term debt - interest (1)	425,950	58,750	117,500	117,500	132,200
Financing arrangements	32,850	32,850	—	—	—
Supply agreements (2)	2,398,966	660,349	781,052	492,194	465,371
Transportation and storage agreements (3)	1,411,287	144,756	262,215	219,499	784,817
Other long-term obligations	29,358	15,655	8,800	2,259	2,644
Operating leases	441,191	97,110	162,729	117,764	63,588
	5,739,602	1,009,470	1,332,296	949,216	2,448,620
Holly Energy Partners					
Long-term debt - principal (4)	1,423,000	—	—	923,000	500,000
Long-term debt - interest (5)	313,303	70,784	141,568	83,451	17,500
Pipeline operating leases	55,814	6,566	13,133	13,133	22,982
Operating leases	4,572	686	1,210	1,040	1,636
Other agreements	10,136	3,599	5,006	1,531	—
	1,806,825	81,635	160,917	1,022,155	542,118
Total	$7,546,427	$1,091,105	$1,493,213	$1,971,371	$2,990,738

(1) Interest payments consist of interest on our 5.875% senior notes.

(2) We have long-term supply agreements to secure certain quantities of crude oil, feedstock and other resources used in the production process at market prices. We have estimated future payments under these fixed-quantity agreements expiring between 2019 and 2025 using current market rates. Additionally, commitments include purchases of 20,000 BPD of crude oil under a 10-year agreement to supply our Woods Cross Refinery.

(3) Consists of contractual obligations under agreements with third parties for the transportation of crude oil, natural gas and feedstocks to our refineries and for terminal and storage services under contracts expiring between 2019 and 2039.

(4) HEP's long-term debt consists of the $500.0 million principal balance on the 6% HEP senior notes and $923.0 million of outstanding borrowings under the HEP Credit Agreement. The HEP Credit Agreement expires in 2022.

(5) Interest payments consist of interest on the 6% HEP senior notes and interest on long-term debt under the HEP Credit Agreement. Interest on the HEP Credit Agreement debt is based on the weighted average rate of 4.24% at December 31, 2018.

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CRITICAL ACCOUNTING POLICIES

Our discussion and analysis of our financial condition and results of operations are based upon our consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States. The preparation of these financial statements requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses, and related disclosure of contingent assets and liabilities as of the date of the financial statements. Actual results may differ from these estimates under different assumptions or conditions. We consider the following policies to be the most critical to understanding the judgments that are involved and the uncertainties that could impact our results of operations, financial condition and cash flows. For additional information, see Note 1 “Description of Business and Summary of Significant Accounting Policies” in the Notes to Consolidated Financial Statements.

Inventory Valuation

Inventories related to our refining operations are stated at the lower of cost, using the LIFO method for crude oil and unfinished and finished refined products, or market. In periods of rapidly declining prices, LIFO inventories may have to be written down to market value due to the higher costs assigned to LIFO layers in prior periods. In addition, the use of the LIFO inventory method may result in increases or decreases to cost of sales in years that inventory volumes decline as the result of charging cost of sales with LIFO inventory costs generated in prior periods. At December 31, 2018 and 2017, market values had fallen below historical LIFO inventory costs and, as a result, we recorded lower of cost or market inventory valuation reserves of $360.1 million and $223.8 million, respectively.

Inventories of our Petro-Canada Lubricants business are stated at the lower of cost, using the first-in, first-out method, or net realizable value.

At December 31, 2018, our lower of cost or market inventory valuation reserve was $360.1 million. This amount, or a portion thereof, is subject to reversal as a reduction to cost of products sold in subsequent periods as inventories giving rise to the reserve are sold, and a new reserve is established. Such a reduction to cost of products sold could be significant if inventory values return to historical cost price levels. Additionally, further decreases in overall inventory values could result in additional charges to cost of products sold should the lower of cost or market inventory valuation reserve be increased.

Goodwill and Long-lived Assets

As of December 31, 2018, our goodwill balance was $2.2 billion, with goodwill assigned to our Refining, Lubricants and Specialty Products and HEP segments of $1.7 billion, $0.2 billion and $0.3 billion, respectively. Goodwill represents the excess of the cost of an acquired entity over the fair value of the assets acquired and liabilities assumed. Goodwill is not subject to amortization and is tested annually or more frequently if an event occurs or circumstances change that would more likely than not reduce the fair value of a reporting unit below its carrying amount. Our goodwill impairment testing first entails a comparison of our reporting units fair values relative to their respective carrying values. If carrying value exceeds fair value for a reporting unit, we measure goodwill impairment as the excess of the carrying amount of reporting unit goodwill over the implied fair value of that goodwill based on estimates of the fair value of all assets and liabilities in the reporting unit.

Our long-lived assets principally consist of our refining assets that are organized as refining asset groups and the assets of our Lubricants and Specialty Products business. The refinery asset groups also constitute our individual refinery reporting units that are used for testing and measuring goodwill impairments. Our long-lived assets are evaluated for impairment by identifying whether indicators of impairment exist and if so, assessing whether the long-lived assets are recoverable from estimated future undiscounted cash flows. The actual amount of impairment loss measured, if any, is equal to the amount by which the asset group’s carrying value exceeds its fair value.

We performed our annual goodwill impairment testing as of July 1, 2018 and determined there was no impairment of goodwill attributable to our reporting units.

Contingencies

We are subject to proceedings, lawsuits and other claims related to environmental, labor, product and other matters. We are required to assess the likelihood of any adverse judgments or outcomes to these matters as well as potential ranges of probable losses. A determination of the amount of reserves required, if any, for these contingencies is made after careful analysis of each individual issue. The required reserves may change in the future due to new developments in each matter or changes in approach such as a change in settlement strategy in dealing with these matters.

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RISK MANAGEMENT

We use certain strategies to reduce some commodity price and operational risks. We do not attempt to eliminate all market risk exposures when we believe that the exposure relating to such risk would not be significant to our future earnings, financial position, capital resources or liquidity or that the cost of eliminating the exposure would outweigh the benefit.

Commodity Price Risk Management
Our primary market risk is commodity price risk. We are exposed to market risks related to the volatility in crude oil and refined products, as well as volatility in the price of natural gas used in our refining operations. We periodically enter into derivative contracts in the form of commodity price swaps, forward purchase and sales and futures contracts to mitigate price exposure with respect to our inventory positions, natural gas purchases, sales prices of refined products and crude oil costs.

Foreign Currency Risk Management
We are exposed to market risk related to the volatility in foreign currency exchange rates. We periodically enter into derivative contracts in the form of foreign exchange forward and foreign exchange swap contracts to mitigate the exposure associated with fluctuations on intercompany notes with our foreign subsidiaries that are not denominated in the U.S. dollar.

As of December 31, 2018, we have the following notional contract volumes related to all outstanding derivative contracts used to mitigate commodity price and foreign currency risk:

		Notional Contract Volumes by Year of Maturity			
Contract Description	Total Outstanding Notional	2019	2020	2021	Unit of Measure
Natural gas price swaps - long	5,400,000	1,800,000	1,800,000	1,800,000	MMBTU
Crude oil price swaps (basis spread) - long	9,503,000	4,745,000	4,758,000	—	Barrels
NYMEX futures (WTI) - short	650,000	650,000	—	—	Barrels
Forward gasoline and diesel contracts - long	325,000	325,000	—	—	Barrels
Foreign currency forward contracts	440,460,402	440,460,402	—	—	U.S. dollar
Forward commodity contracts (platinum) (1)	41,147	41,147	—	—	Troy ounces

(1) Represents an embedded derivative within our catalyst financing arrangements, which may be refinanced or require repayment under certain conditions. See Note 12 “Debt” in the Notes to Consolidated Financial Statements for additional information on these financing arrangements.

The following sensitivity analysis provides the hypothetical effects of market price fluctuations to the commodity positions hedged under our derivative contracts:

	Estimated Change in Fair Value at December 31,	
Commodity-based Derivative Contracts	2018	2017
	(In thousands)	
Hypothetical 10% change in underlying commodity prices	$1,485	$5,451

Interest Rate Risk Management

The market risk inherent in our fixed-rate debt is the potential change arising from increases or decreases in interest rates as discussed below.

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For the fixed rate HollyFrontier Senior Notes and HEP Senior Notes, changes in interest rates will generally affect fair value of the debt, but not earnings or cash flows. The outstanding principal, estimated fair value and estimated change in fair value (assuming a hypothetical 10% change in the yield-to-maturity rates) for this debt as of December 31, 2018 is presented below:

	Outstanding Principal	Estimated Fair Value	Estimated Change in Fair Value
	(In thousands)		
HollyFrontier Senior Notes	$1,000,000	$1,019,160	$ 33,135
HEP Senior Notes	$500,000	$488,310	$ 14,809

For the variable rate HEP Credit Agreement, changes in interest rates would affect cash flows, but not the fair value. At December 31, 2018, outstanding borrowings under the HEP Credit Agreement were $923.0 million. A hypothetical 10% change in interest rates applicable to the HEP Credit Agreement would not materially affect cash flows.

Our operations are subject to hazards of petroleum processing operations, including fire, explosion and weather-related perils. We maintain various insurance coverages, including business interruption insurance, subject to certain deductibles. We are not fully insured against certain risks because such risks are not fully insurable, coverage is unavailable, or premium costs, in our judgment, do not justify such expenditures.

Financial information is reviewed on the counterparties in order to review and monitor their financial stability and assess their ongoing ability to honor their commitments under the derivative contracts. We have not experienced, nor do we expect to experience, any difficulty in the counterparties honoring their commitments.

We have a risk management oversight committee consisting of members from our senior management. This committee oversees our risk enterprise program, monitors our risk environment and provides direction for activities to mitigate identified risks that may adversely affect the achievement of our goals.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

See “Risk Management” under “Management’s Discussion and Analysis of Financial Condition and Results of Operations.”

Reconciliations to Amounts Reported Under Generally Accepted Accounting Principles

Reconciliations of earnings before interest, taxes, depreciation and amortization (“EBITDA”) to amounts reported under generally accepted accounting principles in financial statements.

Earnings before interest, taxes, depreciation and amortization, which we refer to as EBITDA, is calculated as net income (loss) attributable to HollyFrontier stockholders plus (i) interest expense, net of interest income, (ii) income tax provision, and (iii) depreciation and amortization. EBITDA is not a calculation provided for under GAAP; however, the amounts included in the EBITDA calculation are derived from amounts included in our consolidated financial statements. EBITDA should not be considered as an alternative to net income or operating income as an indication of our operating performance or as an alternative to operating cash flow as a measure of liquidity. EBITDA is not necessarily comparable to similarly titled measures of other companies. EBITDA is presented here because it is a widely used financial indicator used by investors and analysts to measure performance. EBITDA is also used by our management for internal analysis and as a basis for financial covenants.

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Set forth below is our calculation of EBITDA.

	Years Ended December 31,		
	2018	2017	2016
	(In thousands)		
Net income (loss) attributable to HollyFrontier stockholders	$1,097,960	$805,395	$(260,453)
Add (subtract) income tax provision	347,243	(12,379)	19,411
Add interest expense	131,363	117,597	72,192
Subtract interest income	(16,892)	(3,736)	(2,491)
Add depreciation and amortization	437,324	409,937	363,027
EBITDA	$1,996,998	$1,316,814	$191,686

Reconciliations of refinery operating information (non-GAAP performance measures) to amounts reported under generally accepted accounting principles in financial statements.

Refinery gross margin and net operating margin are non-GAAP performance measures that are used by our management and others to compare our refining performance to that of other companies in our industry. We believe these margin measures are helpful to investors in evaluating our refining performance on a relative and absolute basis. Refinery gross margin per produced barrel sold is total refining segment revenues less total refining segment cost of products sold, exclusive of lower of cost or market inventory valuation adjustments, divided by sales volumes of produced refined products sold. Net operating margin per barrel sold is the difference between refinery gross margin and refinery operating expenses per produced barrel sold. These two margins do not include the non-cash effects of lower of cost or market inventory valuation adjustments, goodwill and asset impairment charges or depreciation and amortization. Each of these component performance measures can be reconciled directly to our consolidated statements of income. Other companies in our industry may not calculate these performance measures in the same manner.

Below are reconciliations to our consolidated statements of income for refinery net operating and gross margin and operating expenses, in each case averaged per produced barrel sold. Due to rounding of reported numbers, some amounts may not calculate exactly.

Reconciliation of average refining segment net operating margin per produced barrel sold to refinery gross margin to total sales and other revenues

	Years Ended December 31,		
	2018	2017	2016
	(Dollars in thousands, except per barrel amounts)		
Consolidated			
Net operating margin per produced barrel sold	$11.32	$5.45	$2.51
Add average refinery operating expenses per produced barrel sold	6.39	6.11	5.65
Refinery gross margin per produced barrel sold	17.71	11.56	8.16
Times produced barrels sold (BPD)	452,630	452,270	440,640
Times number of days in period	365	365	366
Refining segment gross margin	2,925,868	1,908,308	1,315,998
Add (subtract) rounding	(154)	335	1,112
Total refining segment gross margin	2,925,714	1,908,643	1,317,110
Add refining segment cost of products sold	13,250,849	11,009,419	9,003,605
Refining segment sales and other revenues	16,176,563	12,918,062	10,320,715
Add lubricants and specialty products segment sales and other revenues	1,812,703	1,594,036	464,359
Add HEP segment sales and other revenues	506,220	454,362	402,043

Subtract corporate, other and eliminations	(780,820)	(715,161)	(651,417)
Sales and other revenues	$17,714,666	$14,251,299	$10,535,700

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Reconciliation of average refining segment operating expenses per produced barrel sold to total operating expenses

	Years Ended December 31,		
	2018	2017	2016
	(Dollars in thousands, except per barrel amounts)		
Consolidated			
Average refining operating expenses per produced barrel sold	$6.39	$6.11	$5.65
Times produced barrels sold (BPD)	452,630	452,270	440,640
Times number of days in period	365	365	366
Refinery operating expenses	1,055,692	1,008,630	911,199
Add (subtract) rounding	(483)	229	630
Total refining segment operating expenses	1,055,209	1,008,859	911,829
Add lubricants and specialty products segment operating expenses	167,820	222,461	13,867
Add HEP segment operating expenses	146,430	137,856	124,192
Subtract corporate, other and eliminations	(83,621)	(72,507)	(28,736)
Operating expenses (exclusive of depreciation and amortization)	$1,285,838	$1,296,669	$1,021,152

Item 8. Financial Statements and Supplementary Data

MANAGEMENT'S REPORT ON ITS ASSESSMENT OF THE COMPANY'S INTERNAL CONTROL OVER FINANCIAL REPORTING

Management of HollyFrontier Corporation (the “Company”) is responsible for establishing and maintaining adequate internal control over financial reporting.

All internal control systems, no matter how well designed, have inherent limitations. Therefore, even those systems determined to be effective can provide only reasonable assurance with respect to financial statement preparation and presentation.

Management assessed the Company's internal control over financial reporting as of December 31, 2018 using the criteria for effective control over financial reporting established in “Internal Control - Integrated Framework” issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework). Based on this assessment, management concludes that, as of December 31, 2018, the Company maintained effective internal control over financial reporting.

The Company's independent registered public accounting firm has issued an attestation report on the effectiveness of the Company's internal control over financial reporting as of December 31, 2018. That report appears on page 54.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and the Board of Directors of HollyFrontier Corporation

Opinion on Internal Control over Financial Reporting

We have audited HollyFrontier Corporation's internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (the COSO criteria). In our opinion, HollyFrontier Corporation (the Company) maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of December 31, 2018 and 2017, the related consolidated statements of income, comprehensive income, cash flows, and equity for each of the three years in the period ended December 31, 2018, and the related notes of the Company and our report dated February 20, 2019 expressed an unqualified opinion thereon.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Management's Report on its Assessment of the Company's Internal Control Over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects.

Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ Ernst & Young LLP

Dallas, Texas
February 20, 2019

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and the Board of Directors of HollyFrontier Corporation

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of HollyFrontier Corporation (the Company) as of December 31, 2018 and 2017, the related consolidated statements of income, comprehensive income, cash flows, and equity for each of the three years in the period ended December 31, 2018, and the related notes (collectively referred to as the “financial statements”). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2018, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework), and our report dated February 20, 2019 expressed an unqualified opinion thereon.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company’s financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Ernst & Young LLP

We have served as the Company’s auditor since 1977.

Dallas, Texas
February 20, 2019

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HOLLYFRONTIER CORPORATION
CONSOLIDATED BALANCE SHEETS
(In thousands, except share data)

	December 31, 2018	2017
ASSETS		
Current assets:		
Cash and cash equivalents (HEP: $3,045 and $7,776, respectively)	$1,154,752	$630,757
Accounts receivable: Product and transportation (HEP: $12,332 and $12,803, respectively)	635,623	659,530
Crude oil resales	36,078	61,203
	671,701	720,733
Inventories: Crude oil and refined products	1,166,404	1,409,538
Materials, supplies and other (HEP: $858 and $916, respectively)	187,975	220,554
	1,354,379	1,630,092
Income taxes receivable	34,040	44,337
Prepayments and other (HEP: $3,452 and $1,395, respectively)	81,507	36,909
Total current assets	3,296,379	3,062,828
Properties, plants and equipment, at cost (HEP: $2,058,388 and $2,011,915, respectively)	6,780,980	6,523,789
Less accumulated depreciation (HEP: $(489,217) and $(408,599), respectively)	(2,098,446)	(1,810,515)
	4,682,534	4,713,274
Other assets: Turnaround costs	339,861	231,319
Goodwill (HEP: $314,229 and $310,610, respectively)	2,246,435	2,244,744
Intangibles and other (HEP: $176,291 and $206,167, respectively)	429,392	439,989
	3,015,688	2,916,052
Total assets	$10,994,601	$10,692,154
LIABILITIES AND EQUITY		
Current liabilities:		
Accounts payable (HEP: $16,723 and $14,637, respectively)	$872,627	$1,220,795
Income taxes payable	17,636	3,159
Accrued liabilities (HEP: $27,240 and $33,214, respectively)	277,892	198,756
Total current liabilities	1,168,155	1,422,710
Long-term debt (HEP: $1,418,900 and $1,507,308, respectively)	2,411,540	2,498,993
Deferred income taxes (HEP: $488 and $525, respectively)	722,576	647,785
Other long-term liabilities (HEP: $63,534 and $62,590, respectively)	233,271	225,726
Equity:		
HollyFrontier stockholders’ equity:		
Preferred stock, $1.00 par value – 5,000,000 shares authorized; none issued	—	—
Common stock $.01 par value – 320,000,000 shares authorized; 256,036,788 and 256,015,550 shares issued as of December 31, 2018 and December 31, 2017	2,560	2,560
Additional capital	4,196,125	4,132,696
Retained earnings	4,196,902	3,346,615
Accumulated other comprehensive income	13,623	29,869
	(2,490,639)	(2,140,911)

Common stock held in treasury, at cost – 83,915,297 and 78,607,928 shares as of December 31, 2018 and December 31, 2017, respectively		
Total HollyFrontier stockholders' equity	5,918,571	5,370,829
Noncontrolling interest	540,488	526,111
Total equity	6,459,059	5,896,940
Total liabilities and equity	$10,994,601	$10,692,154

Parenthetical amounts represent asset and liability balances attributable to Holly Energy Partners, L.P. ("HEP") as of December 31, 2018 and 2017. HEP is a variable interest entity.

