HOLLYFRONTIER

2019 ANNUAL REPORT

REFINING

MID-CONTINENT

EL DORADO REFINERY

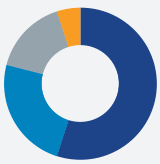
- Located in El Dorado, Kansas
- 135,000 BPD capacity
- Processes sour and heavy Canadian crude oils into high-value light products
- Distributes to high-margin markets in Colorado and Mid-Continent/Plains states

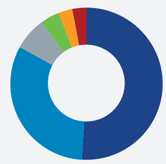
TULSA REFINERIES

- Located in Tulsa, Oklahoma
- 125,000 BPD capacity
- Processes predominantly sweet crude oil with up to 10,000 BPD of sour Canadian crudes
- Distributes to the Mid-Continent states

MID-CONTINENT SALES OF REFINERY PRODUCED PRODUCTS 259,310 BPD

The Mid-Continent Region comprises our El Dorado and Tulsa refineries and has a combined crude oil processing capacity of 260,000 BPD.





SOUTHWEST

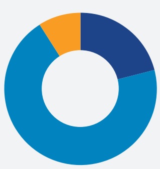
NAVAJO REFINERY

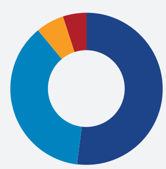
- Located in Artesia, New Mexico, and operated in conjunction with a refining facility 65 miles east in Lovington, New Mexico
- 100,000 BPD capacity
- Processes sour crude oil into high-value light products
- Distributes to high-margin markets in Arizona, New Mexico and West Texas

SOUTHWEST SALES OF REFINERY PRODUCED PRODUCTS 117,230 BPD

The Southwest Region consists of our Navajo refinery and has a crude oil processing capacity of 100,000 BPD.

In addition, we manufacture and market commodity and modified asphalt products throughout the Southwest Region.





ROCKY MOUNTAINS

CHEYENNE REFINERY

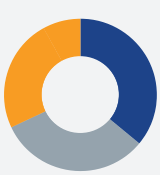
- Located in Cheyenne, Wyoming
- 52,000 BPD capacity
- Processes heavy Canadian crude oils as well as local sweet crudes into high-value light products
- Distributes to high-margin Eastern Rockies and Plains states

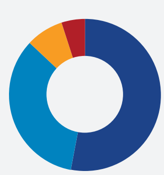
WOODS CROSS REFINERY

- Located in Woods Cross, Utah (near Salt Lake City)
- 45,000 BPD capacity
- Processes regional sweet and advantaged waxy crude
- Distributes to high-margin markets in Utah, Idaho, Nevada, Wyoming and eastern Washington

ROCKY MOUNTAIN SALES OF REFINERY PRODUCED PRODUCTS 72,650 BPD

The Rocky Mountain Region comprises our Cheyenne and Woods Cross refineries and has a combined crude oil processing capacity of 97,000 BPD.





MIDSTREAM

HOLLY ENERGY PARTNERS, L.P.

Holly Energy Partners owns and operates substantially all of the refined product pipeline and terminalling assets that support our refining and marketing operations in the Mid-Continent, Southwest and Rocky Mountain Regions of the United States.

3,400 MILES
OF CRUDE OIL AND PETROLEUM PRODUCT PIPELINES

15 MILLION
BARRELS OF REFINED PRODUCT AND CRUDE OIL STORAGE

9 TERMINALS
AND 7 LOADING RACK FACILITIES

REFINERY PROCESSING UNITS
IN WOODS CROSS, UTAH AND EL DORADO, KANSAS

75% JOINT-VENTURE INTEREST
IN THE UNEV PIPELINE –
A 427-mile refined products pipeline system connecting Salt Lake area refiners to the Las Vegas product market

50% INTEREST
IN THE CHEYENNE PIPELINE –
An 87-mile crude oil pipeline from Fort Laramie, Wyoming to Cheyenne, Wyoming

50% INTEREST
IN THE OSAGE PIPELINE –
A 135-mile crude oil pipeline from Cushing, Oklahoma to El Dorado, Kansas

50% INTEREST
IN CUSHING CONNECT –
A joint venture formed for (i) the development and construction of a new 160,000 barrel per day common carrier crude oil pipeline that will connect the Cushing, Oklahoma crude oil hub to our Tulsa Refineries and (ii) the ownership and operation of 1.5 million barrels of crude oil storage in Cushing, Oklahoma

LUBRICANTS

HOLLYFRONTIER LUBRICANTS AND SPECIALTY PRODUCTS

HollyFrontier Lubricants & Specialty Products (HFLSP) produces base oils and other specialized lubricants in the United States, Canada and the Netherlands, exporting products to more than 80 countries worldwide. In addition to specialty lubricant products produced at our Tulsa Refinery, HFLSP includes the operations of Petro-Canada Lubricants, Red Giant Oil and Sonneborn.

The Petro-Canada Lubricants facility in Mississauga, Ontario 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. These products are marketed worldwide to a diverse customer base through a global sales force and distributor network.

Red Giant Oil, located in Council Bluffs, Iowa, is one of the largest suppliers of locomotive engine oils in North America. Red Giant Oil produces both single and multi-grade oils and offers a range of value-added services and solutions for customers in the railroad industry.

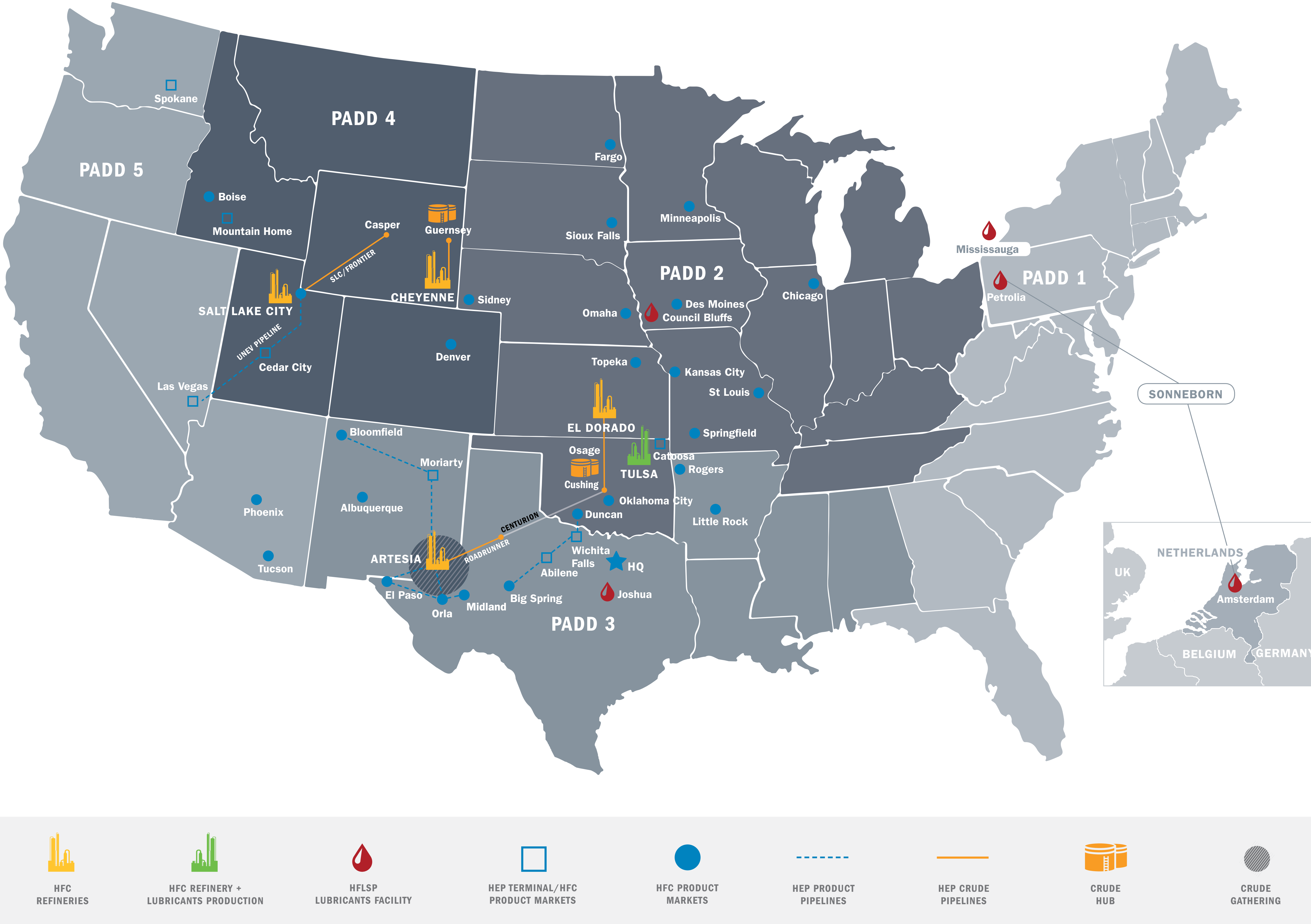
The Tulsa Refinery produces base oils, specialty process oils, horticultural oils, asphalt modifiers and wax. Products are marketed worldwide through strategically located terminals in the United States, as well as our comprehensive distributor network in North America.