See accompanying notes.

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HOLLYFRONTIER CORPORATION
CONSOLIDATED STATEMENTS OF INCOME
(In thousands, except per share data)

	Years Ended December 31, 2018	2017	2016
Sales and other revenues	$17,714,666	$14,251,299	$10,535,700
Operating costs and expenses:			
Cost of products sold (exclusive of depreciation and amortization):			
Cost of products sold (exclusive of lower of cost or market inventory valuation adjustment)	13,940,782	11,467,873	8,766,027
Lower of cost or market inventory valuation adjustment	136,305	(108,685)	(291,938)
	14,077,087	11,359,188	8,474,089
Operating expenses (exclusive of depreciation and amortization)	1,285,838	1,296,669	1,021,152
Selling, general and administrative expenses (exclusive of depreciation and amortization)	290,424	265,721	125,930
Depreciation and amortization	437,324	409,937	363,027
Goodwill and long-lived asset impairment	—	19,247	654,084
Total operating costs and expenses	16,090,673	13,350,762	10,638,282
Income (loss) from operations	1,623,993	900,537	(102,582)
Other income (expense):			
Earnings of equity method investments	5,825	12,510	14,213
Interest income	16,892	3,736	2,491
Interest expense	(131,363)	(117,597)	(72,192)
Loss on early extinguishment of debt	—	(12,225)	(8,718)
Gain on foreign currency transactions	6,197	16,921	—
Gain (loss) on foreign currency swap contracts	—	24,545	(6,520)
Remeasurement gain on HEP pipeline interest acquisitions	—	36,254	—
Other, net	2,923	4,182	1,774
	(99,526)	(31,674)	(68,952)
Income (loss) before income taxes	1,524,467	868,863	(171,534)
Income tax expense (benefit):			
Current	270,274	125,143	(79,181)
Deferred	76,969	(137,522)	98,592
	347,243	(12,379)	19,411
Net income (loss)	1,177,224	881,242	(190,945)
Less net income attributable to noncontrolling interest	79,264	75,847	69,508
Net income (loss) attributable to HollyFrontier stockholders	$1,097,960	$805,395	$(260,453)
Earnings (loss) per share attributable to HollyFrontier stockholders:			
Basic	$6.25	$4.54	$(1.48)
Diluted	$6.19	$4.52	$(1.48)
Average number of common shares outstanding:			
Basic	175,009	176,174	176,101
Diluted	176,661	177,196	176,101

See accompanying notes.

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HOLLYFRONTIER CORPORATION
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(In thousands)

	Years Ended December 31, 2018	2017	2016
Net income (loss)	$1,177,224	$881,242	$(190,945)
Other comprehensive income (loss):			
Foreign currency translation adjustment	(38,227)	22,151	—
Securities available-for-sale:			
Unrealized gain (loss) on marketable securities	—	(4)	81
Reclassification adjustments to net income on sale or maturity of marketable securities	—	—	23
Net unrealized gain (loss) on marketable securities	—	(4)	104
Hedging instruments:			
Change in fair value of cash flow hedging instruments	5,166	2,919	(17,625)
Reclassification adjustments to net income on settlement of cash flow hedging instruments	6,055	10,448	41,585
Amortization of unrealized loss attributable to discontinued cash flow hedges	—	1,080	1,080
Net unrealized gain on hedging instruments	11,221	14,447	25,040
Other post-retirement benefit obligations:			
Actuarial loss on pension plans	(923)	(1,162)	—
Actuarial gain (loss) on post-retirement healthcare plans	2,612	(1,058)	2,363
Post-retirement healthcare plans gain reclassified to net income	(3,481)	(3,481)	(3,482)
Actuarial gain (loss) on retirement restoration plan	258	(123)	(9)
Retirement restoration plan loss reclassified to net income	27	17	15
Net change in other post-retirement benefit obligations	(1,507)	(5,807)	(1,113)
Other comprehensive income (loss) before income taxes	(28,513)	30,787	24,031
Income tax expense (benefit)	(5,585)	11,349	9,322
Other comprehensive income (loss)	(22,928)	19,438	14,709
Total comprehensive income (loss)	1,154,296	900,680	(176,236)
Less noncontrolling interest in comprehensive income	79,264	75,790	69,450
Comprehensive income (loss) attributable to HollyFrontier stockholders	$1,075,032	$824,890	$(245,686)

See accompanying notes.

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HOLLYFRONTIER CORPORATION
CONSOLIDATED STATEMENTS OF CASH FLOWS
(In thousands)

	Years Ended December 31,		
	2018	2017	2016
Cash flows from operating activities:			
Net income (loss)	$1,177,224	$881,242	$(190,945)
Adjustments to reconcile net income (loss) to net cash provided by operating activities:			
Depreciation and amortization	437,324	409,937	363,027
Goodwill and long-lived asset impairment	—	19,247	654,084
Lower of cost or market inventory valuation adjustment	136,305	(108,685)	(291,938)
Earnings of equity method investments, inclusive of distributions	(149)	1,450	961
Loss on early extinguishment of debt attributable to unamortized discount / premium	—	2,475	8,718
Remeasurement gain on HEP pipeline interest acquisitions	—	(36,254)	—
Loss (gain) on sale of assets	2,171	508	(72)
Deferred income taxes	76,969	(137,522)	98,592
Equity-based compensation expense	42,172	42,337	25,561
Change in fair value – derivative instruments	(31,515)	(4,265)	(12,155)
Excess tax expense from equity-based compensation	—	—	(4,209)
(Increase) decrease in current assets:			
Accounts receivable	35,793	(115,322)	(127,221)
Inventories	136,551	(162,297)	(1,869)
Income taxes receivable	7,752	50,601	(68,371)
Prepayments and other	(10,340)	(6,753)	16,555
Increase (decrease) in current liabilities:			
Accounts payable	(326,030)	188,975	247,603
Income taxes payable	15,281	(18,525)	(8,142)
Accrued liabilities	53,281	57,227	16,142
Turnaround expenditures	(217,228)	(135,104)	(125,254)
Other, net	18,855	22,118	5,881
Net cash provided by operating activities	1,554,416	951,390	606,948
Cash flows from investing activities:			
Additions to properties, plants and equipment	(256,888)	(227,449)	(372,195)
Additions to properties, plants and equipment – HEP	(54,141)	(44,810)	(107,595)
Purchase of Red Giant Oil, net of cash acquired	(54,179)	—	—
Purchase of PCLI, net of cash acquired	—	(870,627)	—
Purchase of pipeline interests, net of cash acquired - HEP	—	(245,446)	(42,627)
Proceeds from sale of assets	3,100	1,377	849
Purchases of marketable securities	—	(41,565)	(546,632)
Sales and maturities of marketable securities	—	465,716	266,603
Other, net	1,588	3,134	—
Net cash used for investing activities	(360,520)	(959,670)	(801,597)
Cash flows from financing activities:			
Borrowings under credit agreements	337,000	995,000	869,000
Repayments under credit agreements	(426,000)	(536,000)	(1,028,000)
Proceeds from issuance of senior notes – HFC	—	—	992,550
Proceeds from issuance of senior notes – HEP	—	101,750	394,000
Proceeds from issuance of term loan - HFC	—	—	350,000

Repayment of term loan - HFC	—	—	(350,000)
Redemption of senior notes - HEP	—	(309,750)	—
Proceeds (repayments) of financing arrangements	32,547	—	(39,500)
Proceeds from issuance of common units - HEP	114,759	52,110	125,870
Purchase of treasury stock	(363,437)	(15,926)	(138,107)
Dividends	(233,544)	(235,508)	(234,004)
Distributions to noncontrolling interest	(125,653)	(110,351)	(92,607)
Other, net	—	(13,955)	(10,507)
Net cash provided by (used for) financing activities	(664,328)	(72,630)	838,695
Effect of exchange rate on cash flow	(5,573)	1,088	—
Cash and cash equivalents:			
Increase (decrease) for the period	523,995	(79,822)	644,046
Beginning of period	630,757	710,579	66,533
End of period	$1,154,752	$630,757	$710,579
Supplemental disclosure of cash flow information:			
Cash paid during the period for:			
Interest	$(130,106)	$(124,375)	$(54,074)
Income taxes, net	$(252,644)	$(93,272)	$(40,236)

See accompanying notes.

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HOLLYFRONTIER CORPORATION
CONSOLIDATED STATEMENTS OF EQUITY
(In thousands)

	HollyFrontier Stockholders' Equity						
	Common Stock	Additional Capital	Retained Earnings	Accumulated Other Comprehensive Income (Loss)	Treasury Stock	Non-controlling Interest	Total Equity
Balance at December 31, 2015	$2,560	$4,011,052	$3,271,189	$ (4,155)	$(2,027,231)	$ 556,358	$5,809,773
Net income (loss)	—	—	(260,453)	—	—	69,508	(190,945)
Dividends	—	—	(234,008)	—	—	—	(234,008)
Distributions to noncontrolling interest holders	—	—	—	—	—	(92,607)	(92,607)
Other comprehensive income (loss), net of tax	—	—	—	14,767	—	(58)	14,709
Equity attributable to HEP common unit issuances, net of tax	—	23,110	—	—	—	88,166	111,276
Issuance of common stock under incentive compensation plans, net of forfeitures	—	(25,982)	—	—	25,982	—	—
Equity-based compensation, inclusive of tax expense	—	18,625	—	—	—	2,727	21,352
Purchase of treasury stock	—	—	—	—	(134,062)	—	(134,062)
Purchase of HEP units for restricted grants	—	—	—	—	—	(3,521)	(3,521)
Other	—	—	—	—	—	18	18
Balance at December 31, 2016	$2,560	$4,026,805	$2,776,728	$ 10,612	$(2,135,311)	$ 620,591	$5,301,985
Net income	—	—	805,395	—	—	75,847	881,242
Dividends	—	—	(235,508)	—	—	—	(235,508)
Distributions to noncontrolling interest holders	—	—	—	—	—	(110,351)	(110,351)
Other comprehensive income (loss), net of tax	—	—	—	19,495	—	(57)	19,438
Equity attributable to HEP common unit issuances, net of tax	—	69,802	—	(238)	—	(61,390)	8,174
Equity awards issued in PCLI acquisition	—	6,600	—	—	—	—	6,600
Issuance of common stock under incentive	—	(10,326)	—	—	10,326	—	—

compensation plans, net of forfeitures							
Equity-based compensation	—	39,815	—	—	—	2,522	42,337
Purchase of treasury stock	—	—	—	—	(15,926)	—	(15,926)
Purchase of HEP units for restricted grants	—	—	—	—	—	(605)	(605)
Other	—	—	—	—	—	(446)	(446)
Balance at December 31, 2017	$2,560	$4,132,696	$3,346,615	$ 29,869	$(2,140,911)	$ 526,111	$5,896,940
Net income	—	—	1,097,960	—	—	79,264	1,177,224
Dividends	—	—	(233,544)	—	—	—	(233,544)
Distributions to noncontrolling interest holders	—	—	—	—	—	(125,653)	(125,653)
Other comprehensive loss, net of tax	—	—	—	(22,928)	—	—	(22,928)
Equity attributable to HEP common unit issuances, net of tax	—	42,199	—	—	—	58,134	100,333
Issuance of common stock under incentive compensation plans, net of forfeitures	—	(17,742)	—	—	17,742	—	—
Equity-based compensation	—	38,972	—	—	—	3,200	42,172
Purchase of treasury stock	—	—	—	—	(367,470)	—	(367,470)
Purchase of HEP units for restricted grants	—	—	—	—	—	(568)	(568)
Adoption of accounting standards	—	—	(14,129)	6,682	—	—	(7,447)
Balance at December 31, 2018	$2,560	$4,196,125	$4,196,902	$ 13,623	$(2,490,639)	$ 540,488	$6,459,059

See accompanying notes.

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HOLLYFRONTIER CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

NOTE 1: Description of Business and Summary of Significant Accounting Policies

Description of Business: References herein to HollyFrontier Corporation ("HollyFrontier") include HollyFrontier and its consolidated subsidiaries. In accordance with the Securities and Exchange Commission's ("SEC") "Plain English" guidelines, this Annual Report on Form 10-K has been written in the first person. In these financial statements, the words "we," "our," "ours" and "us" refer only to HollyFrontier and its consolidated subsidiaries or to HollyFrontier or an individual subsidiary and not to any other person, with certain exceptions. Generally, the words "we," "our," "ours" and "us" include Holly Energy Partners, L.P. ("HEP") and its subsidiaries as consolidated subsidiaries of HollyFrontier, unless when used in disclosures of transactions or obligations between HEP and HollyFrontier or its other subsidiaries. These financial statements contain certain disclosures of agreements that are specific to HEP and its consolidated subsidiaries and do not necessarily represent obligations of HollyFrontier. When used in descriptions of agreements and transactions, "HEP" refers to HEP and its consolidated subsidiaries.

We are principally an independent petroleum refiner that produces high-value light products such as gasoline, diesel fuel, jet fuel, specialty lubricant products, and specialty and modified asphalt. We own and operate petroleum refineries that serve markets throughout the Mid-Continent, Southwest and Rocky Mountain regions of the United States. In addition, we own and operate a lubricant production facility with retail and wholesale marketing of its products through a global sales network with locations in Canada, United States, Europe and China. As of December 31, 2018, we:

- owned and operated a petroleum refinery in El Dorado, Kansas (the "El Dorado Refinery"), two refinery facilities located in Tulsa, Oklahoma (collectively, the "Tulsa Refineries"), a refinery in Artesia, New Mexico that is operated in conjunction with crude oil distillation and vacuum distillation and other facilities situated 65 miles away in Lovington, New Mexico (collectively, the "Navajo Refinery"), a refinery located in Cheyenne, Wyoming (the "Cheyenne Refinery") and a refinery in Woods Cross, Utah (the "Woods Cross Refinery");
- owned and operated Petro-Canada Lubricants Inc. ("PCLI") located in Mississauga, Ontario which produces base oils and other specialized lubricant products;
- owned and operated Red Giant Oil Company LLC ("Red Giant Oil"), which supplies locomotive engine oil with storage and distribution facilities in Iowa, Kansas, Utah and Wyoming, along with a blending and packaging facility in Texas;
- owned and operated HollyFrontier Asphalt Company ("HFC Asphalt") which operates various asphalt terminals in Arizona, New Mexico and Oklahoma; and
- owned a 57% limited partner interest and a non-economic general partner interest in HEP. HEP owns and operates logistic assets consisting of petroleum product and crude oil pipelines, terminals, tankage, loading rack facilities and refinery processing units that principally support our refining and marketing operations in the Mid-Continent, Southwest and Rocky Mountain regions of the United States.

On November 12, 2018, we entered into an equity purchase agreement to acquire 100% of the issued and outstanding capital stock of Sonneborn US Holdings Inc. and 100% of the membership rights in Sonneborn Coöperatief U.A. (collectively, "Sonneborn"). The acquisition closed on February 1, 2019.

On July 10, 2018, we entered into a definitive agreement to acquire Red Giant Oil, a privately-owned lubricants company. The acquisition closed on August 1, 2018.

On October 29, 2016, we entered into a share purchase agreement with Suncor Energy Inc. ("Suncor") to acquire 100% of the outstanding capital stock of PCLI. The acquisition closed on February 1, 2017.

See Note 2 for additional information on these acquisitions.

Principles of Consolidation: Our consolidated financial statements include our accounts and the accounts of partnerships and joint ventures that we control through an ownership interest greater than 50% or through a controlling financial interest with respect to variable interest entities. All significant intercompany transactions and balances have been eliminated.

Variable Interest Entities: HEP is a VIE as defined under U.S. generally accepted accounting principles (“GAAP”). A VIE is a legal entity whose equity owners do not have sufficient equity at risk for the entity to finance its activities without additional subordinated financial support or, as a group, the equity holders lack the power, through voting rights, to direct the activities that most significantly impact the entity's financial performance, the obligation to absorb the entity's expected losses or rights to expected residual returns. As the general partner of HEP, we have the sole ability to direct the activities of HEP that most significantly impact HEP's financial performance, and therefore as HEP's primary beneficiary, we consolidate HEP.

Use of Estimates: The preparation of financial statements in accordance with GAAP requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. Actual results could differ from those estimates.

Cash Equivalents: We consider all highly liquid instruments with a maturity of three months or less at the date of purchase to be cash equivalents. Cash equivalents are stated at cost, which approximates market value and are primarily invested in highly-rated instruments issued by government or municipal entities with strong credit standings.

Balance Sheet Offsetting: We purchase and sell inventories of crude oil with certain same-parties that are net settled in accordance with contractual net settlement provisions. Our policy is to present such balances on a net basis since it presents our accounts receivables and payables consistent with our contractual settlement provisions.

Accounts Receivable: Our accounts receivable consist of amounts due from customers that are primarily companies in the petroleum industry. Credit is extended based on our evaluation of the customer's financial condition, and in certain circumstances collateral, such as letters of credit or guarantees, is required. We reserve for doubtful accounts based on our historical loss experience as well as specific accounts identified as high risk, which historically have been minimal. Credit losses are charged to the allowance for doubtful accounts when an account is deemed uncollectible. Our allowance for doubtful accounts was $3.6 million at both December 31, 2018 and 2017.

Accounts receivable attributable to crude oil resales generally represent the sell of excess crude oil to other purchasers and / or users in cases when our crude oil supplies are in excess of our immediate needs as well as certain reciprocal buy / sell exchanges of crude oil. At times we enter into such buy / sell exchanges to facilitate the delivery of quantities to certain locations. In many cases, we enter into net settlement agreements relating to the buy / sell arrangements, which may mitigate credit risk.

Inventories: Inventories related to our refining operations are stated at the lower of cost, using the last-in, first-out (“LIFO”) method for crude oil and unfinished and finished refined products, or market. Cost, consisting of raw material, transportation and conversion costs, is determined using the LIFO inventory valuation methodology and market is determined using current replacement costs. Under the LIFO method, the most recently incurred costs are charged to cost of sales and inventories are valued at the earliest acquisition costs. In periods of rapidly declining prices, LIFO inventories may have to be written down to market value due to the higher costs assigned to LIFO layers in prior periods. In addition, the use of the LIFO inventory method may result in increases or decreases to cost of sales in years that inventory volumes decline as the result of charging cost of sales with LIFO inventory costs generated in prior periods. An actual valuation of inventory under the LIFO method is made at the end of each year based on the inventory levels at that time. Accordingly, interim LIFO calculations are based on management's estimates of expected year-end inventory levels and are subject to the final year-end LIFO inventory valuation.