In February 2019, we acquired Sonneborn, a producer of specialty hydrocarbon chemicals such as white oils, petrolatums and waxes for the personal care, cosmetic, pharmaceutical and food processing industries. Sonneborn has manufacturing facilities in Petrolia, Pennsylvania and the Netherlands. Combined with Petro-Canada Lubricants, it is one of the world's largest producers of pharmaceutical white oils.

4TH LARGEST
BASE OILS PRODUCER IN NORTH AMERICA

35,000 BPD
LUBRICANTS PRODUCTION CAPACITY

10%
OF NORTH AMERICAN PRODUCTION



PADD 5
PADD 4
PADD 2
PADD 1
PADD 3
Spokane
Boise
Mountain Home
Casper
Guernsey
SLC/FRONTIER
CHEYENNE
SALT LAKE CITY
UNEV PIPELINE
Cedar City
Las Vegas
Sidney
Denver
Fargo
Sioux Falls
Minneapolis
Omaha
Des Moines
Council Bluffs
Chicago
Mississauga
Petrolia
SONNEBORN
Topeka
Kansas City
St Louis
EL DORADO
Springfield
Osage
Catoosa
Rogers
Cushing
TULSA
Oklahoma City
Little Rock
Duncan
Bloomfield
Moriarty
Albuquerque
Phoenix
Tucson
CENTURION
ROADRUNNER
ARTESIA
Wichita Falls
HQ
Abilene
Big Spring
Joshua
El Paso
Orla
Midland
NETHERLANDS
UK
Amsterdam
BELGIUM
GERMANY
HFC REFINERIES
HFC REFINERY + LUBRICANTS PRODUCTION
HFLSP LUBRICANTS FACILITY
HEP TERMINAL/HFC PRODUCT MARKETS
HFC PRODUCT MARKETS
HEP PRODUCT PIPELINES
HEP CRUDE PIPELINES
CRUDE HUB
CRUDE GATHERING

SHAREHOLDERS

DEAR FELLOW SHAREHOLDERS

In 2019, HollyFrontier delivered solid operating results as our focus on reliability, safety and efficiency helped drive record throughput and strong margin generation. While the market environment was challenging this past year, we made important progress building on HollyFrontier's already strong foundation by executing key initiatives across our Refining, Midstream, and Lubricants and Specialty Products business segments:

Refining: This segment continues to benefit from the proximity of our five refineries to crude oil production basins, inland coastal crude discounts and a high complexity level that enables us to process heavier crudes and produce a high percentage of gasoline, diesel fuel and other high value refined products. The investments we have made in our refineries over the last five years have increased refining capacity by 15% across our system, strengthened our capabilities and improved reliability and efficiency.

While our full year financial results reflect the lower refined product margin environment, our strong cash flow generation allowed us to invest over $500 million into our assets. We successfully completed turnaround work at our Tulsa, Cheyenne, El Dorado and Woods Cross refineries, and are pleased with our solid operating performance for the year.

Looking ahead, we have a light turnaround schedule for 2020 and are well positioned to drive growth and take advantage of attractive product margins and crude sources across our refining system.

Midstream: HollyFrontier continues to benefit from Holly Energy Partners, L.P.'s (HEP) strong and stable cash flow stream. HEP's system of crude pipelines, storage tanks, distribution terminals and loading rack facilities are positioned near HFC's refining assets in high growth markets. In 2019, HEP achieved very strong volume performance, driven by its oil pipeline systems in Wyoming and Utah, as well as its UNEV product pipeline. Throughout the year, HEP extended its track record of returning capital to shareholders by distributing over $272 million to unitholders (including HFC). In October 2019, HEP and Plains All American Pipeline LP formed a 50/50 joint venture, named Cushing Connect Pipeline & Terminal LLC. The joint venture will construct a 160,000 barrel per day pipeline connecting the Cushing, Oklahoma crude oil hub to HollyFrontier's Tulsa refinery. The joint venture will also own and operate 1.5 million barrels of crude oil storage in Cushing, supporting HollyFrontier's Tulsa and El Dorado refineries.

In 2020, HEP is pursuing compelling growth and value-creation opportunities. HEP intends to capitalize on its existing footprint to drive organic growth, while pursuing disciplined M&A and partnering with HFC to acquire new assets and businesses.

HollyFrontier Lubricants and Specialty Products: The segment produces base oils and specialty lubricants under the HollyFrontier, Petro-Canada Lubricants, Sonneborn and Red Giant Oil brands. It consists of "Rack Back" operations that capture the value between feedstock cost and base oil market prices and "Rack Forward" operations that capture the value between the base oil market prices and product sale revenues from its well-recognized brands and products. In 2019, we continued to build out this segment by integrating Sonneborn and Red Giant Oil. With increased scale and a broader global footprint, we are on track to capture the expected $20 million in annual synergies from the Sonneborn transaction, which will further enhance our Rack Forward earnings power. While our 2019 financial results for this segment reflect a challenging base oil market and the impact of unfavorable macroeconomic conditions, including global trade disruption, we are excited about the growth and value creation prospects of the Lubricants and Specialty Products business.

CASH RETURN TO SHAREHOLDERS

In addition to growing the business, delivering value through the return of capital to shareholders remains a top priority. To that end, in 2019, HollyFrontier returned more than $758 million in cash to shareholders through regular quarterly dividends of $225 million and share repurchases totaling $533 million. In November 2019, the Company's Board of Directors authorized a new $1 billion share repurchase program. The Board also increased the Company's dividend by 6% and intends to target a dividend growth rate of approximately 5% per year over the next three years.

INVESTING AND EVOLVING FOR THE FUTURE

Renewables are a new and evolving area for our company. In November 2019, we announced an exciting $350 million investment in a renewable diesel unit (RDU) at our refinery in Artesia, New Mexico. Renewable diesel is a cleaner burning fuel that produces approximately 50% less greenhouse gas emissions than conventional diesel. The RDU will have an annual production capacity of approximately 125 million gallons, with throughput of 9,000 barrels per day.

This investment expands our capabilities, opens the door for future growth opportunities and mitigates the Company's annual Renewable Identification Number (RIN) purchase obligations. The RDU is being funded with cash on hand and is expected to come online in the first quarter of 2022.

WELL POSITIONED FOR VALUE CREATION

We ended 2019 with solid operational performance and a strong financial foundation. In 2020, we have a clear strategy to create incremental value through a balanced approach to capital allocation, which includes:

- reinvesting in the Company's existing assets;
- maintaining a healthy balance sheet with an investment grade credit profile;
- paying a competitive and sustainable regular dividend through the cycle;
- investing in high-return growth projects and/or acquisitions; and
- returning excess cash to shareholders through share repurchases.

We are moving forward from a position of strength, with the expectation that HollyFrontier will continue to deliver sustainable growth and value creation for shareholders. Our company culture of safety, integrity, teamwork and ownership serve as our foundation.

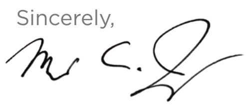
Across all of our operations, safety continues to be a top priority. We achieved strong safety performance in 2019, with a 24% reduction in employee injury rates and 23% reduction in process safety events. We are committed to maintaining a safe work environment enriched by diversity and characterized by championing a culture of teamwork and ownership.

As we move forward, HollyFrontier's talented employees will continue to drive our success. Thanks to their hard work and commitment to working safely, we expect to continue operating reliably and delivering exceptional performance. It cannot be overstated that our people are our most important resource, and we are grateful for everything they do for the Company.

We are energized by the progress we are making and our outlook for the future remains bright. I look forward to updating you throughout 2020.

On behalf of our Board of Directors and our employees, thank you for your investment in HollyFrontier.

Sincerely,



Michael C. Jennings
Chief Executive Officer and President

2019 HFC YEAR IN REVIEW

STRONG FINANCIAL PERFORMANCE

$15.96
REFINERY GROSS MARGIN PER PRODUCED BARREL SOLD

$1.5 BILLION
OPERATING CASH FLOW

$772 MILLION
NET INCOME ATTRIBUTABLE TO HFC STOCKHOLDERS

STRONG FINANCIAL POSITION

$885 MILLION
CASH AND SHORT-TERM INVESTMENTS

S&P | FITCH MOODY'S
INVESTMENT GRADE

27%
CONSOLIDATED DEBT TO CAPITAL RATIO

CAPITAL RETURNED TO SHAREHOLDERS

$758 MILLION
TOTAL RETURNED

$225 MILLION
IN DIVIDENDS

$533 MILLION
IN SHARE REPURCHASES

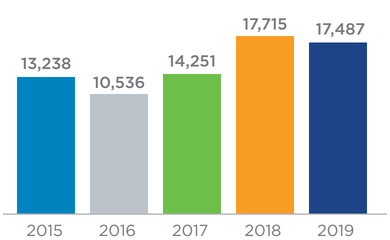
FINANCIAL HIGHLIGHTS

$ in thousands, except per share data

YEAR ENDED DECEMBER 31	2018	2019
Sales and other revenues	$ 17,714,666	$ 17,486,578
Income before income taxes	$ 1,524,467	$ 1,171,504
Net income attributable to HFC stockholders	$ 1,097,960	$ 772,388
Earnings per common share attributable to HFC stockholders – diluted	$ 6.19	$ 4.61
Cash flows from operating activities	$ 1,554,416	$ 1,548,611
Cash flows used for capital expenditures	$ 311,029	$ 293,763
Total assets	$ 10,994,601	$ 12,164,841
HFC stockholders' equity	$ 5,918,571	$ 5,978,193
Sales of produced refined products – barrels per day ("BPD")	452,630	449,190
Employees	3,622	4,074

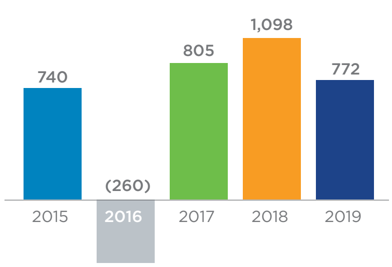
SALES AND OTHER REVENUES

$ in millions



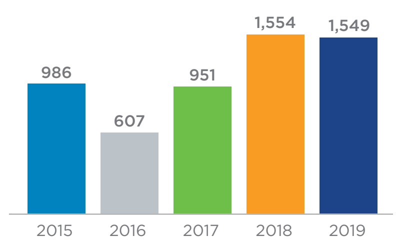
NET INCOME (LOSS) ATTRIBUTABLE TO HFC STOCKHOLDERS

$ in millions



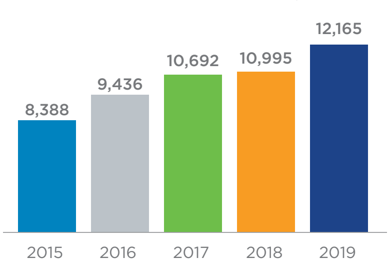
CASH FLOWS FROM OPERATING ACTIVITIES

$ in millions



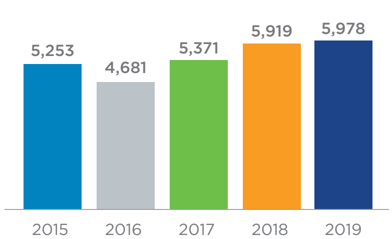
TOTAL ASSETS

$ in millions



HFC STOCKHOLDERS' EQUITY

$ in millions



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

FORM 10-K

(Mark One)

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2019
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**
(Address of principal executive offices)	**(Zip Code)**

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

Securities registered pursuant to 12(b) of the Securities Exchange Act of 1934:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock $0.01 par value	HFC	New York Stock Exchange

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ 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 ☒

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 ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate web site, if any, 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 ☒ No ☐

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	☒	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 ☒

On June 28, 2019, 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 $7.1 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.)

161,869,492 shares of Common Stock, par value $.01 per share, were outstanding on February 14, 2020.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's proxy statement for its annual meeting of stockholders to be held on May 13, 2020, which proxy statement will be filed with the Securities and Exchange Commission within 120 days after December 31, 2019, are incorporated by reference in Part III.

TABLE OF CONTENTS

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 and 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 and transporters of refined petroleum products or lubricant and specialty products in our markets;
- the demand for and supply of crude oil, refined products and lubricant and specialty 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 or lubricant and specialty 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 and consummating 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 cyberattacks 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.

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.

"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.

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 $662.7 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, located in Mississauga, Ontario, 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, 2019, 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 specialty lubricant products;
- owned and operated Sonneborn with manufacturing facilities in Petrolia, Pennsylvania and the Netherlands, which produce specialty lubricant products such as white oils, petrolatums and waxes;
- 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 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, Red Giant Oil and Sonneborn 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,		
	2019	2018	2017
Consolidated			
Crude charge (BPD) (1)	427,600	431,570	438,800
Refinery throughput (BPD) (2)	458,600	463,340	472,010
Sales of produced refined products (BPD) (3)	449,190	452,630	452,270
Refinery utilization (4)	93.6%	94.4%	96.0%
Average per produced barrel sold (5)			
Refinery gross margin	$ 15.96	$ 17.71	$ 11.56
Refinery operating expenses (6)	6.68	6.39	6.11
Net operating margin	$ 9.28	$ 11.32	$ 5.45
Refinery operating expenses per throughput barrel (7)	$ 6.54	$ 6.24	$ 5.86
Feedstocks:			
Sweet crude oil	44%	43%	48%
Sour crude oil	30%	30%	25%
Heavy sour crude oil	15%	17%	16%
Black wax crude oil	4%	4%	4%
Other feedstocks and blends	7%	6%	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.
(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) Represents total refining segment operating expenses, exclusive of depreciation and amortization, divided by sales volumes of refined products produced at our refineries.
(7) 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,		
	2019	2018	2017
Consolidated			
Sales of refined products:			
Gasolines	52%	52%	52%
Diesel fuels	34%	34%	34%
Jet fuels	4%	3%	4%
Fuel oil	2%	2%	2%
Asphalt	4%	4%	4%
Base oils	2%	2%	2%
LPG and other	2%	3%	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 5 “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.

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

	Years Ended December 31,		
	2019	2018	2017
Mid-Continent Region (El Dorado and Tulsa Refineries)			
Crude charge (BPD) (1)	254,010	249,240	261,380
Refinery throughput (BPD) (2)	268,500	264,730	277,940
Sales of produced refined products (BPD) (3)	259,310	255,800	260,800
Refinery utilization (4)	97.7%	95.9%	100.5%
Average per produced barrel sold (5)			
Refinery gross margin	$ 13.71	$ 14.44	$ 9.91
Refinery operating expenses (6)	5.77	5.51	5.15
Net operating margin	$ 7.94	$ 8.93	$ 4.76
Refinery operating expenses per throughput barrel (7)	$ 5.58	$ 5.32	$ 4.83

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

	Years Ended December 31,		
	2019	2018	2017
Mid-Continent Region (El Dorado and Tulsa Refineries)			
Feedstocks:			
Sweet crude oil	55%	54%	61%
Sour crude oil	24%	24%	17%
Heavy sour crude oil	16%	16%	16%
Other feedstocks and blends	5%	6%	6%
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.

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,		
	2019	**2018**	**2017**
Mid-Continent Region (El Dorado and Tulsa Refineries)			
Sales of refined products:			
Gasolines	51%	51%	50%
Diesel fuels	32%	33%	33%
Jet fuels	7%	6%	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.

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

	Years Ended December 31,		
	2019	2018	2017
Southwest Region (Navajo Refinery)			
Crude charge (BPD) (1)	101,760	109,440	100,040
Refinery throughput (BPD) (2)	111,870	118,630	109,280
Sales of produced refined products (BPD) (3)	117,230	120,520	111,630
Refinery utilization (4)	101.8%	109.4%	100.0%
Average per produced barrel sold (5)			
Refinery gross margin	$ 18.97	$ 19.05	$ 12.40
Refinery operating expenses (6)	5.10	4.81	5.20
Net operating margin	$ 13.87	$ 14.24	$ 7.20
Refinery operating expenses per throughput barrel (7)	$ 5.35	$ 4.89	$ 5.31

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

	Years Ended December 31,		
	2019	2018	2017
Southwest Region (Navajo Refinery)			
Feedstocks:			
Sweet crude oil	21%	27%	25%
Sour crude oil	70%	65%	66%
Other feedstocks and blends	9%	8%	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.