Inventories of our Petro-Canada Lubricants business are stated at the lower of cost, using the first-in, first-out method, or net realizable value.

Inventories consisting of process chemicals, materials and maintenance supplies and RINs are stated at the lower of weighted-average cost or net realizable value.

Derivative Instruments: All derivative instruments are recognized as either assets or liabilities in our consolidated balance sheets and are measured at fair value. Changes in the derivative instrument's fair value are recognized in earnings unless specific hedge accounting criteria are met. See Note 13 for additional information.

Properties, Plants and Equipment: Properties, plants and equipment are stated at cost. Depreciation is provided by the straight-line method over the estimated useful lives of the assets, primarily 15 to 32 years for refining, pipeline and terminal facilities, 10 to 40 years for buildings and improvements, 5 to 30 years for other fixed assets and 5 years for vehicles.

HOLLYFRONTIER CORPORATION
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Asset Retirement Obligations: We record legal obligations associated with the retirement of long-lived assets that result from the acquisition, construction, development and / or the normal operation of long-lived assets. The fair value of the estimated cost to retire a tangible long-lived asset is recorded as a liability with the associated retirement costs capitalized as part of the asset's carrying amount in the period in which it is incurred and when a reasonable estimate of the fair value of the liability can be made. If a reasonable estimate cannot be made at the time the liability is incurred, we record the liability when sufficient information is available to estimate the liability's fair value. Certain of our refining assets have no recorded liability for asset retirement obligations since the timing of any retirement and related costs are currently indeterminable.

Our asset retirement obligations were $28.7 million and $24.8 million at December 31, 2018 and 2017, respectively, which are included in “Other long-term liabilities” in our consolidated balance sheets. Accretion expense was insignificant for the years ended December 31, 2018, 2017 and 2016.

Intangibles, Goodwill and Long-lived Assets: Intangible assets are assets (other than financial assets) that lack physical substance, and goodwill represents the excess of the cost of an acquired entity over the fair value of the assets acquired and liabilities assumed. Goodwill acquired in a business combination and intangibles with indefinite useful lives are not amortized, whereas intangible assets with finite useful lives are amortized on a straight-line basis. Goodwill and intangible assets that are not subject to amortization are tested for impairment annually or more frequently if an event occurs or circumstances change that would more likely than not reduce the fair value of a reporting unit below its carrying amount. Goodwill impairment testing first entails a comparison of our reporting unit fair values relative to their respective carrying values. If carrying value exceeds fair value for a reporting unit, we measure goodwill impairment as the excess of the carrying amount of reporting unit goodwill over the implied fair value of that goodwill based on estimates of the fair value of all assets and liabilities in the reporting unit. The carrying amount of our intangible assets and goodwill may fluctuate from period to period due to the effects of foreign currency translation adjustments on goodwill and intangible assets assigned to our Lubricants and Specialty Products segment.

Our long-lived assets principally consist of our refining assets that are organized as refining asset groups and our lubricants and specialty products business. Our long-lived assets are evaluated for impairment by identifying whether indicators of impairment exist and if so, assessing whether the long-lived assets are recoverable from estimated future undiscounted cash flows. The actual amount of impairment loss measured, if any, is equal to the amount by which the asset group’s carrying value exceeds its fair value.

See Note 10 for additional information regarding our goodwill and long-lived assets including impairment charges recorded during the years ended December 31, 2017 and 2016.

Investments in Joint Ventures: We account for investments in which we have a noncontrolling interest, yet have significant influence over the entity, using the equity method of accounting, whereby we record our pro-rata share of earnings, and contributions to and distributions from joint ventures as adjustments to our investment balance. HEP has a 50% interest in Osage Pipe Line Company, LLC, the owner of a pipeline running from Cushing, Oklahoma to El Dorado, Kansas (the “Osage Pipeline”) and a 50% interest in Cheyenne Pipeline, LLC, the owner of a pipeline running from Fort Laramie, Wyoming to Cheyenne, Wyoming (the “Cheyenne Pipeline”), that are accounted for using the equity method of accounting. As of December 31, 2018, HEP's underlying equity and recorded investment balances in the joint ventures are $39.3 million and $83.8 million, respectively. The differences are being amortized as adjustments to HEP's pro-rata share of earnings in the joint ventures.

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Revenue Recognition: Revenue on refined product and excess crude oil sales are recognized when delivered (via pipeline, in-tank or rack) and the customer obtains control of such inventory, which is typically when title passes and the customer is billed. All revenues are reported inclusive of shipping and handling costs billed and exclusive of any taxes billed to customers. Shipping and handling costs incurred are reported as cost of products sold. Additionally, our lubricants and specialty products business has sales agreements with marketers and distributors that provide certain rights of return or provisions for the repurchase of products previously sold to them. Under these agreements, revenues and cost of revenues are deferred until the products have been sold to end customers. HEP recognizes revenues as products are shipped through its pipelines and terminals and as other services are rendered. Additionally, HEP has certain throughput agreements that specify minimum volume requirements, whereby HEP bills a customer for a minimum level of shipments in the event a customer ships below their contractual requirements. If there are no future performance obligations, HEP recognizes these deficiency payments as revenue. In certain of these throughput agreements, a customer may later utilize such shortfall billings as credit towards future volume shipments in excess of its minimum levels within its respective contractual shortfall make-up period. Such amounts represent an obligation to perform future services, which may be initially deferred and later recognized as revenue based on estimated future shipping levels, including the likelihood of a customer’s ability to utilize such amounts prior to the end of the contractual shortfall make-up period. HEP recognizes the service portion of these deficiency payments as revenue when HEP does not expect it will be required to satisfy these performance obligations in the future based on the pattern of rights exercised by the customer. Payment terms under our contracts with customers are consistent with industry norms and are typically payable within 30 days of the date of invoice.

Cost Classifications: Costs of products sold include the cost of crude oil, other feedstocks, blendstocks and purchased finished products, inclusive of transportation costs. We purchase crude oil that at times exceeds the supply needs of our refineries. Quantities in excess of our needs are sold at market prices to purchasers of crude oil that are recorded on a gross basis with the sales price recorded as revenues and the corresponding acquisition cost as cost of products sold. Additionally, we enter into buy / sell exchanges of crude oil with certain parties to facilitate the delivery of quantities to certain locations that are netted at cost. Operating expenses include direct costs of labor, maintenance materials and services, utilities and other direct operating costs. Selling, general and administrative expenses include compensation, professional services and other support costs.

Deferred Maintenance Costs: Our refinery units require regular major maintenance and repairs which are commonly referred to as “turnarounds.” Catalysts used in certain refinery processes also require regular “change-outs.” The required frequency of the maintenance varies by unit and by catalyst, but generally is every two to five years. Turnaround costs are deferred and amortized over the period until the next scheduled turnaround. Other repairs and maintenance costs are expensed when incurred. Deferred turnaround and catalyst amortization expense was $110.9 million, $112.9 million and $110.6 million for the years ended December 31, 2018, 2017 and 2016, respectively.

Environmental Costs: Environmental costs are charged to operating expenses if they relate to an existing condition caused by past operations and do not contribute to current or future revenue generation. We have ongoing investigations of environmental matters at various locations and routinely assess our recorded environmental obligations, if any, with respect to such matters. Liabilities are recorded when site restoration and environmental remediation, cleanup and other obligations are either known or considered probable and can be reasonably estimated. Such estimates are undiscounted and require judgment with respect to costs, time frame and extent of required remedial and clean-up activities and are subject to periodic adjustments based on currently available information. Recoveries of environmental costs through insurance, indemnification arrangements or other sources are included in other assets to the extent such recoveries are considered probable.

Contingencies: We are subject to proceedings, lawsuits and other claims related to environmental, labor, product and other matters. We are required to assess the likelihood of any adverse judgments or outcomes to these matters as well as potential ranges of probable losses. A determination of the amount of reserves required, if any, for these contingencies is made after careful analysis of each individual issue. The required reserves may change in the future due to new developments in each matter or changes in approach such as a change in settlement strategy in dealing with these matters.

Foreign Currency Translation: The functional currency of PCLI and its affiliated non-U.S. Petro-Canada Lubricants entities includes the Canadian dollar, the euro and Chinese renminbi. Balance sheet accounts are translated into U.S. dollars using exchange rates in effect as of the balance sheet date. Revenue and expense accounts are translated using the weighted-average exchange rates during the period presented. Foreign currency translation adjustments are recorded as a component of accumulated other comprehensive income.

HOLLYFRONTIER CORPORATION
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In connection with our PCLI acquisition on February 1, 2017, we issued intercompany notes to initially fund certain of our foreign businesses. Remeasurement adjustments resulting from the conversion of such intercompany financing amounts to functional currencies are recorded as gains and losses as a component of other income (expense) in the income statement. Such adjustments are not recorded to the Lubricants and Specialty Products segment operations, but to corporate and other. See Note 20 for additional information on our segments.

Income Taxes: Provisions for income taxes include deferred taxes resulting from temporary differences in income for financial and tax purposes, using the liability method of accounting for income taxes. The liability method requires the effect of tax rate changes on deferred income taxes to be reflected in the period in which the rate change was enacted. The liability method also requires that deferred tax assets be reduced by a valuation allowance unless it is more likely than not that the assets will be realized.

Potential interest and penalties related to income tax matters are recognized in income tax expense. We believe we have appropriate support for the income tax positions taken and to be taken on our income tax returns and that our accruals for tax liabilities are adequate for all open years based on an assessment of many factors, including past experience and interpretations of tax law applied to the facts of each matter.

Inventory Repurchase Obligations: We periodically enter into same-party sell / buy transactions, whereby we sell certain refined product inventory and subsequently repurchase the inventory in order to facilitate delivery to certain locations. Such sell / buy transactions are accounted for as inventory repurchase obligations under which proceeds received under the initial sell is recognized as an inventory repurchase obligation that is subsequently reversed when the inventory is repurchased. For the years ended December 31, 2018, 2017 and 2016, we received proceeds of $51.2 million, $47.4 million and $57.0 million and subsequently repaid $52.5 million, $49.8 million and $58.0 million, respectively, under these sell / buy transactions.

Accounting Pronouncements - Recently Adopted

Accumulated Other Comprehensive Income
In February 2018, Accounting Standard Update (“ASU”) 2018-02, “Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income (“AOCI”),” was issued permitting a reclassification of stranded tax effects caused by the Tax Cuts and Jobs Act enacted on December 22, 2017 between AOCI and retained earnings. We adopted this standard effective in the first quarter of 2018 and recorded a cumulative effect adjustment of $3.6 million as an increase to AOCI and a decrease to retained earnings. During the third quarter of 2018, we completed analysis of the accounting for the stranded tax effects on AOCI and recorded an additional $3.1 million as an increase to AOCI and a decrease to retained earnings.

Hedge Accounting
In August 2017, ASU 2017-12, “Derivatives and Hedging: Targeted Improvements to Accounting for Hedging Activities,” was issued amending hedge accounting recognition and presentation requirements, including elimination of the requirement to separately measure and report hedge ineffectiveness, and eased certain documentation and assessment requirements. We adopted this standard effective January 1, 2018 and recorded a cumulative effect adjustment of $0.1 million as a decrease to AOCI and an increase to retained earnings to eliminate the separate measurement of hedge ineffectiveness existing at the date of adoption. Our amended presentation and disclosures have been applied prospectively in Note 13.

Stock Compensation

In May 2017, ASU 2017-09, “Stock Compensation: Scope of Modification Accounting,” was issued to provide clarity to accounting for share-based payment awards in the event of a modification in the terms or conditions. We adopted this standard effective January 1, 2018, which did not affect our financial position, results of operations or cash flows.

Post-retirement Benefit Cost

In March 2017, ASU 2017-07, “Improving the Presentation of Net Periodic Pension Cost and Net Periodic Post-retirement Benefit Cost,” was issued amending current GAAP related to the income statement presentation of the components of net periodic pension cost and net periodic post-retirement cost (credit). We adopted this standard effective January 1, 2018 on a retrospective basis with the presentation of service cost separate from the other components of net periodic costs. The interest cost, expected return on plan assets and amortization of prior service credit have been reclassified from cost of products sold, operating expenses and selling, general and administrative expenses to other, net. The adoption of this standard had no impact on our financial condition, results of operations or cash flows.

HOLLYFRONTIER CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
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The effect of the retrospective presentation change related to the net periodic cost / benefit of our defined benefit pension and other post-retirement plans on our consolidated income statement was as follows:

	Year Ended December 31, 2017		
Income Statement	Prior to Adoption	Increase	As Adjusted
	(In thousands)		
Cost of products sold	$11,467,799	$74	$11,467,873
Operating expenses	$1,294,234	$2,435	$1,296,669
Selling, general and administrative expenses	$264,874	$847	$265,721
Other, net	$826	$3,356	$4,182

	Year Ended December 31, 2016		
Income Statement	Prior to Adoption	Increase	As Adjusted
	(In thousands)		
Cost of products sold	$8,765,927	$100	$8,766,027
Operating expenses	$1,018,839	$2,313	$1,021,152
Selling, general and administrative expenses	$125,648	$282	$125,930
Other, net	$(921)	$2,695	$1,774

Business Combinations
In January 2017, ASU 2017-01, “Business Combinations: Clarifying the Definition of a Business,” was issued clarifying the definition of a business with the objective of providing guidance to assist entities with evaluating whether transactions should be accounted for as acquisitions (or disposals) of assets or businesses. We adopted this standard effective January 1, 2018, which did not affect our financial position, results of operations or cash flows.

Cash Flow Presentation
In August 2016, ASU 2016-15, “Classification of Certain Cash Receipts and Cash Payments,” was issued clarifying how entities should classify certain cash receipts and cash payments in the statements of cash flows and amends certain disclosure requirements. We adopted this standard effective January 1, 2018, which did not affect our financial position, results of operations or cash flows.

Revenue Recognition
In May 2014, ASU 2014-09 “Revenue from Contracts with Customers” was issued requiring revenue to be recognized when promised goods or services are transferred to customers in an amount that reflects the expected consideration for these goods or services. We adopted this standard effective January 1, 2018, which resulted in changes to our revenue recognition policies on certain customer contracts. We have lubricant product sales agreements with U.S. and European marketers and distributors that provide rights of return provisions under which we repurchase such products and sell directly to end customers. Prior to January 1, 2018, we recognized revenues and costs, net of allowances for expected returns under such agreements when such products were shipped to U.S. and European distributors. Effective with the adoption of ASU 2014-09, revenues and related product costs are no longer recognized when products are shipped to distributors, but rather, revenues and costs are recognized in earnings only when such products are ultimately sold to end customers.

We adopted this standard using the modified retrospective method, whereby the cumulative effect of applying the new standard was recorded as an adjustment to the opening balance of retained earnings as well as the carrying amounts of assets and liabilities as of January 1, 2018, which had no impact on our cash flows. The following reflects the cumulative effect of adoption as of January 1, 2018.

HOLLYFRONTIER CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
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	Prior to Adoption	Increase (Decrease)	As Adjusted
	(In thousands)		
Accounts receivable: Product and transportation	$659,530	$ (8,198)	$651,332
Inventories: Crude oil and refined products	$1,409,538	$ 5,124	$1,414,662
Accounts payable	$1,220,795	$ 7,336	$1,228,131
Deferred income taxes	$647,785	$ (2,963)	$644,822
Retained earnings	$3,346,615	$ (7,447)	$3,339,168

See Note 4 for additional disclosures of revenues.

Accounting Pronouncements - Not Yet Adopted

Leases
In February 2016, ASU 2016-02, "Leases," was issued requiring leases to be measured and recognized as a lease liability, with a corresponding right-of-use asset on the balance sheet. This standard has an effective date of January 1, 2019, and we have elected to adopt using the modified retrospective transition method, whereby comparative prior period financial information will not be restated and will continue to be reported under the lease accounting standard in effect during those periods. We have also elected practical expedients provided by the new standard, including the package of practical expedients and the short-term lease recognition practical expedient, which allows an entity to not recognize leases with a term of 12 months or less on the balance sheet.

NOTE 2: Acquisitions

Sonneborn
On November 12, 2018, we entered into an equity purchase agreement to acquire 100% of the capital stock of Sonneborn. The acquisition closed on February 1, 2019. Cash consideration paid was $660.0 million. Sonneborn is a producer of specialty hydrocarbon chemicals such as white oils, petrolatums and waxes with manufacturing facilities in the United States and Europe.

This acquisition will be accounted for as a business combination, with the cash purchase price allocated to the acquisition date fair value of assets and liabilities acquired. Due to the short timeframe between the closing of this acquisition and filing of this Annual Report on Form 10-K, we have not completed the detailed valuation studies necessary to arrive at the required fair value estimates of the acquired Sonneborn assets, liabilities assumed and related purchase price allocations.

Red Giant Oil
On July 10, 2018, we entered into a definitive agreement to acquire Red Giant Oil, a privately-owned lubricants company. The acquisition closed on August 1, 2018. Cash consideration paid was $54.2 million. Red Giant Oil is one of the largest suppliers of locomotive engine oil in North America and is headquartered in Council Bluffs, Iowa.

This transaction was accounted for as a business combination using the acquisition method of accounting, with the purchase price allocated to the fair value of the acquired Red Giant Oil assets and liabilities as of the August 1 acquisition date, with the excess purchase price recorded as goodwill assigned to our Lubricants and Specialty

Products segment. This goodwill is deductible for income tax purposes. Fair values are as follows: current assets $14.4 million, properties and equipment $21.3 million, intangible assets $9.7 million, goodwill $10.8 million and current liabilities $2.0 million.

Our consolidated financial and operating results reflect the operations of Red Giant Oil beginning August 1, 2018. Our results of operations for the year ended December 31, 2018 included revenues and income before income taxes of $26.9 million and $1.2 million, respectively, related to these operations.

PCLI
On October 29, 2016, we entered into a share purchase agreement with Suncor to acquire 100% of the outstanding capital stock of PCLI. The acquisition closed on February 1, 2017. Cash consideration paid was $862.1 million, or $1.125 billion Canadian dollars. PCLI is located in Mississauga, Ontario, Canada and is a producer of lubricant products such as base oils, white oils, specialty products and finished lubricants. The operations of our Petro-Canada Lubricants business also include marketing of these products to both retail and wholesale outlets through a global sales network with locations in Canada, the United States, Europe and China.

Aggregate consideration totaled $906.7 million and consists of $862.1 million in cash paid to Suncor at acquisition, a closing date working capital settlement of $30.6 million that was paid to Suncor in the second quarter of 2017, an accrued payable in the amount of $7.4 million, and $6.6 million representing a portion of the fair value of replacement restricted stock unit awards issued to PCLI employees that relate to pre-acquisition services.

This transaction was accounted for as a business combination using the acquisition method of accounting, with the purchase price allocated to the fair value of the acquired PCLI assets and liabilities as of the February 1 acquisition date, with the excess purchase price recorded as goodwill assigned to our Lubricants and Specialty Products segment. This goodwill is not deductible for income tax purposes. Fair values are as follows: cash and cash equivalents $21.6 million, current assets $333.4 million, properties, plants and equipment $438.0 million, goodwill $194.8 million, intangibles and other noncurrent assets $124.3 million, current liabilities $87.4 million and deferred income tax and other long-term liabilities $118.0 million.

We incurred $3.6 million and $27.9 million, for the years ended December 31, 2018 and 2017, respectively, in incremental direct acquisition and integration costs that principally relate to legal, advisory and other professional fees and are presented as selling, general and administrative expenses.

NOTE 3: Holly Energy Partners

HEP is a publicly held master limited partnership that owns and operates logistic assets consisting of petroleum product and crude oil pipelines, terminals, tankage, loading rack facilities and refinery processing units that principally support our refining and marketing operations in the Mid-Continent, Southwest and Rocky Mountain regions of the United States and Delek’s refinery in Big Spring, Texas. Additionally, HEP owns a 75% interest in UNEV Pipeline, LLC (“UNEV”), the owner of a pipeline running from Woods Cross, Utah to Las Vegas, Nevada (the “UNEV Pipeline”) and associated product terminals, and a 50% ownership interest in each of Osage Pipeline Company, LLC, the owner of a pipeline running from Cushing, Oklahoma to El Dorado, Kansas (the “Osage Pipeline”) and Cheyenne Pipeline, LLC, the owner of a pipeline running from Fort Laramie, Wyoming to Cheyenne, Wyoming (the “Cheyenne Pipeline”).

At December 31, 2018, we owned a 57% limited partner interest and a non-economic general partner interest in HEP. As the general partner of HEP, we have the sole ability to direct the activities that most significantly impact HEP's financial performance, and therefore as HEP's primary beneficiary, we consolidate HEP.

HEP has two primary customers (including us) and generates revenues by charging tariffs for transporting petroleum products and crude oil though its pipelines, by charging fees for terminalling refined products and other hydrocarbons, and storing and providing other services at its storage tanks and terminals. Under our long-term transportation agreements with HEP (discussed further below), we accounted for 79% of HEP's total revenues for the year ended December 31, 2018. We do not provide financial or equity support through any liquidity arrangements and / or debt guarantees to HEP.

HEP has outstanding debt under a senior secured revolving credit agreement and its senior notes. HEP's creditors have no recourse to our assets. Furthermore, our creditors have no recourse to the assets of HEP and its consolidated subsidiaries. See Note 12 for a description of HEP's debt obligations.

HEP has risk associated with its operations. If a major customer of HEP were to terminate its contracts or fail to meet desired shipping or throughput levels for an extended period of time, revenue would be reduced and HEP could suffer substantial losses to the extent that a new customer is not found. In the event that HEP incurs a loss, our operating results will reflect HEP's loss, net of intercompany eliminations, to the extent of our ownership interest in HEP at that point in time.

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SLC Pipeline and Frontier Pipeline
On October 31, 2017, HEP acquired the remaining 75% interest in SLC Pipeline LLC, the owner of a pipeline that serves refineries in the Salt Lake City, Utah area (the “SLC Pipeline”), and the remaining 50% interest in Frontier Aspen LLC, the owner of a pipeline running from Wyoming to Frontier Station, Utah (the “Frontier Pipeline”), from subsidiaries of Plains All American Pipeline, L.P. (“Plains”) for cash consideration of $250.0 million.

These acquisitions were accounted for as a business combination achieved in stages. HEP’s preexisting equity method investments in SLC Pipeline LLC and Frontier Aspen LLC were remeasured at an acquisition date fair value of $112.0 million, since HEP acquired a controlling interest, and a gain was recognized on the remeasurement of $36.3 million in the fourth quarter of 2017. The fair value of HEP's preexisting equity method investments in SLC Pipeline LLC and Frontier Aspen LLC was estimated using Level 3 inputs under the income method for these entities, adjusted for lack of control and marketability.

The total consideration of $363.8 million, consisting of cash consideration of $250.0 million and the fair value of HEP's preexisting equity method investments in SLC Pipeline LLC and Frontier Aspen LLC of $112.0 million, and working capital adjustments of $1.8 million, was allocated to the acquisition date fair value of assets and liabilities acquired as of the October 31, 2017 acquisition date, with the excess purchase price recorded as goodwill. Fair values were as follows: cash and cash equivalents $4.6 million, current assets $5.2 million, properties and equipment $275.0 million, intangible assets $70.2 million, goodwill $13.8 million and current liabilities $5.0 million.

Woods Cross Assets
On October 3, 2016, HEP acquired from us all the membership interests of Woods Cross Operating LLC, which owns the crude unit, FCCU and polymerization unit of the first phase of our Woods Cross Refinery expansion project that was completed in the second quarter of 2016, for cash consideration of approximately $278.0 million.

Cheyenne Pipeline
On June 3, 2016, HEP acquired a 50% interest in Cheyenne Pipeline LLC, owner of the Cheyenne Pipeline, in exchange for a contribution of $42.6 million in cash to Cheyenne Pipeline LLC. Cheyenne Pipeline will continue to be operated by an affiliate of Plains, which owns the remaining 50% interest. The 87-mile crude oil pipeline runs from Fort Laramie, Wyoming to Cheyenne, Wyoming and has an 80,000 BPD capacity.

Tulsa Tanks
On March 31, 2016, HEP acquired crude oil tanks located at our Tulsa Refineries from Plains for $39.5 million. Previously in 2009, we sold these tanks to Plains and leased them back, and due to our continuing interest in the tanks, we accounted for the transaction as a financing arrangement. Accordingly, the tanks remained on our balance sheet and were depreciated for accounting purposes, and the proceeds received from Plains were recorded as a financing obligation and presented as a component of outstanding debt. In accounting for HEP’s March 2016 purchase from Plains, the amount paid was recorded against our outstanding financing obligation balance of $30.8 million, with the excess $8.7 million resulting in a loss on early extinguishment of debt.

Magellan Asset Exchange
On February 22, 2016, we obtained a 50% membership interest in Osage Pipe Line Company, LLC (“Osage”) in exchange for a 20-year terminalling services agreement, whereby, a subsidiary of Magellan Midstream Partners (“Magellan Midstream”) will provide terminalling services for all of our products originating in Artesia, New Mexico that require terminalling in or through El Paso, Texas. Under the agreement, we will be charged tariffs based on the

volumes of refined product processed. Osage is the owner of the Osage Pipeline, a 135-mile pipeline that transports crude oil from Cushing, Oklahoma to our El Dorado Refinery in Kansas and also has a connection to the Jayhawk pipeline that services the CHS refinery in McPherson, Kansas. This exchange was accounted for at fair value, whereby the 50% membership interest in the Osage Pipeline was recorded at fair value and an offsetting residual deferred credit in the amount of $38.9 million was recorded, which will be amortized to cost of products sold over the 20-year service period. No gain or loss was recorded for this exchange.

Also on February 22, 2016, we contributed the 50% membership interest in Osage to HEP, and in exchange received HEP's El Paso terminal. Pursuant to this exchange, HEP agreed to build two connections to Magellan Midstream's El Paso terminal. In addition, HEP agreed to become the operator of the Osage Pipeline. This exchange was accounted for at carry-over basis with no resulting gain or loss.

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Transportation Agreements
HEP serves our refineries under long-term pipeline, terminal and tankage throughput agreements and refinery processing tolling agreements expiring from 2020 through 2036. Under these agreements, we pay HEP fees to transport, store and process throughput volumes of refined products, crude oil and feedstocks on HEP's pipelines, terminals, tankage, loading rack facilities and refinery processing units that result in minimum annual payments to HEP including UNEV (a consolidated subsidiary of HEP). Under these agreements, the agreed upon tariff rates are subject to annual tariff rate adjustments on July 1 at a rate based upon the percentage change in Producer Price Index or Federal Energy Regulatory Commission index. As of December 31, 2018, these agreements result in minimum annualized payments to HEP of $314.2 million.

Our transactions with HEP and fees paid under our transportation agreements with HEP and UNEV are eliminated and have no impact on our consolidated financial statements.

Incentive Distribution Rights Simplification Agreement
On October 31, 2017, we closed on an equity restructuring transaction with HEP pursuant to which our incentive distribution rights were canceled and our 2% general partner interest in HEP was converted into a non-economic general partner interest in HEP. In consideration, we received 37,250,000 HEP common units. In addition, we agreed to waive $2.5 million of limited partner cash distributions for each of twelve consecutive quarters beginning with the first quarter the units issued were eligible to receive distributions as consideration.

HEP Private Placement Agreements
On January 25, 2018, HEP entered into a common unit purchase agreement in which certain purchasers agreed to purchase in a private placement 3,700,000 HEP common units, representing limited partner interests, at a price of $29.73 per common unit. The private placement closed on February 6, 2018, at which time HEP received proceeds of $110.0 million, which were used to repay indebtedness under the HEP Credit Agreement.

HEP Common Unit Continuous Offering Program
In May 2016, HEP established a continuous offering program under which HEP may issue and sell common units from time to time, representing limited partner interests, up to an aggregate gross sales amount of $200 million. During the year ended December 31, 2018, HEP issued 171,246 common units under this program, providing $5.2 million in gross proceeds. As of December 31, 2018, HEP has issued 2,413,153 common units under this program, providing $82.3 million in gross proceeds.

HEP intends to use the net proceeds for general partnership purposes, which may include funding working capital, repayment of debt, acquisitions and capital expenditures. Amounts repaid under HEP’s credit facility may be reborrowed from time to time.

As a result of these transactions and resulting HEP ownership changes, we adjusted additional capital and equity attributable to HEP's noncontrolling interest holders to reallocate HEP's equity among its unitholders.

NOTE 4: Revenues

Substantially all revenue-generating activities relate to sales of refined product and excess crude oil inventories sold at market prices (variable consideration) under contracts with customers. Additionally, we have revenues attributable to

HEP logistics services provided under petroleum product and crude oil pipeline transportation, processing, storage and terminalling agreements with third parties.

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Disaggregated revenues are as follows:

	Years Ended December 31,		
	2018	2017	2016
	(In thousands)		
Revenues by type			
Refined product revenues			
Transportation fuels [1]	$13,326,654	$11,056,038	$9,098,204
Specialty lubricant products [2]	1,636,859	1,415,842	464,359
Asphalt, fuel oil and other products [3]	985,234	743,394	422,644
Total refined product revenues	15,948,747	13,215,274	9,985,207
Excess crude oil revenues [4]	1,597,321	891,756	436,974
Transportation and logistic services	108,412	77,225	68,927
Other revenues [5]	60,186	67,044	44,592
Total sales and other revenues	$17,714,666	$14,251,299	$10,535,700

	Years Ended December 31,		
	2018	2017	2016
	(In thousands)		
Refined product revenues by market			
North America			
Mid-Continent	$8,427,200	$7,099,754	$6,077,634
Southwest	3,772,278	2,952,224	2,425,761
Rocky Mountains	2,476,044	2,055,221	1,481,812
Northeast	339,407	259,840	—
Canada	732,321	673,842	—
Europe and Asia	201,497	174,393	—
Total refined product revenues	$15,948,747	$13,215,274	$9,985,207

(1) Transportation fuels consist of gasoline, diesel and jet fuel.
(2) Specialty lubricant products consist of base oil, waxes, finished lubricants and other specialty fluids.
(3) Asphalt, fuel oil and other products revenue include revenues attributable to our Refining and Lubricants and Specialty Products segments of $822,587 and $162,647, respectively, for the year ended December 31, 2018, $565,200 and $178,194, respectively, for the year ended December 31, 2017, and $422,644 and zero, respectively, for the year ended December 31, 2016.
(4) Excess crude oil revenues represent sales of purchased crude oil inventory that at times exceeds the supply needs of our refineries.
(5) Other revenues are principally attributable to our Refining segment.

Our consolidated balance sheet reflects contract liabilities related to unearned revenues attributable to future service obligations under HEP’s third-party transportation agreements. The following table presents changes to contract liabilities during the year ended December 31, 2018.

January 1, 2018	Increase	Recognized as Revenue	December 31, 2018
(In thousands)			

Accrued liabilities	$179	$6,748	$(6,795)	$ 132

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As of December 31, 2018, we have long-term contracts with customers that specify minimum volumes of gasoline, diesel, lubricants and specialty products to be sold ratably at market prices through 2021. Such volumes are typically nominated in the month preceding delivery and delivered ratably throughout the following month. Future prices are subject to market fluctuations and therefore, we have elected the exemption to exclude variable consideration under these contracts under Accounting Standards Codification 606-10-50-14A. Aggregate minimum volumes expected to be sold (future performance obligations) under our long-term product sales contracts with customers are as follows:

	2019	2020	2021	Thereafter	Total
	(In thousands)				
Refined product sales volumes (barrels)	23,062	2,180	845	—	26,087

Additionally, HEP has long-term contracts with third-party customers that specify minimum volumes of product to be transported through its pipelines and terminals that result in fixed-minimum annual of revenues through 2022. Annual minimum revenues attributable to HEP’s third-party contracts as of December 31, 2018 are presented below:

	2019	2020	2021	Thereafter	Total
	(In thousands)				
HEP contractual minimum revenues	$42,022	$18,073	$10,867	$ 1,686	$72,648

We have no customers which have accounted for over 10% of our annual revenues for the years ended December 31, 2018, 2017 or 2016.

NOTE 5: Fair Value Measurements

Our financial instruments measured at fair value on a recurring basis consist of derivative instruments and RINs credit obligations.

Fair value measurements are derived using inputs (assumptions that market participants would use in pricing an asset or liability, including assumptions about risk). GAAP categorizes inputs used in fair value measurements into three broad levels as follows:

- (Level 1) Quoted prices in active markets for identical assets or liabilities.
- (Level 2) Observable inputs other than quoted prices included in Level 1, such as quoted prices for similar assets and liabilities in active markets, similar assets and liabilities in markets that are not active or can be corroborated by observable market data.
- (Level 3) Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities. This includes valuation techniques that involve significant unobservable inputs.

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The carrying amounts of derivative instruments and RINs credit obligations at December 31, 2018 and 2017 were as follows:

Financial Instrument	Carrying Amount	Fair Value by Input Level Level 1	Level 2	Level 3
	(In thousands)			
December 31, 2018				
Assets:				
NYMEX futures contracts	$2,473	$2,473	$—	$ —
Foreign currency forward contracts	25,956	—	25,956	—
Commodity price swaps	10,817	—	10,817	—
Commodity forward contracts	1,034	—	1,034	—
Total assets	$40,280	$2,473	$37,807	$ —
Liabilities:				
Commodity price swaps	$956	$—	$956	$ —
Commodity forward contracts	1,137	—	1,137	—
RINs credit obligations (1)	4,084	—	4,084	—
Total liabilities	$6,177	$—	$6,177	$ —
December 31, 2017				
Assets:				
Commodity forward contracts	$3,840	$—	$3,840	$—
Total assets	$3,840	$—	$3,840	$—
Liabilities:				
NYMEX futures contracts	$3,360	$3,360	$—	$—
Commodity price swaps	2,424	—	2,424	—
Commodity forward contracts	1,020	—	1,020	—
RINs credit obligations (1)	8,931	—	8,931	—
Total liabilities	$15,735	$3,360	$12,375	$—

(1) Represent obligations for RINs credits for which we do not have sufficient quantities at December 31, 2018 and December 31, 2017 to satisfy our Environmental Protection Agency ("EPA") regulatory blending requirements.

Level 1 Financial Instruments
Our NYMEX futures contracts are exchange traded and are measured and recorded at fair value using quoted market prices, a Level 1 input.

Level 2 Financial Instruments
Derivative instruments consisting of foreign currency forward contracts, commodity price swaps and forward sales and purchase contracts are measured and recorded at fair value using Level 2 inputs. The fair value of the commodity price swap contracts is based on the net present value of expected future cash flows related to both variable and fixed rate legs of the respective swap agreements. The measurements are computed using market-based observable input and quoted forward commodity prices with respect to our commodity price swaps. RINs credit obligations are valued

based on current market RINs prices. The fair value of foreign currency forward contracts are based on values provided by a third party, which were derived using market quotes for similar type instruments, a Level 2 input.

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NOTE 6: Earnings Per Share

Basic earnings per share is calculated as net income (loss) attributable to HollyFrontier stockholders divided by the average number of shares of common stock outstanding. Diluted earnings per share assumes, when dilutive, the issuance of the net incremental shares from restricted shares and performance share units. The following is a reconciliation of the denominators of the basic and diluted per share computations for net income (loss) attributable to HollyFrontier stockholders:

	Years Ended December 31,		
	2018	2017	2016
	(In thousands, except per share data)		
Net income (loss) attributable to HollyFrontier stockholders	$1,097,960	$805,395	$(260,453)
Participating securities' (restricted stock) share in earnings	3,714	5,047	1,003
Net income (loss) attributable to common shares	$1,094,246	$800,348	$(261,456)
Average number of shares of common stock outstanding	175,009	176,174	176,101
Effect of dilutive variable restricted shares and performance share units [(1)]	1,652	1,022	—
Average number of shares of common stock outstanding assuming dilution	176,661	177,196	176,101
Basic earnings (loss) per share	$6.25	$4.54	$(1.48)
Diluted earnings (loss) per share	$6.19	$4.52	$(1.48)
(1) Excludes anti-dilutive restricted and performance share units of:	238	543	469

NOTE 7: Stock-Based Compensation

We have a principal share-based compensation plan (the "Long-Term Incentive Compensation Plan"). The compensation cost charged against income for the plan was $39.0 million, $39.8 million and $22.8 million for the years ended December 31, 2018, 2017 and 2016, respectively. Our accounting policy for the recognition of compensation expense for awards with pro-rata vesting is to expense the costs ratably over the vesting periods.

Additionally, HEP maintains a share-based compensation plan for Holly Logistic Services, L.L.C.'s non-employee directors and certain executives and employees. Compensation cost attributable to HEP's share-based compensation plan was $3.2 million, $2.5 million and $2.7 million for the years ended December 31, 2018, 2017 and 2016, respectively.

Restricted Stock and Restricted Stock Units

Under our Long-Term Incentive Compensation Plan, we grant certain officers and other key employees restricted stock unit awards with awards generally vesting over a period of three years. We previously granted restricted stock to certain officers and key employees with awards vesting over a period of three years. Certain restricted stock unit award recipients have the right to receive dividends, however, restricted stock units do not have any other rights of absolute ownership. Restricted stock award recipients are generally entitled to all the rights of absolute ownership of the restricted shares from the date of grant including the right to vote the shares and to receive dividends. Upon vesting, restrictions on the restricted stock and restricted stock units lapse at which time they convert to common shares or cash. In addition, we grant non-employee directors restricted stock unit awards, which typically vest over a period of one year and are payable in stock. The fair value of each restricted stock and restricted stock unit award is measured based on the grant date market price of our common shares and is amortized over the respective vesting period. We account for forfeitures on an estimated basis.