On November 18, 2019, we announced our plans to construct a new renewable diesel unit ("RDU") at our Artesia facility. The RDU will have a production capacity of approximately 125 million gallons a year and allow us to process soybean oil and other renewable feedstocks into renewable diesel. This investment will provide us the opportunity to meet the demand for low-carbon fuels while covering the cost of our annual RINs purchase obligation under current market conditions. The RDU, along with corresponding rail infrastructure and storage tanks, is estimated to have a total capital cost of $350 million, and is expected to be completed in the first quarter of 2022.

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.

Products

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

	Years Ended December 31,		
	2019	2018	2017
Southwest Region (Navajo Refinery)			
Sales of refined products:			
Gasolines	52%	50%	51%
Diesel fuels	37%	40%	39%
Fuel oil	3%	3%	3%
Asphalt	5%	4%	4%
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 into high-value light products.

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

	Years Ended December 31,		
	2019	2018	2017
Rocky Mountain Region (Cheyenne and Woods Cross Refineries)			
Crude charge (BPD) [(1)]	71,830	72,890	77,380
Refinery throughput (BPD) [(2)]	78,230	79,980	84,790
Sales of produced refined products (BPD) [(3)]	72,650	76,300	79,840
Refinery utilization [(4)]	74.1%	75.1%	79.8%
Average per produced barrel sold [(5)]			
Refinery gross margin	$ 19.13	$ 26.55	$ 15.78
Refinery operating expenses [(6)]	12.47	11.83	10.46
Net operating margin	$ 6.66	$ 14.72	$ 5.32
Refinery operating expenses per throughput barrel [(7)]	$ 11.58	$ 11.28	$ 9.85

	Years Ended December 31,		
	2019	2018	2017
Rocky Mountain Region (Cheyenne and Woods Cross Refineries)			
Feedstocks:			
Sweet crude oil	36%	28%	34%
Heavy sour crude oil	32%	42%	35%
Black wax crude oil	24%	21%	22%
Other feedstocks and blends	8%	9%	9%
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.

Products

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

	Years Ended December 31,		
	2019	2018	2017
Rocky Mountain Region (Cheyenne and Woods Cross Refineries)			
Sales of refined products:			
Gasolines	53%	55%	58%
Diesel fuels	34%	33%	32%
Fuel oil	4%	3%	3%
Asphalt	5%	5%	4%
LPG and other	4%	4%	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, Sonneborn and the 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. 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.

Sonneborn is a producer of specialty hydrocarbon chemicals such as white oils, petrolatums and waxes for the personal care, cosmetic, pharmaceutical and food processing industries. Combined with Petro-Canada Lubricants, it is one of the world's largest producers of pharmaceutical white oils.

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, 2019, Red Giant Oil for the period August 1, 2018 (date of acquisition) through December 31, 2019, and Sonneborn for the period February 1, 2019 (date of acquisition) through December 31, 2019.

	Years Ended December 31,		
	2019	**2018**	**2017**
Lubricants and Specialty Products			
Throughput (BPD)	20,251	19,590	21,710
Sales of produced refined products (BPD)	34,827	30,510	32,910
Sales of produced refined products:			
Finished products	49%	48%	45%
Base oils	27%	31%	31%
Other	24%	21%	24%
Total	100%	100%	100%

PCLI owns and operates a production facility 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 are high-pressure hydrotreating and hydrofinishing, solvent dewaxing and catalytic dewaxing. In addition, the facility operates a hydrogen plant, naphtha hydrotreater and catalytic reformer, along with other utility units to support production. 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.

Sonneborn has manufacturing facilities in Petrolia, Pennsylvania and the Netherlands. The Sonneborn Petrolia site has a production capacity of 6,000 BPD with flexibility to produce a full range of finished specialty products. The primary operating unit is a high-pressure hydrotreater with hydrofinishing. In addition, the facility operates a hydrogen plant along with other utility units to support production. The Petrolia plant also includes packaging facilities with distribution capabilities through rail and trucking. The Sonneborn Netherland sites include processing facilities in Amsterdam and Koog with a production capacity of approximately 1,500 BPD. The primary operating units include base oil acid treating, percolation filtration, and bleaching & steaming operations. The Netherland sites include packaging facilities with distribution capabilities through truck and marine.

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 US Holdings, Inc.'s ("Delek") 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"), Cheyenne Pipeline, LLC, the owner of a pipeline running from Fort Laramie, Wyoming to Cheyenne, Wyoming (the "Cheyenne Pipeline") and Cushing Connect Pipeline & Terminal LLC ("Cushing Connect"), the owner of a crude oil storage terminal in Cushing, Oklahoma and a to-be-constructed pipeline that will run from Cushing, Oklahoma to our Tulsa Refineries.

HEP generates revenues by charging tariffs for transporting petroleum products and crude oil through its pipelines, by leasing certain pipeline capacity to third parties including 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.

Investment in Joint Venture

Cushing Connect Joint Venture
On October 2, 2019, HEP Cushing LLC, a wholly-owned subsidiary of HEP, and Plains Marketing, L.P., a wholly-owned subsidiary of Plains All American Pipeline, L.P. ("Plains"), formed a 50/50 joint venture, Cushing Connect, for (i) the development and construction of a new 160,000 barrel per day common carrier crude oil pipeline (the "Cushing Connect Pipeline") that will connect the Cushing, Oklahoma crude oil hub to our Tulsa Refineries and (ii) the ownership and operation of 1.5 million barrels of crude oil storage in Cushing, Oklahoma (the "Cushing Connect Terminal"). The Cushing Connect Terminal is expected to be placed in service during the second quarter of 2020, and the Cushing Connect Pipeline is expected to be placed in service during the first quarter of 2021. Long-term commercial agreements have been entered into to support the Cushing Connect assets.

Cushing Connect will contract with an affiliate of HEP to manage the construction and operation of the Cushing Connect Pipeline and with an affiliate of Plains to manage the operation of the Cushing Connect Terminal. The total investment in Cushing Connect will be shared proportionately among the partners, and HEP estimates its share of the cost of the Cushing Connect Terminal contributed by Plains and Cushing Connect Pipeline construction costs are approximately $65.0 million.

Acquisition

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 for cash consideration of $250.0 million.

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 2021 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 ("FERC") index. As of December 31, 2019, these agreements result in minimum annualized payments to HEP of $348.1 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.

As of December 31, 2019, HEP's assets included:

Pipelines

- approximately 800 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;
- 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;
- 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;
- a 50% interest in the Cheyenne Pipeline, an 87-mile crude oil pipeline running from Fort Laramie, Wyoming to Cheyenne, Wyoming; and
- a 50% interest in Cushing Connect, a joint venture formed to construct a 160,000 BPD pipeline to connect the Cushing, Oklahoma crude oil hub to our Tulsa Refineries.

Refined Product Terminals and Refinery Tankage

- three refined product terminals located in Orla, Texas and Moriarty and Bloomfield, New Mexico, with an aggregate capacity of approximately 458,000 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 600,000 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; and
- a 50% interest in Cushing Connect's crude oil tankage with a capacity of approximately 1,500,000 barrels in Cushing, Oklahoma.

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, 2019, we had 4,074 employees, of which 1,430 are currently covered by collective bargaining agreements having various expiration dates between 2020 and 2024. We consider our employee relations to be good.

Environmental Regulation

We are subject to numerous international, federal, state, provincial and local laws and regulations 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 and regulations 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; the issuance of injunctive relief limiting or prohibiting certain operations; and reputational harm. In addition, many environmental laws provide a mechanism for citizens to file suit against regulated facilities for alleged environmental violations. Compliance with applicable environmental laws, regulations and permits or other authorizations 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 facilities 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, the EPA has reduced several National Ambient Air Quality Standards ("NAAQS"), and implementation of such 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. For additional information regarding risks relating to our small refinery exemptions, see Item 1A, "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." 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 are ongoing. 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.

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 incur 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 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 July 8, 2019, the EPA issued a replacement rule titled the Affordable Clean Energy Rule, which is focused solely on electric generating units. 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.

The CWA also regulates filling or discharges to wetlands and other "waters of the United States." On January 23, 2020, 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 narrowed the regulatory reach of the CWA regulations relative to a prior 2015 rulemaking. The final rule will become effective 60 days after issuance. Because the rule does not expand the scope of the CWA's jurisdiction, it will not likely adversely impact our operations; however, we expect the final rule to be subject to litigation, and multiple challenges to the EPA's prior rulemakings remains pending, both of which create uncertainty.

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.

Other Environmental Regulations - 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, the Fisheries Act, the Greenhouse Gas Pollution Pricing Act and their 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. Regulatory trends towards more stringent emission requirements and operating controls are expected to continue at federal, provincial and local levels.