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A summary of restricted stock and restricted stock unit activity and changes during the year ended December 31, 2018 is presented below:

Restricted Stock and Restricted Stock Units	Grants	Weighted Average Grant Date Fair Value	Aggregate Intrinsic Value ($000)
Outstanding at January 1, 2018 (non-vested)	1,726,188	$ 33.51	
Granted	495,360	64.96	
Vesting (transfer/conversion to common stock)	(909,755)	33.01	
Forfeited	(114,879)	34.59	
Outstanding at December 31, 2018 (non-vested)	1,196,914	$ 46.81	$ 61,186

For the years ended December 31, 2018, 2017 and 2016, restricted stock and restricted stock units vested having a grant date fair value of $30.0 million, $24.9 million and $18.4 million, respectively. For the years ended December 31, 2017 and 2016, we granted restricted stock and restricted stock units having a weighted average grant date fair value of $35.02 and $21.66, respectively. As of December 31, 2018, there was $34.0 million of total unrecognized compensation cost related to non-vested restricted stock and restricted stock unit grants. That cost is expected to be recognized over a weighted-average period of 1.6 years.

Performance Share Units
Under our Long-Term Incentive Compensation Plan, we grant certain officers and other key employees performance share units, which are payable in stock or cash upon meeting certain criteria over the service period, and generally vest over a period of three years. Under the terms of our performance share unit grants, awards are subject to “financial performance” and “market performance” criteria. Financial performance is based on our financial performance compared to a peer group of independent refining companies, while market performance is based on the relative standing of total shareholder return achieved by HollyFrontier compared to peer group companies. The number of shares ultimately issued or cash paid under these awards can range from zero to 200% of target award amounts.

A summary of performance share unit activity and changes during the year ended December 31, 2018 is presented below:

Performance Share Units	Grants
Outstanding at January 1, 2018 (non-vested)	692,661
Granted	139,720
Vesting and transfer of ownership to recipients	(115,596)
Forfeited	(54,354)
Outstanding at December 31, 2018 (non-vested)	662,431

For the year ended December 31, 2018, we issued 115,596 shares of common stock, representing a 100% payout on vested performance share units having a grant date fair value of $8.8 million. For the years ended December 31, 2017 and 2016, we issued common stock upon the vesting of the performance share units having a grant date fair value of $6.6 million and $7.4 million, respectively. As of December 31, 2018, there was $14.2 million of total unrecognized compensation cost related to non-vested performance share units having a grant date fair value of $38.00 per unit. That cost is expected to be recognized over a weighted-average period of 1.6 years.

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NOTE 8: Inventories

Inventory consists of the following components:

	December 31,	
	2018	2017
	(In thousands)	
Crude oil	$503,705	$581,417
Other raw materials and unfinished products(1)	360,124	396,618
Finished products(2)	662,713	655,336
Lower of cost or market reserve	(360,138)	(223,833)
Process chemicals(3)	31,413	24,792
Repairs and maintenance supplies and other (4)	156,562	195,762
Total inventory	$1,354,379	$1,630,092

(1) Other raw materials and unfinished products include feedstocks and blendstocks, other than crude.
(2) Finished products include gasolines, jet fuels, diesels, lubricants, asphalts, LPG's and residual fuels.
(3) Process chemicals include additives and other chemicals.
(4) Includes RINs

Our inventories that are valued at the lower of LIFO cost or market reflect a valuation reserve of $360.1 million and $223.8 million at December 31, 2018 and 2017, respectively. The December 31, 2017 market reserve of $223.8 million was reversed due to the sale of inventory quantities that gave rise to the 2017 reserve. A new market reserve of $360.1 million was established as of December 31, 2018 based on market conditions and prices at that time. The effect of the change in the lower of cost or market reserve was an increase to cost of products sold of $136.3 million for the year ended December 31, 2018 and a decrease of $108.7 million and $291.9 million for the years ended December 31, 2017 and 2016, respectively.

At December 31, 2018, 2017 and 2016, the LIFO value of inventory, net of the lower of cost or market reserve, was equal to current costs. For the year ended December 31, 2018, we recognized a charge of $49.6 million to cost of products sold as we liquidated certain quantities of LIFO inventory that were carried at historical acquisition costs above market prices at the time of liquidation.

During the three months ended June 30, 2018, the EPA granted the Woods Cross Refinery a one-year small refinery exemption from the Renewable Fuel Standard ("RFS") program requirements for the 2017 calendar year end. As a result, the Woods Cross Refinery's gasoline and diesel production are not subject to the Renewable Volume Obligation ("RVO") for 2017. In the second quarter of 2018, we increased our inventory of RINs and reduced our cost of products sold by $25.3 million, representing the net cost of the Woods Cross Refinery's RINs charge to cost of products sold in 2017, less the loss incurred for selling 2017 vintage RINs in excess of those which we can use subject to the 20% carryover limit.

During the three months ended March 31, 2018, the EPA granted the Cheyenne Refinery a one-year small refinery exemption from the RFS program requirements for the 2015 and 2017 calendar years end. As a result, the Cheyenne Refinery's gasoline and diesel production are not subject to the RVO for those years. At the date we received the 2017 Cheyenne Refinery exemption, we had not yet retired RINs to satisfy the 2017 RVO, which we intended to satisfy, in part, with 2016 vintage RINs subject to the 20% carryover limit. In the first quarter of 2018, we increased our inventory of RINs and reduced our cost of products sold by $37.9 million, representing the net cost of the Cheyenne Refinery's RINs charged to cost of products sold in 2017, less the loss incurred from selling 2016 vintage RINs prior to their expiration in 2018.

In the first quarter of 2018, the EPA provided us 2018 vintage RINs to replace the RINs previously retired to meet the Cheyenne Refinery's 2015 RVO. In the first quarter of 2018, we increased our inventory of RINs and reduced our cost of products sold by $33.8 million representing the fair value of the 2018 replacement RINs obtained from the Cheyenne Refinery's exemption of its 2015 RVO.

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In May 2017, the EPA granted the Cheyenne Refinery a one-year small refinery exemption from the RFS program requirements for the 2016 calendar year. As a result, the Cheyenne Refinery's gasoline and diesel production are not subject to the RVO for 2016. In September 2017, the EPA reinstated the RINs previously retired to meet our Cheyenne Refinery's 2016 RVO. The cost of the RINs used earlier to satisfy the Cheyenne Refinery's 2016 RVO of $30.5 million was charged to cost of products sold in 2016. In the second quarter of 2017, we increased our inventory of RINs and reduced our cost of products sold by this amount, representing the cost of the RINs that were reinstated as a result of the RFS exemption received by the Cheyenne Refinery.

Additionally, in December 2017, the EPA granted the Woods Cross Refinery a one-year small refinery exemption from the RFS program requirements for the 2016 calendar year. In the fourth quarter of 2017, we increased our inventory of RINs and reduced our cost of products sold in the amount of $27.3 million, representing the cost of the RINs reinstated as a result of the RFS exemption received by the Woods Cross Refinery.

During the second quarter of 2018, the Renewable Fuel Association and three other associations sought judicial review of three hardship waivers granted by the EPA under the RFS provisions of the Clean Air Act by filing a lawsuit in the United States Court of Appeals for the Tenth Circuit ("Tenth Circuit") that alleges the EPA erred in granting the waivers. This challenge includes two hardship waivers granted to our subsidiaries for the 2016 compliance year. The Tenth Circuit granted our motion to intervene in the case, thereby making us a party to this case. It is too early to assess whether the case is expected to have any impact on us.

NOTE 9: Properties, Plants and Equipment

The components of properties, plants and equipment are as follows:

	December 31,	
	2018	2017
	(In thousands)	
Land, buildings and improvements	$455,508	$442,214
Refining facilities	4,034,546	3,904,161
Pipelines and terminals	1,729,994	1,484,502
Transportation vehicles	20,311	20,394
Other fixed assets	296,843	467,469
Construction in progress	243,778	205,049
	6,780,980	6,523,789
Accumulated depreciation	(2,098,446)	(1,810,515)
	$4,682,534	$4,713,274

We capitalized interest attributable to construction projects of $4.8 million, $5.0 million and $8.0 million for the years ended December 31, 2018, 2017 and 2016, respectively.

Depreciation expense was $309.0 million, $286.5 million and $247.9 million for the years ended December 31, 2018, 2017 and 2016, respectively.

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NOTE 10: Goodwill, Long-lived Assets and Intangibles

Goodwill and long-lived assets
As of December 31, 2018, our goodwill balance was $2.2 billion. During 2018, we recognized $10.8 million in goodwill as a result of our Red Giant Oil acquisition. Also during 2018, HEP recognized $3.6 million in goodwill as a result of the acquisition of HEP's remaining interests in SLC Pipeline and Frontier Pipeline. See Note 20 for additional information on our segments. The carrying amount of our goodwill may fluctuate from period to period due to the effects of foreign currency translation adjustments on goodwill assigned to our Lubricants and Specialty Products segment.

The following is a summary of our goodwill by segment:

	Refining	Lubricants and Specialty Products	HEP	Total
	(In thousands)			
Balance at December 31, 2017				
Goodwill	$2,042,790	$200,662	$310,610	$2,554,062
Accumulated impairment losses	(309,318)	—	—	(309,318)
	1,733,472	200,662	310,610	2,244,744
Additional goodwill acquired	—	10,791	3,619	14,410
Foreign currency translation adjustment	—	(12,719)	—	(12,719)
Balance at December 31, 2018				
Goodwill	2,042,790	198,734	314,229	2,555,753
Accumulated impairment losses	(309,318)	—	—	(309,318)
	$1,733,472	$198,734	$314,229	$2,246,435

We performed our annual goodwill impairment testing as of July 1. There was no impairment of goodwill during the years ended December 31, 2018 and 2017. See below for discussion of our goodwill impairment recognized during the year ended December 31, 2016.

In 2017, we incurred long-lived asset impairment charges totaling $23.2 million, including $19.2 million of construction-in-progress that primarily related to engineering work for a planned expansion to add lubricants production capabilities at our Woods Cross Refinery as we concluded to no longer pursue for various reasons including our recent acquisition of PCLI. The remaining $4.0 million in charges relate to property, plant and equipment that we expensed in the form of accelerated depreciation in the income statement.

During the second quarter of 2016, we performed interim impairment testing of our El Dorado and Cheyenne Refinery asset groups (also representing distinct reporting units for goodwill impairment testing) after identifying a combination of events and circumstances that are indicators of potential long-lived asset and goodwill impairment. The indicators included lower than typical gross margins, a decrease in the gross margin outlook and decrease in our market capitalization due to a decline in our common share price. As a result, we determined that the carrying value of the Cheyenne Refinery asset group had been impaired and recorded long-lived asset impairment charges of $344.8

million that principally related to properties, plant and equipment and a goodwill impairment charge of $309.3 million.

Testing initially entailed an assessment of the carrying values of our refining asset groups for recoverability through a comparison of our asset group carrying values relative to its estimated future undiscounted cash flows. This assessment indicated impairment of the Cheyenne Refinery asset group had occurred. The impairment loss was measured as the excess of the carrying amount of the asset group over its respective fair value, which was derived using a combination of both income and market approaches. The income approach reflects expected future cash flows based on estimates of future crack spreads, forecasted production levels, operating costs and capital expenditures. Our market approaches include both the guideline public company and guideline transaction methods. Both methods utilize pricing multiples derived from historical market transactions of other like-kind assets. These fair value measurements involve significant unobservable inputs (Level 3 inputs).Our long-lived asset impairment testing did not identify any impairment related to our El Dorado Refinery asset group.

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There was no impairment of long-lived assets during the year ended December 31, 2018.

Intangibles
The carrying amounts of our intangible assets presented in "Intangibles and other" in our consolidated balance sheet are as follows:

		December 31	
	Useful Life	2018	2017
		(In thousands)	
Customer relationships	10 - 20 years	$91,941	$84,399
Transportation agreements	30 years	59,933	59,933
Trademarks, patents and other	10 - 20 years	83,326	90,858
		235,200	235,190
Accumulated amortization		(52,834)	(36,201)
Total intangibles		$182,366	$198,989

Amortization expense was $16.6 million, $9.1 million and $3.1 million for the years ended December 31, 2018, 2017 and 2016, respectively and expected to approximate $16.7 million for each of the next five years.

NOTE 11: Environmental

We expensed $14.8 million, $13.1 million and $6.6 million for the years ended December 31, 2018, 2017 and 2016, respectively, for environmental remediation obligations. The accrued environmental liability reflected in our consolidated balance sheets was $110.2 million and $103.7 million at December 31, 2018 and 2017, respectively, of which $93.8 million and $89.6 million, respectively, were classified as other long-term liabilities. These accruals include remediation and monitoring costs expected to be incurred over an extended period of time (up to 30 years for certain projects). Estimated liabilities could increase in the future when the results of ongoing investigations become known, are considered probable and can be reasonably estimated.

NOTE 12: Debt

HollyFrontier Credit Agreement
We have a $1.35 billion senior unsecured revolving credit facility maturing in February 2022 (the "HollyFrontier Credit Agreement"). The HollyFrontier Credit Agreement may be used for revolving credit loans and letters of credit from time to time and is available to fund general corporate purposes. At December 31, 2018, we were in compliance with all covenants, had no outstanding borrowings and had outstanding letters of credit totaling $2.2 million under the HollyFrontier Credit Agreement.

Indebtedness under the HollyFrontier Credit Agreement bears interest, at our option at either a) an alternate base rate (as defined in the credit agreement) plus an applicable margin of (ranging from 0.125% - 1.000%), b) LIBOR plus an applicable margin (ranging from 1.125% to 2.000%), or c) Canadian Dealer Offered Rate plus an applicable margin (ranging from 1.125% to 2.000%) for Canadian dollar denominated borrowings.

HEP Credit Agreement

HEP has a $1.4 billion senior secured revolving credit facility maturing in July 2022 (the “HEP Credit Agreement”) and is available to fund capital expenditures, investments, acquisitions, distribution payments, working capital and for general partnership purposes. It is also available to fund letters of credit up to a $50 million sub-limit and has a $300 million accordion. During the year ended December 31, 2018, HEP received advances totaling $337.0 million and repaid $426.0 million under the HEP Credit Agreement. At December 31, 2018, HEP was in compliance with all of its covenants, had outstanding borrowings of $923.0 million and no outstanding letters of credit under the HEP Credit Agreement.

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Indebtedness under the HEP Credit Agreement bears interest, at HEP's option, at either a reference rate announced by the administrative agent plus an applicable margin or at a rate equal to LIBOR plus an applicable margin. In each case, the applicable margin is based upon the ratio of HEP’s funded debt to earnings before interest, taxes, depreciation and amortization (as defined in the HEP Credit Agreement). The weighted average interest rates in effect on HEP’s Credit Agreement borrowings were 4.24% and 3.73% at December 31, 2018 and 2017, respectively.

HEP’s obligations under the HEP Credit Agreement are collateralized by substantially all of HEP’s assets and are guaranteed by HEP's material wholly-owned subsidiaries. Any recourse to the general partner would be limited to the extent of HEP Logistics Holdings, L.P.’s assets, which other than its investment in HEP, are not significant. HEP’s creditors have no recourse to our other assets. Furthermore, our creditors have no recourse to the assets of HEP and its consolidated subsidiaries.

HollyFrontier Senior Notes
In March 2016 and November 2016, we issued $250 million and $750 million, respectively, in aggregate principal amount of 5.875% senior notes (the “HollyFrontier Senior Notes”) maturing April 2026. The HollyFrontier Senior Notes are unsecured and unsubordinated obligations of ours and rank equally with all our other existing and future unsecured and unsubordinated indebtedness.

HollyFrontier Financing Arrangements
In December 2018, certain of our wholly-owned subsidiaries entered into financing arrangements whereby such subsidiaries sold a portion of their precious metals catalyst to a financial institution and then leased back the precious metals catalyst in exchange for total cash received of $32.5 million. The volume of the precious metals catalyst and the lease rate are fixed over the one-year term of each lease, and the lease payments are recorded as interest expense. At maturity, we must repurchase the precious metals catalyst at its then fair market value. These financing arrangements are recorded at a Level 2 fair value totaling $32.9 million at December 31, 2018 and included in “Accrued liabilities” in our consolidated balance sheets. See Note 5 for additional information on Level 2 inputs.

In March 2016, we extinguished a financing arrangement at a cost of $39.5 million and recognized an $8.7 million loss on the early termination. The financing arrangement related to a sale and lease-back of certain crude oil tankage that we sold to an affiliate of Plains in October 2009 for $40.0 million.

HollyFrontier Term Loan
In April 2016, we entered into a $350 million senior unsecured term loan (the “HollyFrontier Term Loan”) maturing in April 2019. The HollyFrontier Term Loan was fully repaid with proceeds received upon the November 2016 issuance of the HollyFrontier Senior Notes.

HEP Senior Notes
In July 2016 and September 2017, HEP issued $400 million and $100 million, respectively, in aggregate principal amount of 6.0% HEP senior notes in a private placement. HEP used the net proceeds to repay indebtedness under the HEP Credit Agreement.

HEP's 6.0% senior notes ($500 million aggregate principal amount maturing August 2024) (the “HEP Senior Notes”) are unsecured and impose certain restrictive covenants, including limitations on HEP’s ability to incur additional indebtedness, make investments, sell assets, incur certain liens, pay distributions, enter into transactions with affiliates, and enter into mergers. At any time when the HEP Senior Notes are rated investment grade by both Moody’s and Standard & Poor’s and no default or event of default exists, HEP will not be subject to many of the foregoing covenants. Additionally, HEP has certain redemption rights under the HEP Senior Notes.

In January 2017, HEP redeemed its $300 million aggregate principal amount of 6.5% senior notes maturing March 2020 at a redemption cost of $309.8 million, at which time HEP recognized a $12.2 million early extinguishment loss consisting of a $9.8 million debt redemption premium and unamortized discount and financing costs of $2.4 million. HEP funded the redemption with borrowings under the HEP Credit Agreement.

Indebtedness under the HEP Senior Notes is guaranteed by HEP’s wholly-owned subsidiaries. HEP’s creditors have no recourse to our assets. Furthermore, our creditors have no recourse to the assets of HEP and its consolidated subsidiaries.

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The carrying amounts of long-term debt are as follows:

	December 31,	
	2018	2017
	(In thousands)	
HollyFrontier 5.875% Senior Notes		
Principal	$1,000,000	$1,000,000
Unamortized discount and debt issuance costs	(7,360)	(8,315)
	992,640	991,685
HEP Credit Agreement	923,000	1,012,000
HEP 6% Senior Notes		
Principal	500,000	500,000
Unamortized discount and debt issuance costs	(4,100)	(4,692)
	495,900	495,308
Total HEP long-term debt	1,418,900	1,507,308
Total long-term debt	$2,411,540	$2,498,993

The fair values of the senior notes are as follows:

	December 31,	
	2018	2017
	(In thousands)	
HollyFrontier senior notes	$1,019,160	$1,113,470
HEP senior notes	$488,310	$525,120

These fair values are based on estimates provided by a third party using market quotes for similar type instruments, a Level 2 input. See Note 5 for additional information on Level 2 inputs.