Additionally, our assets and operations in the Netherlands are required to comply with Dutch regulations that are similar to, and in some cases more stringent than, those described above for our U.S. operations. The statutes to which our Dutch assets and operations are subject include the Environmental Protection Act, the Activities Decree, the Environmental Licensing (General Provisions) Bill, the Water Act, the Soil Protection Act, the Major Accidents (Risks) Decree, the European Habitat Directive, and the Economic Offences Act. However, many of the existing environmental laws will be supplanted by the Environment and Planning Act, which is expected to enter into force in January 2021. Generally, these regulations create a system of environmental permits covering the most significant emissions to water, air and soil, as well as other environmental impacts. The Netherlands also participates in certain broader European legal initiatives, including GHG cap and trade programs. Additionally, in December 2019, the High Council of the Netherlands upheld a court order for the government of the Netherlands to reduce the country's GHG emissions by 25% (compared to 1990) by 2020, and in January 2020,the Climate Act came into force, with the goal of significantly reducing GHG emissions by 49% (compared to 1990) by 2030 and by at least 95% by 2050. It is unclear what further measures the Dutch government will take to reduce GHG emissions pursuant to this law.

Enforcement and Litigation Proceedings - 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, 2019, we had an accrual of $117.7 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. To the extent that future expenditures for these purposes are material and can be reasonably determined, these costs are disclosed and accrued, if applicable.

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"), comparable state statutes, and Canadian and Dutch regulations applicable to our operations in Canada and the Netherlands. 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. Many of the revised requirements do not become effective until 2021, and the EPA issued a final rule in December 2019 that rescinded several of the requirements of the 2017 rule. 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 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, global market conditions, actions by foreign nations 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. 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, 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 decrease to cost of products sold in the amount of $119.8 million and an increase of $136.3 million for the years ended December 31, 2019 and 2018, respectively.

There are various risks associated with greenhouse gases and climate change that could result in increased operating costs and litigation and reduced demand for the refined products we produce and investment in our industry.

Climate change continues to attract considerable attention in the United States, Canada, Europe, and other regions. Numerous proposals have been made and could continue to be made at the international, national, regional and state levels of government to monitor and limit existing emissions of GHGs as well as to restrict or eliminate such future emissions. As a result, our operations are subject to a series of regulatory, political, litigation, and financial risks associated with the refining of petroleum products and emission of GHGs.

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. The U.S. Supreme Court has also found that GHG emissions constitute a pollutant under the CAA. Accordingly, the EPA has adopted rules that, among other things, establish construction and operating permit reviews for GHG emissions from certain large stationary sources, require the monitoring and annual reporting of GHG emissions from certain petroleum and natural gas sources in the United States or to control or reduce emissions of GHGs, including methane, from such sources. In addition, the EPA, together with the DOT, implement GHG emission and corporate average fuel economy standards for vehicles manufactured in the United States. Additionally, various states and groups of states have adopted or are considering adopting legislation, regulations or other regulatory initiatives that are focused on such areas as GHG cap and trade programs, carbon taxes, reporting and tracking programs, and restriction of emissions. Similar such regulations exist at the provincial and federal levels in Canada, including a nation-wide greenhouse gas pricing initiative and regulations related to the control of GHGs from automobiles and light duty trucks and either cap and trade programs or carbon taxes in the provinces of Quebec, Ontario, and Alberta. The Netherlands also participates in certain European legal initiatives, including GHG cap and trade programs, and recently promulgated the Climate Act with the goal of significantly reducing GHG emissions by 49% (compared to 1990) by 2030 and by at least 95% by 2050. It is unclear what further measures the Dutch government will take to reduce GHG emissions pursuant to this law. At the international level, there is a non-binding agreement, the United Nations-sponsored “Paris Agreement,” for nations to limit their GHG emissions through individually-determined reduction goals every five years after 2020, although the United States has announced its withdrawal from such agreement, effective November 4, 2020.

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. Additionally, political, litigation and financial risks may result in curtailed refinery activity, incurred liability, or other adverse effects on our business, financial condition and results of operations.

There are also increasing risks of litigation related to climate change effects. Governments and third-parties have brought suit against some fossil fuel companies alleging, among other things, that such companies created public nuisances by producing fuels that contributed to climate change, such as rising sea levels, and therefore are responsible for roadway and infrastructure damages as a result, or alleging that the companies have been aware of the adverse effects of climate change for some time but defrauded their investors by failing to adequately disclose those impacts. While we are not party to such suits at this time, we may become subject to such litigation in the future. Such cases could also adversely impact public perception and the demand for fossil fuels and petroleum products, which could subsequently result in decreased demand for our services and refined products and a drop in our share price.

Our share price could be adversely impacted if existing shareholders, including institutional investors, elect in the future to shift some or all of their investments into non-energy related sectors based on social and environmental considerations. Additionally, in recent years institutional lenders have become more attentive to sustainable lending practices and have been lobbied intensively, and often publicly, by environmental activists, proponents of the international Paris Agreement, and foreign citizenry concerned about climate change not to provide funding for fossil fuel energy companies. Limitation of investments in and financings for fossil fuel energy companies could result in the restriction, delay or cancellation of drilling programs or development or production activities, could result in a reduction of available capital funding for potential development projects and could also adversely affect demand for our services and refined products, all of which could impact our future financial results.

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 the past, we have received small refinery exemptions under the RFS program for certain of our refineries. However, there is no assurance that such an exemption will be obtained for any of our refineries in future years. For example, the EPA has recently indicated it plans to more closely align the agency's criteria for granting small refinery exemptions with the recommendation of the Department of Energy, which could result in fewer such exemptions being granted. The failure to obtain such exemptions for certain of our refineries could result in the need to purchase more RINs than we currently have estimated and accrued for in our consolidated financial statements. EPA recently promulgated new RFS regulations that could require the agency to increase the volume of renewable fuel or RINs that refiners are required to purchase if the agency anticipates it will grant small refinery exemptions. This also could increase the number of RINs we need to purchase. Additionally, a recent decision by the U.S. Court of Appeals for the 10th Circuit vacated two small refinery exemption decisions for the 2016 compliance year and remanded the case to the EPA for further proceedings. It is not clear at this time what steps the EPA will take with respect to our 2016 small refinery exemptions, or how the case will impact future small refinery exemptions.

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 RINs 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.

To successfully operate our facilities, we are required to expend significant amounts for capital outlays and operating expenditures. If we are unable to complete capital projects at their expected costs or in a timely manner, 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.

Our facilities 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 facilities by installing new equipment and redesigning older equipment to improve refinery capacity. The installation and redesign of key equipment at our facilities involves significant uncertainties, including the following: our upgraded equipment may not perform at expected 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.

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, terrorists or cyberattacks, domestic vandalism 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.

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.

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, global market conditions, actions by foreign nations and customer demand.

Cyberattacks or security breaches could have a material adverse effect on our business, financial condition and results of operations.

Our business is dependent upon information systems and other digital technologies for controlling our plants and pipelines, processing transactions and summarizing and reporting results of operations. The secure processing, maintenance and transmission of information is critical to our operations. We monitor our information systems on a 24/7 basis in an effort to detect cyberattacks or security breaches. Preventative and detective measures we utilize include independent cybersecurity audits and penetration tests. We implemented these efforts along with other risk mitigation procedures to detect and address unauthorized and damaging activity on our network, stay abreast of the increasing threat landscape and improve our security posture. Information technology system failures, communications network disruptions (whether intentional by a third party or due to natural disaster), and security breaches could still impact equipment and software used to control plants and pipelines, resulting in improper operation of our assets, potentially including delays in the delivery or availability of our customers' products, contamination or degradation of the products we transport, store or distribute, or releases of hydrocarbon products and other damage to our facilities for which we could be held liable.

Furthermore, we collect and store sensitive data in the ordinary course of our business, including personally identifiable information of our employees as well as our proprietary business information and that of our customers, suppliers, investors and other stakeholders. Despite our security measures, our information systems may become the target of cyberattacks or security breaches (including employee error, malfeasance or other breaches), which could result in the theft or loss of the stored information, misappropriation of assets, disruption of transactions and reporting functions, our ability to protect customer or company information and our financial reporting. Even with insurance coverage, a claim could be denied or coverage delayed. A cyber-attack or security breach could result in liability under data privacy laws, regulatory penalties, damage to our reputation or a loss of consumer confidence in our products and services, or additional costs for remediation and modification or enhancement of our information systems to prevent future occurrences, all of which could have a material and adverse effect on our business, financial condition or results of operations.

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.

The market for our lubricants and specialty products segment is highly competitive and requires us to continuously develop and introduce new products and product enhancements.