Principal maturities of long-term debt are as follows:

Years Ending December 31,	(In thousands)
2019	$—
2020	—
2021	—
2022	923,000
2023	—
Thereafter	1,500,000
Total	$2,423,000

NOTE 13: Derivative Instruments and Hedging Activities

Commodity Price Risk Management

Our primary market risk is commodity price risk. We are exposed to market risks related to the volatility in crude oil and refined products, as well as volatility in the price of natural gas used in our refining operations. We periodically enter into derivative contracts in the form of commodity price swaps, forward purchase and sales and futures contracts to mitigate price exposure with respect to our inventory positions, natural gas purchases, sales prices of refined products and crude oil costs.

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Foreign Currency Risk Management
We are exposed to market risk related to the volatility in foreign currency exchange rates. We periodically enter into derivative contracts in the form of foreign exchange forward and foreign exchange swap contracts to mitigate the exposure associated with fluctuations on intercompany notes with our foreign subsidiaries that are not denominated in the U.S. dollar.

Accounting Hedges
We have swap contracts serving as cash flow hedges against price risk on forecasted purchases of natural gas and to lock in basis spread differentials on forecasted purchases of crude oil. We also periodically have forward sales contracts that lock in the prices of future sales of crude oil and refined product and swap contracts serving as cash flow hedges against price risk on forecasted purchases of WTI crude oil and forecasted sales of refined product. These contracts have been designated as accounting hedges and are measured at fair value with offsetting adjustments (gains/losses) recorded directly to other comprehensive income. These fair value adjustments are later reclassified to earnings as the hedging instruments mature.

The following table presents the pre-tax effect on other comprehensive income ("OCI") and earnings due to fair value adjustments and maturities of hedging instruments under hedge accounting:

	Net Unrealized Gain (Loss) Recognized in OCI			Gain (Loss) Reclassified into Earnings			
Derivatives Designated as Cash Flow Hedging Instruments	Years Ended December 31,			Income Statement Location	Years Ended December 31,		
(In thousands)	2018	2017	2016		2018	2017	2016
Commodity contracts	$11,221	$14,538	$25,139	Sales and other revenues	$(5,093)	$7,836	$(20,293)
				Cost of products sold	—	(299)	—
				Operating expenses	(962)	(19,244)	(21,864)
Interest rate contracts [1]	—	(91)	(99)	Interest expense	—	179	(508)
Total	$11,221	$14,447	$25,040		$(6,055)	$(11,528)	$(42,665)

(1) HEP used interest rate swap contracts to manage its exposure to interest rate risk, which matured in July 2017.

Economic Hedges
We have commodity contracts including forward purchase and sell contracts and NYMEX futures contracts to lock in prices on forecasted purchases and sales of inventory, as well as swap contracts to lock in the crack spread of WTI and sub-octane gasoline, that serve as economic hedges (derivatives used for risk management, but not designated as accounting hedges). We also have forward currency contracts to fix the rate of foreign currency. Additionally, our catalyst financing arrangements discussed in Note 12 could require repayment under certain conditions based on the future pricing of precious metals, which is an embedded derivative. These contracts are measured at fair value with offsetting adjustments (gains/losses) recorded directly to income.

The following table presents the pre-tax effect on income due to maturities and fair value adjustments of our economic hedges:

Gain (Loss) Recognized in Earnings

Derivatives Not Designated as Hedging Instruments	Income Statement Location	Years Ended December 31,		
		2018	2017	2016
		(In thousands)		
Commodity contracts	Cost of products sold	$16,655	$(12,327)	$(6,889)
	Operating expenses	—	(6,697)	7,276
	Interest expense	(198)	—	—
Foreign currency contracts	Gain on foreign currency transactions	41,834	—	—
	Gain (loss) on foreign currency swap contracts (1)	—	24,545	(6,520)
	Total	$58,291	$5,521	$(6,133)

(1) Relates to Canadian currency swap contracts that settled on February 1, 2017 and effectively fixed the conversion rate on our PCLI purchase price.

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As of December 31, 2018, we have the following notional contract volumes related to outstanding derivative instruments:

	Total Outstanding Notional	Notional Contract Volumes by Year of Maturity 2019	2020	2021	Unit of Measure
Derivatives Designated as Hedging Instruments					
Natural gas price swaps - long	5,400,000	1,800,000	1,800,000	1,800,000	MMBTU
Crude oil price swaps (basis spread) - long	9,503,000	4,745,000	4,758,000	—	Barrels
Derivatives Not Designated as Hedging Instruments					
NYMEX futures (WTI) - short	650,000	650,000	—	—	Barrels
Forward gasoline and diesel contracts - long	325,000	325,000	—	—	Barrels
Foreign currency forward contracts	440,460,402	440,460,402	—	—	U. S. dollar
Forward commodity contracts (platinum)	41,147	41,147	—	—	Troy ounces

The following table presents the fair value and balance sheet locations of our outstanding derivative instruments. These amounts are presented on a gross basis with offsetting balances that reconcile to a net asset or liability position in our consolidated balance sheets. We present on a net basis to reflect the net settlement of these positions in accordance with provisions of our master netting arrangements.

	Derivatives in Net Asset Position			Derivatives in Net Liability Position		
	Gross Assets	Gross Liabilities Offset in Balance Sheet	Net Assets Recognized in Balance Sheet	Gross Liabilities	Gross Assets Offset in Balance Sheet	Net Liabilities Recognized in Balance Sheet
		(In thousands)				
December 31, 2018						
Derivatives designated as cash flow hedging instruments:						
Commodity price swap contracts	$11,790	$(973)	$ 10,817	$1,755	$ (799)	$ 956
	$11,790	$(973)	$ 10,817	$1,755	$ (799)	$ 956
Derivatives not designated as cash flow hedging instruments:						
NYMEX futures contracts	$2,473	$—	$ 2,473	$—	$ —	$ —
Commodity forward contracts	1,034	—	1,034	1,137	—	1,137
Foreign currency forward contracts	25,956	—	25,956	—	—	—
	$29,463	$—	$ 29,463	$1,137	$ —	$ 1,137
Total net balance			$ 40,280			$ 2,093
Balance sheet classification:			$ 37,982			$ 1,137

Prepayment and other		Accrued liabilities	
Intangibles and other	2,298	Other long-term liabilities	956
	$ 40,280		$ 2,093

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	Derivatives in Net Asset Position			Derivatives in Net Liability Position		
	Gross Assets	Gross Liabilities Offset in Balance Sheet	Net Assets Recognized in Balance Sheet	Gross Liabilities	Gross Assets Offset in Balance Sheet	Net Liabilities Recognized in Balance Sheet
	(In thousands)					
December 31, 2017						
Derivatives designated as cash flow hedging instruments:						
Commodity price swap contracts	$—	$—	$ —	$2,424	$ —	$ 2,424
Commodity forward contracts	3,067	—	3,067	418	—	418
	$3,067	$—	$ 3,067	$2,842	$ —	$ 2,842
Derivatives not designated as cash flow hedging instruments:						
NYMEX futures contracts	$—	$—	$ —	$3,360	$ —	$ 3,360
Commodity forward contracts	773	—	773	602	—	602
	$773	$—	$ 773	$3,962	$ —	$ 3,962
Total net balance			$ 3,840			$ 6,804
				Accrued liabilities		$ 5,365
				Other long-term liabilities		1,439
Balance sheet classification:	Prepayment and other		$ 3,840			$ 5,365

At December 31, 2018, we had a pre-tax net unrealized gain of $9.9 million classified in accumulated other comprehensive income that relates to all accounting hedges having contractual maturities through 2021. Assuming commodity prices remain unchanged, an unrealized gain of $8.5 million will be effectively transferred from accumulated other comprehensive income into the statement of income as the hedging instruments contractually mature over the next twelve-month period.

NOTE 14: Income Taxes

The Tax Cuts and Jobs Act (the “Act”) was enacted on December 22, 2017. The Act reduced the U.S. federal corporate tax rate from 35% to 21%, required companies to pay a one-time transition tax on earnings of certain foreign subsidiaries that were previously deferred and created new taxes on certain foreign sourced earnings. At December 31, 2017, we had not completed our accounting for the tax effects of enactment of the Act; however, in certain cases, as described below, we made a reasonable estimate of the effects on our existing deferred tax balances, the one-time transition tax and related matters. For the items for which a reasonable estimate had been made, we recognized a provisional tax benefit amount of $307.1 million, which was included as a component of the income tax provision in

2017.

For the year ended December 31, 2018, we completed the analysis of the accounting for the tax effects for which provisional adjustments were made during the fourth quarter of 2017, resulting in our recording during 2018 of an additional tax benefit of $7.8 million. These adjustments to the previously recorded provisional amounts included the effects on existing deferred tax balances, the one-time transition tax and deferred U.S. taxes on foreign subsidiaries earnings and profits.

Deferred Tax Assets and Liabilities: For the year ended December 31, 2017, we remeasured certain deferred tax assets and liabilities based upon the rates at which they are expected to reverse in the future, which is generally 25%.

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Foreign Tax Effects: The one-time transition tax was based on our foreign subsidiaries' earnings and profits ("E&P") arising primarily from our acquisition of PCLI in 2017. This E&P was previously deferred from U.S. income taxes at 35% plus the effect of U.S. state income tax, or together generally 38%. We previously provided deferred U.S. taxes for the repatriation of these deferred amounts. At December 31, 2017, we recorded a provisional amount for our one-time transition tax liability of $6.5 million for our foreign subsidiaries at 15.5% plus the effect of state income tax, or together generally 20%, as we had not yet completed our calculation of the total foreign E&P for these foreign subsidiaries. In the course of preparing our U.S. federal income tax return during 2018, this amount changed slightly upon finalizing the calculation of foreign E&P previously deferred from U.S. federal taxation. Additional income taxes were provided for the remaining outside basis difference inherent in these entities at 21% plus the effect of U.S. state income tax, or together generally 25% as these amounts were not considered to be indefinitely reinvested in foreign operations for which we provided deferred taxes of $1.4 million.

At December 31, 2018, our accounting for these provisional amounts related to foreign tax effects is complete. Our one-time transition tax calculation was finalized during 2018 and the resulting liability determined to be $6.6 million.

The provision for income taxes is comprised of the following:

	Years Ended December 31,		
	2018	2017	2016
	(In thousands)		
Current			
Federal	$239,566	$102,786	$(71,878)
State	40,788	2,760	(7,304)
Foreign	(10,080)	19,597	—
Deferred			
Federal	46,434	(156,767)	100,208
State	27,845	28,527	(1,615)
Foreign	2,690	(9,282)	—
	$347,243	$(12,379)	$19,411

The statutory federal income tax rate applied to pre-tax book income reconciles to income tax expense (benefit) as follows:

	Years Ended December 31,		
	2018	2017	2016
	(In thousands)		
Tax computed at statutory rate	$320,138	$304,102	$(60,037)
Effect of the Act	(7,800)	(307,101)	—
State income taxes, net of federal tax benefit	56,936	21,343	(14,056)
Domestic production activities deduction	—	(9,937)	4,170
Noncontrolling interest in net income	(20,215)	(29,357)	(26,903)
Goodwill	—	—	119,722
Other	(1,816)	8,571	(3,485)
	$347,243	$(12,379)	$19,411

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Deferred income taxes reflect the net tax effects of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes. Our deferred income tax assets and liabilities as of December 31, 2018 and 2017 are as follows:

	December 31, 2018		
	Assets	Liabilities	Total
	(In thousands)		
Deferred income taxes			
Properties, plants and equipment (due primarily to tax in excess of book depreciation)	$—	$(577,133)	$(577,133)
Accrued employee benefits	15,395	—	15,395
Accrued post-retirement benefits	8,482	—	8,482
Accrued environmental costs	29,937	—	29,937
Hedging instruments	—	(4,099)	(4,099)
Inventory differences	—	(22,518)	(22,518)
Deferred turnaround costs	—	(87,360)	(87,360)
Net operating loss and tax credit carryforwards	13,702	—	13,702
Investment in HEP	—	(94,587)	(94,587)
Valuation allowance	—	(3,100)	(3,100)
Other	—	(1,295)	(1,295)
Total	$67,516	$(790,092)	$(722,576)

	December 31, 2017		
	Assets	Liabilities	Total
	(In thousands)		
Deferred income taxes			
Properties, plants and equipment (due primarily to tax in excess of book depreciation)	$—	$(560,957)	$(560,957)
Accrued employee benefits	14,685	—	14,685
Accrued post-retirement benefits	10,358	—	10,358
Accrued environmental costs	28,657	—	28,657
Hedging instruments	16	—	16
Inventory differences	—	(35,501)	(35,501)
Deferred turnaround costs	—	(58,645)	(58,645)
Net operating loss and tax credit carryforwards	23,037	—	23,037
Investment in HEP	—	(62,321)	(62,321)
Valuation allowance	—	(588)	(588)
Other	—	(6,526)	(6,526)
Total	$76,753	$(724,538)	$(647,785)

We have Oklahoma income tax credits of $0.4 million that can be carried forward indefinitely, and Kansas income tax credits of $7.5 million that can be carried forward for 16 tax years. We have a $12.1 million net operating loss in Luxembourg that we do not anticipate utilizing. We have recorded an adjustment to the valuation allowance of $2.5 million and $0.6 million during the years ended December 31, 2018 and 2017, respectively.

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A reconciliation of the beginning and ending amount of unrecognized tax benefits is as follows:

	Years Ended December 31,		
	2018	2017	2016
		(In thousands)	
Balance at January 1	$53,752	$ 22,137	$—
Additions based on tax positions related to the current year	—	31,615	22,137
Balance at December 31	$53,752	$ 53,752	$22,137

At December 31, 2018, 2017 and 2016, there were $53.8 million, $53.8 million, and $22.1 million, respectively, of unrecognized tax benefits that, if recognized, would affect our effective tax rate. Unrecognized tax benefits are adjusted in the period in which new information about a tax position becomes available or the final outcome differs from the amount recorded.

The 2016 and 2017 additions to unrecognized tax benefits relates to claims filed with the IRS on the federal income tax treatment of refundable biodiesel/ethanol blending tax credits for certain prior years. The issues related to the claims are complex and uncertain, and we cannot conclude that it is more likely than not that we will sustain the claims. Therefore, no tax benefit has been recognized for the filed claims. During the next 12 months, it is reasonably possible that an ultimate resolution regarding these claims could reduce unrecognized tax benefits (due to a court ruling in favor of the IRS). We do not expect these reductions to have a significant impact on our financial statements because such reductions would not significantly affect our annual effective tax rate.

We recognize interest and penalties relating to liabilities for unrecognized tax benefits as an element of tax expense. We have not recorded any penalties related to our uncertain tax positions as we believe that it is more likely than not that there will not be any assessment of penalties.

We are subject to U.S. and Canadian federal income tax, Oklahoma, Kansas, New Mexico, Iowa, Arizona, Utah, Colorado and Nebraska income tax and to income tax of multiple other state jurisdictions. We have substantially concluded all state and local income tax matters for tax years through 2013. Other than the federal claim noted above, we have materially concluded all U.S. federal income tax matters for tax years through December 31, 2013.

NOTE 15: Stockholders' Equity

Shares of our common stock outstanding and activity for the years ended December 31, 2018, 2017 and 2016 are presented below:

	Years Ended December 31,		
	2018	2017	2016
Common shares outstanding at January 1	177,407,622	177,345,266	180,234,388
Issuance of restricted stock, excluding restricted stock with performance feature	—	55,626	870,378
Vesting of performance units	115,596	138,374	76,404
Vesting of restricted stock with performance feature	543,396	350,063	40,294

Forfeitures of restricted stock	(58,497)	(139,634)	(16,795)
Purchase of treasury stock [1]	(5,886,626)	(342,073)	(3,859,403)
Common shares outstanding at December 31	172,121,491	177,407,622	177,345,266

(1) Includes 369,255, 342,073 and 147,922 shares, respectively, withheld under the terms of stock-based compensation agreements to provide funds for the payment of payroll and income taxes due at the vesting of share-based awards, as well as other stock repurchases under separate authority from our Board of Directors.

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In September 2018, our Board of Directors approved a $1 billion share repurchase program, which replaced all existing share repurchase programs, authorizing us to repurchase common stock in the open market or through privately negotiated transactions. The timing and amount of stock repurchases will depend on market conditions and corporate, regulatory and other relevant considerations. This program may be discontinued at any time by the Board of Directors. As of December 31, 2018, we had remaining authorization to repurchase up to $787.6 million under this stock repurchase program. In addition, we are authorized by our Board of Directors to repurchase shares in an amount sufficient to offset shares issued under our compensation programs.

During the years ended December 31, 2018, 2017 and 2016, we withheld shares of our common stock from certain employees in the amounts of $19.6 million, $15.9 million and $4.7 million, respectively. These withholdings were made under the terms of restricted stock and performance share unit agreements upon vesting, at which time, we concurrently made cash payments to fund payroll and income taxes on behalf of officers and employees who elected to have shares withheld from vested amounts to pay such taxes.

NOTE 16: Other Comprehensive Income (Loss)

The components and allocated tax effects of other comprehensive income are as follows:

	Before-Tax	Tax Expense (Benefit)	After-Tax
	(In thousands)		
Year Ended December 31, 2018			
Net change in foreign currency translation adjustment	$(38,227)	$(8,064)	$(30,163)
Net unrealized gain on hedging instruments	11,221	2,857	8,364
Net change in pension and other post-retirement benefit obligations	(1,507)	(378)	(1,129)
Other comprehensive loss attributable to HollyFrontier stockholders	$(28,513)	$(5,585)	$(22,928)
Year Ended December 31, 2017			
Net change in foreign currency translation adjustment	$22,151	$7,774	$14,377
Net unrealized loss on marketable securities	(4)	(1)	(3)
Net unrealized gain on hedging instruments	14,447	5,613	8,834
Net change in pension and other post-retirement benefit obligations	(5,807)	(2,037)	(3,770)
Other comprehensive income	30,787	11,349	19,438
Less other comprehensive loss attributable to noncontrolling interest	(57)	—	(57)
Other comprehensive income attributable to HollyFrontier stockholders	$30,844	$11,349	$19,495
Year Ended December 31, 2016			
Net unrealized gain on marketable securities	$104	$40	$64
Net unrealized gain on hedging instruments	25,040	9,713	15,327
Net change in other post-retirement benefit obligations	(1,113)	(431)	(682)
Other comprehensive income	24,031	9,322	14,709
Less other comprehensive loss attributable to noncontrolling interest	(58)	—	(58)
Other comprehensive income attributable to HollyFrontier stockholders	$24,089	$9,322	$14,767

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The following table presents the income statement line item effects for reclassifications out of accumulated other comprehensive income ("AOCI"):

AOCI Component	Gain (Loss) Reclassified From AOCI			Income Statement Line Item
	Years Ended December 31,			
	2018	2017	2016	
	(In thousands)			
Marketable securities	$—	$—	$(23)	Interest income
	—	—	(9)	Income tax benefit
	—	—	(14)	Net of tax
Hedging instruments:				
Commodity price swaps	(5,093)	7,836	(20,293)	Sales and other revenues
	—	(299)	—	Cost of products sold
	(962)	(19,244)	(21,864)	Operating expenses
Interest rate swaps	—	179	(508)	Interest expense
	(6,055)	(11,528)	(42,665)	
	(1,544)	(4,490)	(16,387)	Income tax benefit
	(4,511)	(7,038)	(26,278)	Net of tax
	—	(74)	320	Noncontrolling interest
	(4,511)	(7,112)	(25,958)	Net of tax and noncontrolling interest
Other post-retirement benefit obligations:				
Post-retirement healthcare obligations	3,481	3,481	3,482	Other, net
	888	1,347	1,348	Income tax expense
	2,593	2,134	2,134	Net of tax
Retirement restoration plan	(27)	(17)	(15)	Selling, general and administrative expenses
	(7)	(7)	(6)	Income tax benefit
	(20)	(10)	(9)	Net of tax
Total reclassifications for the period	$(1,938)	$(4,988)	$(23,847)	

Accumulated other comprehensive income in the equity section of our consolidated balance sheets includes:

	Years Ended December 31,	
	2018	2017
	(In thousands)	
Foreign currency translation adjustment	$(12,676)	$14,377
Unrealized loss on pension obligation	(1,404)	(654)
Unrealized gain on post-retirement benefit obligations	20,358	16,939
Unrealized gain (loss) on hedging instruments	7,345	(793)
Accumulated other comprehensive income	$13,623	$29,869

NOTE 17: Pension and Post-retirement Plans

In connection with our PCLI acquisition, we agreed to establish employee benefit plans including union and non-union pension plans and a post-retirement healthcare plan for PCLI employees that were previously covered under legacy Suncor plans.