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.

Our acquisition strategy involves numerous risks, any of which could adversely affect us.

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.

We incur significant costs, and expect to incur additional costs in the future, to comply with existing, new and changing environmental, energy, health and safety laws and regulations, and face potential exposure for environmental matters.

Operations of our facilities and pipelines are subject to international, foreign, 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, ship 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, we have manufacturing and distribution operations in foreign countries that are subject to the environmental laws and regulations of such foreign countries. Permits or other authorizations are required under these laws for the operation of our facilities, 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, refinery shutdowns, and reputational harm. 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 and, in 2018, published attainment/nonattainment designations. 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. 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 processed, manufactured, handled, used, released or disposed.

We are and have been the subject of various local, state, provincial, federal, foreign, 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 foreign and domestic 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 or courts 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.

We are also subject to existing, and may in the future be subject to new or changing, domestic and foreign energy policy legislation. For example, in the United States, the Energy Independence and Security Act mandates annually increasing levels for the use of renewable fuels such as ethanol and increasing energy efficiency goals, among other steps. Dutch law also focuses on increasing the use of renewal fuels, and in Canada, fuel content legislation 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."

Our wholesale purchases and sales of crude oil and certain petroleum products expose us to potential regulatory risks.

The Federal Trade Commission ("FTC") holds statutory authority to monitor certain segments of the wholesale markets for crude oil, gasoline, and petroleum distillates, and it has imposed broad regulations prohibiting fraud and manipulation of such markets. With regard to our wholesale purchases and sales of such commodities, we are required to observe the market related regulations enforced by the FTC, which holds substantial enforcement authority. Our purchases and sales may also be subject to certain reporting and other requirements. Additionally, to the extent that we enter into transportation contracts with common carrier pipelines that are subject to FERC regulation, we are subject to FERC requirements related to the use of such capacity. Any failure on our part to comply with the regulations and policies of the FTC or the FERC could result in the imposition of civil and criminal penalties. Failure to comply with such regulations, as interpreted and enforced, could have a material adverse effect on our business, results of operations, financial condition and our ability to make cash distributions.

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, terror or cyberattacks, domestic vandalism, 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 commercially 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.

There can be no assurance that insurance will cover all or any damages and losses resulting from these types of hazards. We are not fully insured against all risks incident to our business and therefore, we self-insure certain risks. If any of our facilities were to experience an interruption in operations, our earnings 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.

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 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.

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.

The five U.S. 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 (including business interruption) 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.

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, catastrophic events 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.

We may be subject to information technology system failures, communications network disruptions and data breaches.

We depend on the efficient and uninterrupted operation of hardware and software systems and infrastructure, including our operating, communications and financial reporting systems. These systems are critical in meeting customer expectations, effectively tracking, maintaining and operating our equipment, directing and compensating our employees, and interfacing with our financial reporting system. We have implemented safeguards and other preventative measures to protect our systems and data, including sophisticated network security and internal control measures; however, our information technology systems and communications network, and those of our information technology and communication service providers, remain vulnerable to interruption by fire, earthquake, power loss, telecommunications failure, terrorist attacks, Internet failures, computer malware, cyberattacks, data breaches and other events unforeseen or generally beyond our control.

Our business is subject to complex and evolving U.S. and foreign laws, regulations and security standards regarding privacy, cybersecurity and data protection ("data protection laws"). Many of these laws are subject to change and uncertain interpretation, and could result in claims, increased cost of operations, or otherwise harm our business.

The constantly evolving regulatory and legislative environment surrounding data privacy and protection poses increasingly complex compliance challenges, and complying with such data protection laws could increase the costs and complexity of compliance. While we do not collect significant amounts of personal information from consumers, we do have personal information from our employees, job applicants and some business partners, such as contractors and distributors. Any failure, whether real or perceived, by us to comply with applicable data protection laws could result in proceedings or actions against us by governmental entities or others, subject us to significant fines, penalties, judgments, and negative publicity, require us to change our business practices, increase the costs and complexity of compliance, and adversely affect our business.

For example, the General Data Protection Regulation (GDPR), 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 may offer from time to time to customers in the European Union. The GDPR requires companies to satisfy strict requirements regarding the handling of personal and sensitive data, including its use, protection and the ability of persons whose data is stored to correct or require deletion of data about themselves. Failure to comply with GDPR requirements could result in substantial penalties. While we have invested time and resources in preparing for and complying with the GDPR, the GDPR and other similar privacy/security laws and regulations (including potential new data privacy laws and regulations in the U.S. or other foreign countries in which we operate), as well as any associated inquiries or investigations or any other government actions, may increase our operating costs.

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.

Our business is subject to the risks of international operations, including currency fluctuations

We derive a portion of our revenue and earnings from international operations. Our acquisitions of Petro-Canada Lubricants and Sonneborn have expanded our operations and sales in foreign countries and correspondingly may increase our exposure to foreign exchange risks. 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 revenue, competitiveness and cost of doing business, which could have a material adverse effect on our business, financial condition and results of operations.

In addition, 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, distributors 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.

In addition, global market risks, actions by foreign nations and other international conditions, particularly in a time of increasing economic and global instability, may have a material adverse effect on our results and operations. The consequences of such uncertainty cannot be anticipated or quantified.

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, 2019, 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 third parties, 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 2021 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.

While we own a 57% limited partner interest and a non-economic general partner interest in HEP, HEP is a publicly-traded master limited partnership and is a legally distinct entity. Conflicts of interest may arise between us and HEP, which may subject us to claims from HEP's public unitholders.

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, 2019.

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.

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, 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 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 domestic 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 and domestic vandalism 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, vandalism 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.

The EPA and the National Highway Traffic Safety Administration ("NHTSA") are required to promulgate requirements regarding the Corporate Average Fuel Economy ("CAFE") of the nation's passenger fleet. On August 28, 2012, the EPA and NHTSA adopted standards through model year 2025 in two phases. The first phase established 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. However, following the change in presidential administrations, there have been attempts to modify these standards. In August 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. While the EPA issued a rule in September 2019 that seeks to preempt the ability of states to set stricter standards than those set by the federal government, no final rule has yet been issued regarding amendments to the current CAFE standards. All of these rulemakings will likely be subject to challenge by a variety of parties seeking stricter GHG and CAFE standards. 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.

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.

We sell many of our lubricants and specialty products through distributors, which presents risks that could adversely affect our operating results.

A large portion of our lubricants and specialty product sales, both in domestic and international markets, occur through distributors. As a result, we are dependent on these distributors to promote and create demand for our products. We cannot assure you that we will be successful in maintaining and strengthening our relationships with our distributors or establishing relationships with new distributors who have the ability to market, sell and support our products effectively. We may rely on one or more key distributors for a product or a region, and the loss of these distributors could reduce our revenue. The sales, business practices and reputation of our distributors may affect our business and our reputation. The consolidation of distributors, loss of a relationship with a distributor, significant disagreement with a distributor, or significant deterioration in the financial condition of a distributor could also have an adverse effect on our operating results and may also result in increased competition in the applicable jurisdiction.

We may be unable to adequately protect our intellectual property, which may increase our cost of doing business or otherwise hurt our ability to compete in the market.

We use intellectual property in the ordinary course of our business, including trademarks, trade secrets, copyrighted work and innovations, some of which is material to our business. We take measures to identify and protect our intellectual property through practices appropriate for securing and protecting exclusive rights in and to our intellectual property, including applying for registrations in the United States and in various foreign countries. 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 trademarks (or other marks likely to cause confusion among our consumers), technologies, products and processes. In addition, the laws and/or judicial systems and enforcement mechanisms of foreign countries in which we create, market and sell our products may afford little or no effective protection of our intellectual property. We may also be subject to infringement complaints from others challenging our use of a technology. We cannot guarantee that our efforts to enforce our intellectual property rights against unauthorized use and appropriation, or our efforts to defend against third party claims of infringement would be successful. These potential risks to our intellectual property could subject us to increased competition and negatively impact our liquidity, financial position and results of operations.

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 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 person 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.

A portion of our workforce is unionized, and any disruptions in our labor force or adverse employee relations could adversely affect our business.

We depend on unionized labor for the operation of many of our facilities. As of December 31, 2019, approximately 35% of our employees were represented by labor unions under collective bargaining agreements with various expiration dates. In addition, employees who are not currently represented by labor unions may seek union representation in the future. We may not be able to renegotiate our collective bargaining agreements when they expire on satisfactory terms or at all. If we are unable to renegotiate our collective bargaining agreements when they expire, any work stoppages or other labor disturbances at these facilities could have an adverse effect on our business, impact our ability to make distributions to our unitholders and payments of our debt obligations, and increase our costs. In addition, our existing labor agreements may not prevent a strike or work stoppage or other adverse employee relations event at any of our facilities in the future, and any work stoppage could negatively affect our results of operations and financial condition.