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Our agreement with Suncor also provides that pension assets related to the union and non-union pension plans are transferred to to a pension trust, which we established, and are computed in accordance with the share purchase agreement, subject to regulatory approval. The asset transfer to our PCLI pension plan trust was a cash transfer that occurred in September 2018. As of December 31, 2018, these retirement plan assets are all in cash.

The following table sets forth the changes in the benefit obligation and plan assets of our PCLI pension plans for the year ended December 31, 2018 and the eleven months ended December 31, 2017:

	Year Ended December 31, 2018	February 1, 2017 to December 31, 2017
	(In thousands)	
Change in plans' benefit obligations		
Pension plans' benefit obligation - beginning of period	$63,582	$52,155
Service cost	4,420	3,598
Interest cost	2,249	1,979
Actuarial loss	1,058	4,503
Benefits paid	(1,429)	(966)
Foreign currency exchange rate changes	(5,445)	2,313
Pension plans' benefit obligation - end of year	$64,435	$63,582
Change in pension plans assets		
Fair value of plans assets - beginning of period	$59,261	$51,870
Actual return on plans assets	3,599	6,182
Employer contributions	6,239	—
Benefits paid	(1,429)	(966)
Foreign currency exchange rate changes	(5,208)	2,175
Fair value of plans assets - end of year	$62,462	$59,261
Funded status		
Under-funded balance	$(1,973)	$(4,321)
Amounts recognized in consolidated balance sheets		
Accrued pension liability	$(1,973)	$(4,321)
Amounts recognized in accumulated other comprehensive income		
Cumulative actuarial loss	$1,977	$1,162

The accumulated benefit obligation was $52.5 million and $52.8 million at December 31, 2018 and 2017, respectively, which are also the measurement dates used for our pension plans.

The following table provides information regarding pension plans with a projected benefit obligation in excess of the fair value of plan assets:

	December 31,	
	2018	2017

	(In thousands)	
Projected benefit obligation	$36,144	$63,582
Plan assets	$34,145	$59,261

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The weighted average assumptions used to determine end of period benefit obligations:

	December 31, 2018	2017
Discount rate	3.70%	3.40%
Rate of future compensation increases	3.00%	3.00%

Net periodic pension expense consisted of the following components:

	Year Ended December 31, 2018	February 1, 2017 to December 31, 2017
	(In thousands)	
Service cost - benefit earned during the period	$4,420	$ 3,598
Interest cost on projected benefit obligations	2,249	1,979
Expected return on plans assets	(3,464)	(2,841)
Net periodic pension expense	$3,205	$ 2,736

The weighted average assumptions used to determine net periodic pension expense:

	Year Ended December 31, 2018	February 1, 2017 to December 31, 2017
Discount rate	3.40 %	3.80 %
Rate of future compensation increases	3.00 %	3.00 %
Expected long-term rate of return on assets	5.75 %	5.75 %

The expected long-term rate of return on assets is based on a target investment mix of 60% long-term bonds and 40% global equities.

It is estimated that there will be no actuarial loss that will be amortized from accumulated other comprehensive income into net periodic benefit expense in 2019.

We expect to contribute $3.3 million to the PCLI pensions plans in 2019. Benefit payments, which reflect expected future service, are expected to be paid as follows: $1.0 million in 2019, $1.3 million in 2020, $1.5 million in 2021, $1.8 million in 2022, $2.0 million in 2023 and $13.1 million in 2024 to 2028.

Post-retirement Healthcare Plans
We have a post-retirement healthcare and other benefits plan that is available to certain of our employees who satisfy certain age and service requirements. This plan is unfunded and provides differing levels of healthcare benefits

dependent upon hire date and work location. Not all of our employees are covered by this plan at December 31, 2018. In addition, we established a post-retirement healthcare and other benefits plan for our PCLI employees.

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The following table sets forth the changes in the benefit obligation and plan assets of our post-retirement healthcare plans for the years ended December 31, 2018 and 2017:

	Years Ended December 31,	
	2018	2017
	(In thousands)	
Change in plans' benefit obligation		
Post-retirement plans' benefit obligation - beginning of year	$29,499	$18,992
PCLI acquisition	—	8,212
Service cost	1,648	1,511
Interest cost	938	987
Participant contributions	178	181
Benefits paid	(1,931)	(1,800)
Actuarial loss (gain)	(2,643)	1,058
Foreign currency exchange rate changes	(809)	358
Post-retirement plans' benefit obligation - end of year	$26,880	$29,499
Change in plan assets		
Fair value of plan assets - beginning of year	$—	$—
Employer contributions	1,676	1,542
Participant contributions	255	258
Benefits paid	(1,931)	(1,800)
Fair value of plan assets - end of year	$—	$—
Funded status		
Under-funded balance	$(26,880)	$(29,499)
Amounts recognized in consolidated balance sheets		
Accrued post-retirement liability	$(26,880)	$(29,499)
Amounts recognized in accumulated other comprehensive income		
Cumulative actuarial (loss) gain	$2,379	$(287)
Prior service credit	25,473	28,953
Total	$27,852	$28,666

Benefit payments, which reflect expected future service, are expected to be paid as follows: $1.9 million in 2019; $1.7 million in 2020; $1.7 million in 2021; $1.8 million in 2022; $1.9 million in 2023; and $9.2 million in 2024 through 2028.

The weighted average assumptions used to determine end of period benefit obligations:

	December 31, 2018		December 31, 2017	
	HFC	PCLI	HFC	PCLI
Discount rate	3.95 %	3.70 %	3.35 %	3.40 %

Current health care trend rate	6.50 %	6.50 %	7.00 %	6.50 %
Ultimate health care trend rate	5.00 %	5.00 %	5.00 %	5.00 %
Year rate reaches ultimate trend rate	2028	2022	2028	2022

HOLLYFRONTIER CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
Continued

Net periodic post-retirement credit consisted of the following components:

	Years Ended December 31,		
	2018	2017	2016
	(In thousands)		
Service cost – benefit earned during the year	$1,648	$1,511	$1,294
Interest cost on projected benefit obligations	938	987	787
Amortization of prior service credit	(3,481)	(3,481)	(3,482)
Net periodic post-retirement credit	$(895)	$(983)	$(1,401)

Prior service credits are amortized over the average remaining effective period to obtain full benefit eligibility for participants.

Assumed health care cost trend rates have an effect on the amounts reported for the post-retirement health care benefit plan. The weighted average assumptions used to determine net periodic benefit expense follow:

	Years Ended December 31,				
	2018		2017		2016
	HFC	PCLI	HFC	PCLI	HFC
Discount rate	3.35 %	3.40 %	3.75 %	3.80 %	3.90 %
Current health care trend rate	7.00 %	6.50 %	7.00 %	6.50 %	8.00 %
Ultimate health care trend rate	5.00 %	5.00 %	5.00 %	5.00 %	5.00 %
Year rate reaches ultimate trend rate	2028	2022	2030	2022	2041

The effect of a 1% change in health care cost trend rates is as follows:

	1% Point Increase	1% Point Decrease
	(In thousands)	
Service cost	$185	$(154)
Interest cost	$65	$(55)
Year-end accumulated post-retirement benefit obligation	$1,719	$(1,462)

Retirement Restoration Plan

We have an unfunded retirement restoration plan that provides for additional payments from us so that total retirement plan benefits for certain executives will be maintained at the levels provided in the retirement plan before the application of Internal Revenue Code limitations. We expensed $0.1 million, $0.1 million and $0.1 million for the years ended December 31, 2018, 2017 and 2016, respectively, in connection with this plan. The accrued liability reflected in the consolidated balance sheets was $2.3 million and $2.7 million at December 31, 2018 and 2017, respectively. As of December 31, 2018, the projected benefit obligation under this plan was $2.3 million. Annual benefit payments of $0.2 million are expected to be paid through 2028, which reflect expected future service.

Defined Contribution Plan

We have a defined contribution “401(k)” plan that covers substantially all U.S. employees. Our contributions are based on an employee's eligible compensation and years of service. We also partially match our employees’ contributions. We expensed $19.1 million, $17.6 million and $17.5 million for the years ended December 31, 2018, 2017 and 2016, respectively, in connection with this plan.

HOLLYFRONTIER CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
Continued

NOTE 18: Lease Commitments

We lease certain office and storage facilities, rail cars and other equipment under long-term operating leases, most of which contain renewal options. At December 31, 2018, the minimum future rental commitments under operating leases having non-cancellable lease terms in excess of one year are as follows:

	(In thousands)
2019	$ 104,362
2020	92,491
2021	84,581
2022	70,874
2023	61,063
Thereafter	88,206
Total	$ 501,577

Rental expense charged to operations was $84.1 million, $95.7 million and $93.2 million for the years ended December 31, 2018, 2017 and 2016, respectively.

NOTE 19: Contingencies and Contractual Commitments

We are a party to various litigation and legal proceedings which we believe, based on advice of counsel, will not either individually or in the aggregate have a materially adverse effect on our financial condition, results of operations or cash flows.

We have made claims with our insurance providers for a business interruption related to a fire at our Woods Cross Refinery that occurred during 2018. These claims are currently being evaluated by our insurance providers. We account for business interruption insurance recoveries as a gain contingency and only recognize such recoveries upon resolution of the claims with insurance providers. No amounts have been recognized to date for these business interruption claims.

Contractual Commitments
We have various long-term agreements (entered in the normal course of business) to purchase crude oil, natural gas, feedstocks and other resources to ensure we have adequate supplies to operate our refineries. The substantial majority of our purchase obligations are based on market prices or rates. These contracts expire in 2019 through 2025.

We also have long-term agreements with third parties for the transportation and storage of crude oil, natural gas and feedstocks to our refineries and for terminal and storage services that expire in 2019 through 2039. At December 31, 2018, the minimum future transportation and storage fees under transportation agreements having terms in excess of one year are as follows:

	(In thousands)
2019	$144,756

2020	138,893
2021	123,322
2022	109,083
2023	110,416
Thereafter	784,817
Total	$1,411,287

Transportation and storage costs incurred under these agreements totaled $143.3 million, $140.5 million and $135.1 million for the years ended December 31, 2018, 2017 and 2016, respectively. These amounts do not include contractual commitments under our long-term transportation agreements with HEP, as all transactions with HEP are eliminated in these consolidated financial statements.

We have a crude oil supply contract that requires the supplier to deliver a specified volume of crude oil or pay a shortfall fee for the difference in the actual barrels delivered to us less the specified barrels per the supply contract. For the contract year ended August 31, 2017, the actual number of barrels delivered to us was substantially less than the specified barrels, and we recorded a reduction to cost of products sold and accumulated a shortfall fee receivable of $26.0 million during this period. In September 2017, the supplier notified us they are disputing the shortfall fee owed and in October 2017 notified us of their demand for arbitration. We offset the receivable with payments of invoices for deliveries of crude oil received subsequent to August 31, 2017, which is permitted under the supply contract. For the second contract year ended August 31, 2018, the actual number of barrels delivered to us was less than the specified barrels, and we recorded a reduction to cost of products sold and accumulated a shortfall fee receivable of $8.0 million during this period. We offset the receivable with payments of invoices for deliveries of crude oil received subsequent to August 31, 2018, which is permitted under the supply contract. The shortfall fees owed for the second contract year are now also part of the arbitration proceedings. We believe the disputes and claims made by the supplier are without merit.

In March 2006, a subsidiary of ours sold the assets of Montana Refining Company under an Asset Purchase Agreement (“APA”). Calumet Montana Refining LLC, the current owner of the assets, has submitted requests for reimbursement of approximately $20.0 million pursuant to contractual indemnity provisions under the APA for various costs incurred. Calumet has also asserted claims related to environmental matters. We have rejected all of the currently pending claims for payment, and selected issues were arbitrated in July 2018. In September 2018, the arbitration panel ruled on the selected issues and held that the APA places a number of important limitations on claims advanced by Calumet. The remaining issues are set to be heard by the arbitration panel in April 2019. We have accrued appropriate costs for this matter, and we believe that any reasonably possible losses beyond the amounts accrued are not material.

NOTE 20: Segment Information

Our operations are organized into three reportable segments, Refining, Lubricants and Specialty Products and HEP. Our operations that are not included in the Refining, Lubricants and Specialty Products and HEP segments are included in Corporate and Other. Intersegment transactions are eliminated in our consolidated financial statements and are included in Eliminations. Corporate and Other and Eliminations are aggregated and presented under Corporate, Other and Eliminations column.

The Refining segment represents the operations of the El Dorado, Tulsa, Navajo, Cheyenne and Woods Cross Refineries and HFC Asphalt (aggregated as a reportable segment). Refining activities involve the purchase and refining of crude oil and wholesale and branded marketing of refined products, such as gasoline, diesel fuel and jet fuel. These petroleum products are primarily marketed in the Mid-Continent, Southwest and Rocky Mountain regions of the United States. HFC Asphalt operates various asphalt terminals in Arizona, New Mexico and Oklahoma.

The Lubricants and Specialty Products segment involves PCLI’s production operations, located in Mississauga, Ontario, that includes lubricant products such as base oils, white oils, specialty products and finished lubricants, and the operations of our Petro-Canada Lubricants business that includes the marketing of products to both retail and wholesale outlets through a global sales network with locations in Canada, the United States, Europe and China. Additionally, the Lubricants and Specialty Products segment includes specialty lubricant products produced at our Tulsa Refineries that are marketed throughout North America and are distributed in Central and South America. Also, effective with our acquisition that closed August 1, 2018, the Lubricants and Specialty Products segment includes Red Giant Oil, one of the largest suppliers of locomotive engine oil in North America.

The HEP segment includes all of the operations of HEP, which owns and operates logistics and refinery assets consisting of petroleum product and crude oil pipelines, terminals, tankage, loading rack facilities and processing units in the Mid-Continent, Southwest and Rocky Mountain regions of the United States. The HEP segment also includes a 75% ownership interest in UNEV (a consolidated subsidiary of HEP) and 50% ownership interest in each of the Osage Pipeline and the Cheyenne Pipeline. Revenues from the HEP segment are earned through transactions with unaffiliated parties for pipeline transportation, rental and terminalling operations as well as revenues relating to pipeline transportation services provided for our refining operations. Due to certain basis differences, our reported amounts for the HEP segment may not agree to amounts reported in HEP's periodic public filings.

The accounting policies for our segments are the same as those described in the summary of significant accounting policies (see Note 1).