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 global 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 in discussions with the Wyoming Department of Environmental Quality ("WDEQ") and the EPA relating to alleged violations of air quality emission limitations and requirements related to operation of certain refinery units at the Cheyenne Refinery. Notices of Violations were issued by the WDEQ in late 2016 and 2018. On July 18, 2019, HFCR and WDEQ entered into a consent decree, and on August 9, 2019, HFCR paid penalties in the amount of $117,000 related to alleged violations of air quality limits that occurred during the second quarter of 2016 through the second quarter of 2017. Separately, on October 23, 2019, HFCR received a Notice of Violation from the WDEQ for possible violations of air quality standards during the first and second quarters of 2019. No penalty demand has yet been made by the WDEQ relating to such possible violations. HFCR and WDEQ are in discussions to resolve WDEQ's alleged violations of air quality limits that occurred during the third quarter of 2017 through calendar year 2019.

On August 19, 2019 and October 30, 2019, HFCR received letters from the EPA providing a preliminary estimate of stipulated penalties related to the alleged violations that occurred during the third quarter of 2017 through the second quarter of 2019 pursuant to HFCR's federal consent decree. HFCR responded to the EPA preliminary estimate of stipulated penalties related to the alleged violations that occurred during the third quarter of 2017 through calendar year 2018 in a letter dated September 18, 2019, followed by meetings with the EPA and the WDEQ on November 14, 2019 and December 4, 2019, to discuss an appropriate resolution of all alleged violations. HFCR settled the allegations in the EPA's August 19, 2019 and October 30, 2019 letters, and pursuant to a demand letter dated January 9, 2020, HFCR was assessed stipulated penalties totaling $700,000 pursuant to HFCR's federal consent decree.

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 civil violations relating to flaring devices and other equipment at the refinery. Topics of the discussions include (a) three information requests for activities beginning in January 2009, (b) Risk Management Program compliance issues relating to a November 2014 inspection and subsequent events, (c) a Notice of Violation issued by the EPA in August 2017 and (d) possible late reporting under the Emergency Planning and Community Right-to-Know Act for the release of sulfur dioxide and visible emissions from October 2018. Some of the foregoing civil investigations resulted from fires that occurred at the El Dorado Refinery in September 2017, October 2018 and March 2019. An employee fatality occurred during the September 2017 event. HFEDR is currently in a dialogue with the EPA about a possible settlement of alleged civil violations for the foregoing items.

The Occupational Safety and Health Administration ("OSHA") completed an investigation of the March 2019 event and issued one citation to HFEDR on August 29, 2019. The citation was settled without payment of a penalty. HFEDR previously settled the OSHA claims related to an investigation of the September 2017 event. In April 2019, HFEDR became aware that the EPA also initiated a criminal investigation into one or more of the foregoing events. HFEDR has received a grand jury subpoena requesting certain documents be provided to the EPA with respect to the September 2017 event. We are cooperating with this investigation.

Tulsa

HollyFrontier Tulsa Refining LLC ("HFTR") operates under two Consent Decrees with the EPA and the Oklahoma Department of Environmental Quality ("ODEQ") for the East and West Refineries. On December 13, 2017, during a meeting between the parties, ODEQ proposed stipulated penalties related to violations of the two Consent Decrees. The violations concern Clean Air Act regulated fuel gas and flare operations. On July 1, 2019, ODEQ issued a demand letter for stipulated penalties under the East Refinery Consent Decree as proposed in the 2017 meeting. In August 2019, HFTR paid the penalties set forth in the demand letter to ODEQ and the EPA satisfying the requirements of the East Refinery Consent Decree. On September 16, 2019, ODEQ issued a demand letter for stipulated penalties under the West Refinery Consent Decree. HFTR is working with ODEQ to resolve this matter. Additionally, on April 3, 2019, during a meeting between the parties, the EPA notified HFTR of potential monitoring violations of the Consent Decrees. HFTR is working with the ODEQ and the EPA to document a settlement agreement for the additional actions.

Woods Cross

HollyFrontier Woods Cross Refining LLC ("HFWCR") received an early settlement agreement from the Utah Department of Environmental Quality's Division of Air Quality ("DAQ") for alleged violations associated with operation of HFWCR's diesel-fired emergency engines. HFWCR agreed to the terms of the agreement. The agreement was approved by the Utah Air Quality Board. In accordance with the settlement agreement, HFWCR paid $105,583 on December 17, 2019 to settle this matter.

Federal Trade Commission

On July 23, 2019, the Federal Trade Commission ("FTC") issued a Civil Investigative Demand and a related Subpoena Duces Tecum requesting we provide specified information relating to the Sonneborn acquisition that closed on February 1, 2019. We are in the process of responding to the FTC request. Based on the limited information that we have at this time, we are unable to predict the outcome of this request. On December 14, 2018, we received early termination of the applicable waiting period under the Hart-Scott-Rodino Antitrust Improvements Act from the FTC and Department of Justice with respect to the Sonneborn acquisition. On January 17, 2019, we received early termination of the applicable waiting period under the German antitrust laws with respect to the Sonneborn acquisition. Early termination is granted to transactions that the antitrust agencies determine raise no substantive competition concerns.

Renewable Fuel Standard

Various subsidiaries of HollyFrontier moved to intervene in four lawsuits brought by renewable fuel interest groups against the EPA in federal courts alleging violations of the Renewable Fuel Standard under the Clean Air Act and challenging the EPA's handling of small refinery exemptions. We intervened to vigorously defend the EPA's position on small refinery exemptions because we believe the EPA correctly applied applicable law to the matters at issue. The U.S. Court of Appeals for the DC Circuit dismissed one of these four lawsuits on November 12, 2019 for lack of jurisdiction. On January 24, 2020, the U.S. Court of Appeals for the 10th Circuit vacated the small refinery exemptions granted to two of our refineries for 2016 and remanded the case to the EPA for further proceedings. It is not clear at this time what steps the EPA will take with respect to our 2016 small refinery exemptions, or how the case will impact future small refinery exemptions.

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.

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 $1.0 billion share repurchase program authorizing us to repurchase common stock in the open market or through privately negotiated transactions. The following table includes repurchases made under this program during the fourth quarter of 2019.

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 2019	564,778	$ 54.58	564,778	$ 282,392,758
November 2019	25,000	$ 55.09	25,000	$ 281,015,550
December 2019	71,970	$ 52.72	—	$ 1,000,000,000
Total for October to December 2019	661,748		589,778	

During the quarter ended December 31, 2019, 71,970 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.

In November 2019, our Board of Directors approved a $1.0 billion share repurchase program, which replaced all existing share repurchase programs, including $281.0 million remaining under the previously existing $1.0 billion share repurchase program. 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 February 13, 2020, we had approximately 87,770 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.

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,				
	2019	2018	2017	2016	2015
	(In thousands, except per share data)				
FINANCIAL DATA					
For the period					
Sales and other revenues	$ 17,486,578	$ 17,714,666	$ 14,251,299	$ 10,535,700	$ 13,237,920
Income (loss) before income taxes	1,171,504	1,524,467	868,863	(171,534)	1,208,568
Income tax expense (benefit)	299,152	347,243	(12,379)	19,411	406,060
Net income (loss)	872,352	1,177,224	881,242	(190,945)	802,508
Less net income attributable to noncontrolling interest	99,964	79,264	75,847	69,508	62,407
Net income (loss) attributable to HollyFrontier stockholders	$ 772,388	$ 1,097,960	$ 805,395	$ (260,453)	$ 740,101
Earnings (loss) per share attributable to HollyFrontier stockholders - basic	$ 4.64	$ 6.25	$ 4.54	$ (1.48)	$ 3.91
Earnings (loss) per share attributable to HollyFrontier stockholders - diluted	$ 4.61	$ 6.19	$ 4.52	$ (1.48)	$ 3.90
Cash dividends declared per common share	$ 1.34	$ 1.32	$ 1.32	$ 1.32	$ 1.31
Average number of common shares outstanding:					
Basic	166,287	175,009	176,174	176,101	188,731
Diluted	167,385	176,661	177,196	176,101	188,940
Net cash provided by operating activities	$ 1,548,611	$ 1,554,416	$ 951,390	$ 606,948	$ 985,868
Net cash used for investing activities	$ (972,914)	$ (360,520)	$ (959,670)	$ (801,597)	$ (381,748)
Net cash provided by (used for) financing activities	$ (848,255)	$ (664,328)	$ (72,630)	$ 838,695	$ (1,105,572)
At end of period					
Cash, cash equivalents and investments in marketable securities	$ 885,162	$ 1,154,752	$ 630,757	$ 1,134,727	$ 210,552
Working capital	$ 1,620,261	$ 2,128,224	$ 1,640,118	$ 1,767,780	$ 587,450
Total assets	$ 12,164,841	$ 10,994,601	$ 10,692,154	$ 9,435,661	$ 8,388,299
Total debt	$ 2,455,640	$ 2,411,540	$ 2,498,993	$ 2,235,137	$ 1,040,040
Total equity	$ 6,509,426	$ 6,459,059	$ 5,896,940	$ 5,301,985	$ 5,809,773

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 United States, 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 United States, 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 $662.7 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.