HOLLYFRONTIER CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
Continued

	Refining	Lubricants and Specialty Products	HEP	Corporate, Other and Eliminations	Consolidated Total
	(In thousands)				
Year Ended December 31, 2018					
Sales and other revenues:					
Revenues from external customers	$15,806,304	$1,799,506	$108,412	$444	$17,714,666
Intersegment revenues	370,259	13,197	397,808	(781,264)	—
	$16,176,563	$1,812,703	$506,220	$(780,820)	$17,714,666
Cost of products sold (exclusive of lower of cost or market inventory valuation adjustment)	$13,250,849	$1,381,540	$—	$(691,607)	$13,940,782
Lower of cost or market inventory valuation adjustment	$136,305	$—	$—	$—	$136,305
Operating expenses	$1,055,209	$167,820	$146,430	$(83,621)	$1,285,838
Selling, general and administrative expenses	$113,641	$143,750	$11,041	$21,992	$290,424
Depreciation and amortization	$284,439	$43,255	$98,492	$11,138	$437,324
Income (loss) from operations	$1,336,120	$76,338	$250,257	$(38,722)	$1,623,993
Earnings of equity method investments	$—	$—	$5,825	$—	$5,825
Capital expenditures	$202,791	$37,448	$54,141	$16,649	$311,029
Total assets	$6,465,155	$1,506,209	$2,142,027	$881,210	$10,994,601
Year Ended December 31, 2017					
Sales and other revenues:					
Revenues from external customers	$12,579,672	$1,594,036	$77,225	$366	$14,251,299
Intersegment revenues	338,390	—	377,137	(715,527)	—
	$12,918,062	$1,594,036	$454,362	$(715,161)	$14,251,299
Cost of products sold (exclusive of lower of cost or market inventory valuation adjustment)	$11,009,419	$1,093,984	$—	$(635,530)	$11,467,873
Lower of cost or market inventory valuation adjustment	$(107,479)	$(1,206)	$—	$—	$(108,685)
Operating expenses	$1,008,859	$222,461	$137,856	$(72,507)	$1,296,669
Selling, general and administrative expenses	$103,246	$105,666	$14,336	$42,473	$265,721
Depreciation and amortization	$289,434	$31,894	$77,660	$10,949	$409,937
Long-lived asset impairment	$19,247	$—	$—	$—	$19,247
Income (loss) from operations	$595,336	$141,237	$224,510	$(60,546)	$900,537
Earnings of equity method investments	$—	$—	$12,510	$—	$12,510
Capital expenditures	$176,533	$31,464	$44,810	$19,452	$272,259
Total assets	$6,474,666	$1,610,472	$2,191,984	$415,032	$10,692,154
Year Ended December 31, 2016					
Sales and other revenues:					
Revenues from external customers	$10,002,831	$464,359	$68,927	$(417)	$10,535,700
Intersegment revenues	317,884	—	333,116	(651,000)	—
	$10,320,715	$464,359	$402,043	$(651,417)	$10,535,700
	$9,003,605	$377,136	$—	$(614,714)	$8,766,027

Cost of products sold (exclusive of lower of cost or market inventory valuation adjustment)					
Lower of cost or market inventory valuation adjustment	$(287,848)	$(4,090)	$—	$—	$(291,938)
Operating expenses	$911,829	$13,867	$124,192	$(28,736)	$1,021,152
Selling, general and administrative expenses	$92,515	$2,899	$12,557	$17,959	$125,930
Depreciation and amortization	$281,701	$620	$68,811	$11,895	$363,027
Goodwill and long-lived asset impairment	$654,084	$—	$—	$—	$654,084
Income (loss) from operations	$(335,171)	$73,927	$196,483	$(37,821)	$(102,582)
Earnings of equity method investments	$—	$—	$14,213	$—	$14,213
Capital expenditures	$357,407	$5,708	$107,595	$9,080	$479,790
Total assets	$6,048,091	$465,715	$1,920,487	$1,001,368	$9,435,661

HOLLYFRONTIER CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
Continued

NOTE 21: Quarterly Information (Unaudited)

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year
	(In thousands, except per share data)				
Year Ended December 31, 2018					
Sales and other revenues	$4,128,427	$4,471,236	$4,770,799	$4,344,204	$17,714,666
Operating costs and expenses	$3,732,580	$3,964,259	$4,267,282	$4,126,552	$16,090,673
Income from operations (1)	$395,847	$506,977	$503,517	$217,652	$1,623,993
Income before income taxes	$373,899	$480,360	$478,390	$191,818	$1,524,467
Net income attributable to HollyFrontier stockholders	$268,091	$345,507	$342,466	$141,896	$1,097,960
Net income per share attributable to HollyFrontier stockholders - basic	$1.51	$1.96	$1.95	$0.82	$6.25
Net income per share attributable to HollyFrontier stockholders - diluted	$1.50	$1.94	$1.93	$0.81	$6.19
Dividends per common share	$0.33	$0.33	$0.33	$0.33	$1.32
Average number of shares of common stock outstanding:					
Basic	176,617	175,899	175,097	172,485	175,009
Diluted	177,954	177,586	176,927	174,259	176,661
Year Ended December 31, 2017					
Sales and other revenues	$3,080,483	$3,458,864	$3,719,247	$3,992,705	$14,251,299
Operating costs and expenses	$3,114,019	$3,338,034	$3,270,834	$3,627,875	$13,350,762
Income (loss) from operations (2) (3)	$(33,536)	$120,830	$448,413	$364,830	$900,537
Income (loss) before income taxes	$(54,571)	$106,069	$446,103	$371,262	$868,863
Net income (loss) attributable to HollyFrontier stockholders	$(45,468)	$57,767	$272,014	$521,082	$805,395
Net income (loss) per share attributable to HollyFrontier stockholders - basic	$(0.26)	$0.33	$1.53	$2.94	$4.54
Net income (loss) per share attributable to HollyFrontier stockholders - diluted	$(0.26)	$0.33	$1.53	$2.92	$4.52
Dividends per common share	$0.33	$0.33	$0.33	$0.33	$1.32
Average number of shares of common stock outstanding:					
Basic	176,210	176,147	176,149	176,265	176,174
Diluted	176,210	176,302	176,530	177,457	177,196

(1) For 2018, income from operations reflects non-cash lower of cost or market inventory valuation reductions of $103.8 million and $106.9 million for the first and second quarters, respectively, and a charge of $17.8 million and $329.2 million for the third and fourth quarters, respectively.

(2) For 2017, income from operations reflects long-lived asset impairment charges of $23.2 million in the second quarter.

(3) For 2017, income from operations reflects non-cash lower of cost or market inventory valuation charges of $11.8 million and $84.0 million for the first and second quarters, respectively, and a reduction of $111.1 million and $93.4 million for the third and fourth quarters, respectively.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

We have had no change in, or disagreement with, our independent registered public accountants on matters involving accounting and financial disclosure.

Item 9A. Controls and Procedures

Evaluation of disclosure controls and procedures. Our principal executive officer and principal financial officer have evaluated, as required by Rule 13a-15(b) under the Securities Exchange Act of 1934 (the "Exchange Act"), our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e)) under the Exchange Act as of the end of the period covered by this annual report on Form 10-K. Our disclosure controls and procedures are designed to provide reasonable assurance that the information we are required to disclose in the reports that we file or submit under the Exchange Act is accumulated and communicated to our management, including our principal executive officer and principal financial officer, as appropriate, to allow timely decisions regarding required disclosure and is recorded, processed, summarized and reported within the time periods specified in the Securities and Exchange Commission's rules and forms. Based upon the evaluation, our principal executive officer and principal financial officer have concluded that our disclosure controls and procedures were effective at the reasonable assurance level as of December 31, 2018.

Changes in internal control over financial reporting. There have been no changes in our internal control over financial reporting (as defined in Rule 13a-15(f) under the Exchange Act) that occurred during our last fiscal quarter that have materially affected or are reasonably likely to materially affect our internal control over financial reporting.

See Item 8 for "Management's Report on its Assessment of the Company's Internal Control Over Financial Reporting" and "Report of the Independent Registered Public Accounting Firm."

Item 9B. Other Information

There have been no events that occurred in the fourth quarter of 2018 that would need to be reported on Form 8-K that have not previously been reported.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

The information required by Items 401, 405, 406 and 407(c)(3), (d)(4) and (d)(5) of Regulation S-K in response to this item will be set forth in our definitive proxy statement for the annual meeting of stockholders to be held on May 8, 2019 and is incorporated herein by reference.

Item 11. Executive Compensation

The information required by Items 402 and 407(e)(4) and (e)(5) of Regulation S-K in response to this item will be set forth in our definitive proxy statement for the annual meeting of stockholders to be held on May 8, 2019 and is incorporated herein by reference.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

The equity compensation plan information required by Item 201(d) and the information required by Item 403 of Regulation S-K in response to this item will be set forth in our definitive proxy statement for the annual meeting of stockholders to be held on May 8, 2019 and is incorporated herein by reference.

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Item 13. Certain Relationships and Related Transactions, and Director Independence

The information required by Items 404 and 407(a) of Regulation S-K in response to this item will be set forth in our definitive proxy statement for the annual meeting of stockholders to be held on May 8, 2019 and is incorporated herein by reference.

Item 14. Principal Accounting Fees and Services

The information required by Item 9(e) of Schedule 14A in response to this item will be set forth in our definitive proxy statement for the annual meeting of stockholders to be held on May 8, 2019 and is incorporated herein by reference.

PART IV

Item 15. Exhibits, Financial Statement Schedules

(a) Documents filed as part of this report

(1) Index to Consolidated Financial Statements

	Page in Form 10-K
Report of Independent Registered Public Accounting Firm	56
Consolidated Balance Sheets at December 31, 2018 and 2017	57
Consolidated Statements of Income for the years ended December 31, 2018, 2017 and 2016	58
Consolidated Statements of Comprehensive Income for the years ended December 31, 2018, 2017 and 2016	59
Consolidated Statements of Cash Flows for the years ended December 31, 2018, 2017 and 2016	60
Consolidated Statements of Equity for the years ended December 31, 2018, 2017 and 2016	61
Notes to Consolidated Financial Statements	62

(2) Index to Consolidated Financial Statement Schedules

All schedules are omitted since the required information is not present or is not present in amounts sufficient to require submission of the schedule, or because the information required is included in the consolidated financial statements or notes thereto.

(3) Exhibits

The Exhibit Index on pages 105 to 110 of this Annual Report on Form 10-K lists the exhibits that are filed or furnished, as applicable, as part of this Annual Report on Form 10-K.

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HOLLYFRONTIER CORPORATION
INDEX TO EXHIBITS

Exhibits are numbered to correspond to the exhibit table in Item 601 of Regulation S-K

Exhibit Number	Description
2.1†	Asset Sale and Purchase Agreement, dated October 19, 2009, between Holly Refining & Marketing-Tulsa LLC, HEP Tulsa LLC and Sinclair Tulsa Refining Company (incorporated by reference to Exhibit 2.1 of Registrant's Current Report on Form 8-K filed October 21, 2009, File No. 1-03876).
2.2†	Amendment No. 1 to Asset Sale and Purchase Agreement, dated December 1, 2009, between Holly Refining & Marketing-Tulsa LLC, HEP Tulsa LLC and Sinclair Tulsa Refining Company (incorporated by reference to Exhibit 2.1 of Registrant's Current Report on Form 8-K filed December 7, 2009, File No. 1-03876).
2.3†	Asset Sale and Purchase Agreement, dated April 15, 2009, between Holly Refining & Marketing-Midcon, L.L.C. and Sunoco, Inc. (incorporated by reference to Exhibit 2.1 of Registrant's Current Report on Form 8-K filed April 16, 2009, File No. 1-03876).
2.4†	Share Purchase Agreement, dated October 29, 2016, by and between Suncor Energy Inc. and 9952110 Canada Inc. (incorporated by reference to Exhibit 2.1 of Registrant's Current Report on Form 8-K filed October 31, 2016, File No. 1-03876).
2.5†	Equity Restructuring Agreement, dated as of October 18, 2017, by and between HEP Logistics Holdings, L.P. and Holly Energy Partners, L.P. (incorporated by reference to Exhibit 2.1 of Registrant's Current Report on Form 8-K filed October 19, 2017, File No. 1-03876).
2.6†	Equity Purchase Agreement, dated November 12, 2018, by and between Sonneborn Holdings, L.P., Sonneborn Co-Op LLC, Sonneborn Coöperatief U.A. and HollyFrontier LSP Holdings LLC (incorporated by reference to Exhibit 2.1 of Registrant's Current Report on Form 8-K filed November 13, 2018, File No. 1-03846).
2.7*	Waiver and Amendment to Equity Purchase Agreement, dated January 31, 2019, by and between Sonneborn Holdings, L.P., Sonneborn Co-Op LLC, Sonneborn Coöperatief U.A. and HollyFrontier LSP Holdings LLC
3.1	Amended and Restated Certificate of Incorporation of HollyFrontier Corporation (incorporated by reference to Exhibit 3.1 of Registrant's Current Report on Form 8-K filed July 8, 2011, File No. 1-03876).
3.2	Amended and Restated Bylaws of HollyFrontier Corporation (incorporated by reference to Exhibit 3.1 of Registrant's Current Report on Form 8-K filed February 20, 2014, File No. 1-03876).
4.1	Indenture, dated July 19, 2016, among Holly Energy Partners, L.P., Holly Energy Finance Corp., and each of the Guarantors party thereto and U.S. Bank National Association (incorporated by reference to Exhibit 4.1 of Holly Energy Partners, L.P.'s Current Report on Form 8-K filed July 19, 2016, File Number 1-32225).

4.2	First Supplemental Indenture, dated November 2, 2016, among Woods Cross Operating LLC, Holly Energy Partners, L.P., and Holly Energy Finance Corp., the other Guarantors and U.S. Bank National Association (incorporated by reference to Exhibit 4.3 of Holly Energy Partners, L.P.'s Quarterly Report on Form 10-Q for the quarterly period ended September 30, 2016, File Number 1-32225).
4.3	Second Supplemental Indenture, dated July 26, 2017, by and among Holly Energy Holdings LLC, HEP Cheyenne Shortline LLC, Holly Energy Partners, L.P., Holly Energy Finance Corp., the other guarantors therein and U.S. Bank National Association, as trustee (incorporated by reference to Exhibit 4.1 of Registrant's Quarterly Report on Form 10-Q for the quarterly period ended June 30, 2017, File No. 1-03876).
4.4	Third Supplemental Indenture, dated as of May 29, 2018, by and among HEP Oklahoma LLC, Holly Energy Partners, L.P., Holly Energy Finance Corp., the other Guarantors party thereto, and U.S. Bank National Association (incorporated by reference to Exhibit 4.1 of Holly Energy Partners, L.P.'s Quarterly Report on Form 10-Q for the quarterly period ended June 30, 2018, File No. 1-32225).
4.5	Indenture, dated March 22, 2016, between HollyFrontier Corporation and Wells Fargo Bank, National Association (incorporated by reference to Exhibit 4.1 of Registrant's Current Report on Form 8-K filed March 22, 2016, File No. 1-03876).
4.6	Supplemental Indenture, dated March 22, 2016, between HollyFrontier Corporation and Wells Fargo Bank, National Association (incorporated by reference to Exhibit 4.2 of Registrant's Current Report on Form 8-K filed March 22, 2016, File No. 1-03876).

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Exhibit Number	Description
10.1	Amended and Restated Intermediate Pipelines Agreement, dated June 1, 2009, among Holly Corporation, Navajo Refining Company, L.L.C, Holly Energy Partners, L.P., Holly Energy Partners – Operating, L.P., HEP Pipeline, L.L.C., Lovington-Artesia, L.L.C., HEP Logistics Holdings, L.P., Holly Logistics Services, L.L.C. and HEP Logistics GP, L.L.C. (incorporated by reference to Exhibit 10.2 of Holly Energy Partners, L.P.'s Current Report on Form 8-K filed June 5, 2009, File No. 1-32225).
10.2	Amendment to Amended and Restated Intermediate Pipelines Agreement, dated December 9, 2010, among Navajo Refining Company, L.L.C, Holly Energy Partners, L.P., Holly Energy Partners – Operating, L.P., HEP Pipeline, L.L.C., Lovington-Artesia, L.L.C., HEP Logistics Holdings, L.P., Holly Logistics Services, L.L.C. and HEP Logistics GP, L.L.C. (incorporated by reference to Exhibit 10.4 of Registrant's Annual Report on Form 10-K for its fiscal year ended December 31, 2010, File No. 1-03876).
10.3	Assignment and Assumption Agreement (Amended and Restated Intermediate Pipelines Agreement), effective January 1, 2011, between Navajo Refining Company, L.L.C. and Holly Refining & Marketing Company LLC (incorporated by reference to Exhibit 10.5 of Registrant's Annual Report on Form 10-K for its fiscal year ended December 31, 2010, File No. 1-03876).
10.4	Tulsa Equipment and Throughput Agreement, dated August 1, 2009, between Holly Refining & Marketing - Tulsa LLC and HEP Tulsa LLC (incorporated by reference to Exhibit 10.3 of Holly Energy Partners L.P.'s Current Report on Form 8-K filed August 6, 2009, File No. 1-32225).
10.5	Amendment to Tulsa Equipment and Throughput Agreement, dated December 9, 2010, among Holly Refining & Marketing - Tulsa LLC and HEP Tulsa LLC (incorporated by reference to Exhibit 10.7 of Registrant's Annual Report on Form 10-K for its fiscal year ended December 31, 2010, File No. 1-03876).
10.6	Assignment and Assumption Agreement (Tulsa Equipment and Throughput Agreement), effective January 1, 2011, between Holly Refining & Marketing - Tulsa, LLC and Holly Refining & Marketing Company LLC (incorporated by reference to Exhibit 10.8 of Registrant's Annual Report on Form 10-K for its fiscal year ended December 31, 2010, File No. 1-03876).
10.7	Tulsa Purchase Option Agreement, dated August 1, 2009, between Holly Refining & Marketing - Tulsa LLC and HEP Tulsa LLC (incorporated by reference to Exhibit 10.4 of Holly Energy Partners L.P.'s Current Report on Form 8-K filed August 6, 2009, File No. 1-32225).
10.8	Third Amended and Restated Crude Pipelines and Tankage Agreement, dated March 12, 2015, by and among Navajo Refining Company, L.L.C., Holly Refining & Marketing Company - Woods Cross LLC, HollyFrontier Refining & Marketing LLC, Holly Energy Partners-Operating, L.P., HEP Pipeline, L.L.C. and HEP Woods Cross L.L.C. (incorporated by reference to Exhibit 10.2 of Registrant's Current Report on Form 8-K filed March 16, 2015, File No. 1-03876).
10.9	Second Amended and Restated Refined Products Pipelines and Terminals Agreement, dated February 22, 2016, by and among HollyFrontier Refining & Marketing LLC, HollyFrontier Corporation, Holly Energy Partners - Operating, L.P. and Holly Energy Partners, L.P. (incorporated by reference to Exhibit 10.3 of Registrant's Current Report on Form 8-K filed February 22, 2016, File No. 1-03876).
10.10	

	First Amendment to Second Amended and Restated Refined Products Pipelines and Terminals Agreement, dated October 29, 2018, effective June 4, 2018, by and between HollyFrontier Refining & Marketing LLC and Holly Energy Partners - Operating, L.P. (incorporated by reference to Exhibit 10.6 of Registrant's Current Report on Form 8-K filed November 1, 2018, File No. 1-03846).
10.11	Nineteenth Amended and Restated Omnibus Agreement, dated October 29, 2018, effective June 1, 2018, by and among HollyFrontier Corporation, Holly Energy Partners, L.P. and certain of their respective subsidiaries (incorporated by reference to Exhibit 10.2 of Registrant's Current Report on Form 8-K filed November 1, 2018, File No. 1-03876).
10.12	Senior Unsecured 5-Year Revolving Credit Agreement, dated July 1, 2014, among HollyFrontier Corporation, as borrower, Union Bank, N. A. as administrative agent, and each of the financial institutions party thereto as lenders (incorporated by reference to Exhibit 10.1 of Registrant's Current Report on Form 8-K filed July 8, 2014, File No. 1-03876).
10.13	First Amendment to Senior Unsecured 5-Year Revolving Credit Agreement, dated as of February 16, 2017, among HollyFrontier Corporation, as borrower, The Bank of Tokyo-Mitsubishi UFJ, Ltd., as administrative agent, and the lenders party thereto (incorporated by reference to Exhibit 10.1 of Registrant's Current Report on Form 8-K filed February 21, 2017, File No. 1-03876).
10.14	Release of Subsidiary Guarantee, dated December 29, 2015, by and among HollyFrontier Corporation and Union Bank, N.A. (incorporated by reference to Exhibit 10.40 of Registrant's Annual Report on Form 10-K for the fiscal year ended December 31, 2015, File No. 1-03876).

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Exhibit Number	Description
10.15	Frontier Products Offtake Agreement El Dorado Refinery, dated October 19, 1999, between Frontier Oil and Refining Company and Equiva Trading Company (now Shell Oil Products US, assignee of Equiva Trading Company) ("the Agreement") and First Amendment to the Agreement dated September 18, 2000, Second Amendment to the Agreement dated September 21, 2000, Third Amendment to the Agreement dated December 19, 2000, Fourth Amendment to the Agreement dated February 22, 2001, Fifth Amendment to the Agreement dated August 14, 2001, Sixth Amendment to the Agreement dated November 5, 2001, Seventh Amendment to the Agreement dated April 22, 2002, Eighth Amendment to the Agreement date d May 30, 2003, Ninth Amendment to the Agreement dated May 25, 2004, Tenth Amendment to the Agreement dated May 3, 2005, Eleventh Amendment to the Agreement dated March 31, 2006,