HFC acquired 100% of the outstanding capital stock of PCLI 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, 2019, net income attributable to HollyFrontier stockholders was $772.4 million compared to net income of $1,098.0 million and $805.4 million for the years ended December 31, 2018, and 2017, respectively. Overall gross refining margins per produced barrel sold for 2019 decreased 10% over the year ended December 31, 2018 due to lower 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 $110.6 million for the year ended December 31, 2019, which is net of the $36.6 million cost reduction resulting from small refinery RINs waivers granted by the EPA in 2019 as described in Note 9 "Inventories" in the Notes to Consolidated Financial Statements.

OUTLOOK

In 2020, we expect continued global economic growth to fuel increased demand for transportation fuels, lubricants, specialty products and base oils. Within our Refining segment, we anticipate healthy utilization rates across our refining system in 2020 due to light planned maintenance. For the first quarter 2020, we expect to run between 425,000-435,000 barrels per day of crude oil.

In our Lubricants and Specialty Products segment, we expect the Rack Forward business to generate $250-$275 million of EBITDA based on an expected steady demand for finished lubricants. Within the Rack Back portion, we expect the base oil market will continue to improve from cyclical lows in 2019 as existing capacity absorbs growing demand for premium base oils.

At HEP, we expect contractual tariff escalators and earnings from our Cushing Connect joint venture to offset cost inflation. HEP intends to maintain its quarterly distribution at $0.6725, while expecting to achieve a distribution coverage ratio of 1.0x for the full year 2020.

A more detailed discussion of our financial and operating results for the years ended December 31, 2019 and 2018 is presented in the following sections. Discussions of year-over-year comparisons for 2018 and 2017 can be found in “Management's Discussion and Analysis of Financial Condition and Results of Operations” in Part II, Item 7 of our Annual Report on Form 10-K for the year ended December 31, 2018.

RESULTS OF OPERATIONS

Financial Data

	Years Ended December 31,		
	2019	2018	2017
	(In thousands, except per share data)		
Sales and other revenues	$ 17,486,578	$ 17,714,666	$ 14,251,299
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)	13,918,384	13,940,782	11,467,873
Lower of cost or market inventory valuation adjustment	(119,775)	136,305	(108,685)
	13,798,609	14,077,087	11,359,188
Operating expenses (exclusive of depreciation and amortization)	1,394,052	1,285,838	1,296,669
Selling, general and administrative expenses (exclusive of depreciation and amortization)	354,236	290,424	265,721
Depreciation and amortization	509,925	437,324	409,937
Goodwill and asset impairment	152,712	—	19,247
Total operating costs and expenses	16,209,534	16,090,673	13,350,762
Income from operations	1,277,044	1,623,993	900,537
Other income (expense):			
Earnings of equity method investments	5,180	5,825	12,510
Interest income	22,139	16,892	3,736
Interest expense	(143,321)	(131,363)	(117,597)
Loss on early extinguishment of debt	—	—	(12,225)
Gain on foreign currency transactions	5,449	6,197	16,921
Gain on foreign currency swap contracts	—	—	24,545
Remeasurement gain on HEP pipeline interest acquisitions	—	—	36,254
Other, net	5,013	2,923	4,182
	(105,540)	(99,526)	(31,674)
Income before income taxes	1,171,504	1,524,467	868,863
Income tax expense (benefit)	299,152	347,243	(12,379)
Net income	872,352	1,177,224	881,242
Less net income attributable to noncontrolling interest	99,964	79,264	75,847
Net income attributable to HollyFrontier stockholders	$ 772,388	$ 1,097,960	$ 805,395
Earnings per share attributable to HollyFrontier stockholders:			
Basic	$ 4.64	$ 6.25	$ 4.54
Diluted	$ 4.61	$ 6.19	$ 4.52
Cash dividends declared per common share	$ 1.34	$ 1.32	$ 1.32
Average number of common shares outstanding:			
Basic	166,287	175,009	176,174
Diluted	167,385	176,661	177,196

Other Financial Data

	Years Ended December 31,		
	2019	2018	2017
		(In thousands)	
Net cash provided by operating activities	$ 1,548,611	$ 1,554,416	$ 951,390
Net cash used for investing activities	$ (972,914)	$ (360,520)	$ (959,670)
Net cash used for financing activities	$ (848,255)	$ (664,328)	$ (72,630)
Capital expenditures	$ 293,763	$ 311,029	$ 272,259
EBITDA (1)	$ 1,702,647	$ 1,996,998	$ 1,316,814

(1) Earnings before interest, taxes, depreciation and amortization, which we refer to as "EBITDA," is calculated as net income 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 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,		
	2019	2018	2017
Consolidated			
Crude charge (BPD) (1)	427,600	431,570	438,800
Refinery throughput (BPD) (2)	458,600	463,340	472,010
Sales of produced refined products (BPD) (3)	449,190	452,630	452,270
Refinery utilization (4)	93.6%	94.4%	96.0%
Average per produced barrel (5)			
Refinery gross margin	$ 15.96	$ 17.71	$ 11.56
Refinery operating expenses (6)	6.68	6.39	6.11
Net operating margin	$ 9.28	$ 11.32	$ 5.45
Refinery operating expenses per throughput barrel (7)	$ 6.54	$ 6.24	$ 5.86

(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.

(6) Represents total refining segment operating expenses, exclusive of depreciation and amortization, divided by sales volumes of refined products produced at our refineries.
(7) 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, 2019. Red Giant Oil is included for the period August 1, 2018 (date of acquisition) through December 31, 2019. Sonneborn is included for the period February 1, 2019 (date of acquisition) through December 31, 2019.

	Years Ended December 31,		
	2019	2018	2017
Lubricants and Specialty Products			
Throughput (BPD)	20,251	19,590	21,710
Sales of produced barrels sold (BPD)	34,827	30,510	32,910

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, 2019				
Sales and other revenues	$ 661,523	$ 1,883,920	$ (452,915)	$ 2,092,528
Cost of products sold	620,660	1,412,291	(452,915)	1,580,036
Operating expenses	116,984	114,539	—	231,523
Selling, general and administrative expenses	31,854	136,741	—	168,595
Depreciation and amortization	37,001	51,780	—	88,781
Goodwill impairment [(4)]	152,712	—	—	152,712
Income (loss) from operations	$ (297,688)	$ 168,569	$ —	$ (129,119)
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

(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. Rack back results reflect the increase in feedstock prices from 2017 to 2019 combined with softening market conditions from the increased supply of base oils.
(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.
(3) Intra-segment sales of rack back produced base oils to rack forward are eliminated under the "Eliminations" column.
(4) During the three months ended June 30, 2019, a goodwill impairment charge of $152.7 million was recorded in the PCLI reporting unit within the Lubricants and Specialty Products segment. We have separately allocated this charge for purposes of management's discussion and analysis presentation of Rack Back and Rack Forward results entirely to Rack Back.

Results of Operations - Year Ended December 31, 2019 Compared to Year Ended December 31, 2018

Summary
Net income attributable to HollyFrontier stockholders for the year ended December 31, 2019 was $772.4 million ($4.64 per basic and $4.61 per diluted share), a $325.6 million decrease compared to net income attributable to HollyFrontier stockholders of $1,098.0 million ($6.25 per basic and $6.19 per diluted share) for the year ended December 31, 2018. Net income decreased due principally to a goodwill impairment charge of $152.7 million and lower gross refining margins. For the year ended December 31, 2019, lower of cost or market inventory reserve adjustments increased pre-tax earnings by $119.8 million compared to a decrease of $136.3 million for the year ended December 31, 2018. Refinery gross margins for the year ended December 31, 2019 decreased to $15.96 per produced barrel from $17.71 for the year ended December 31, 2018. During 2019, our Cheyenne Refinery and Woods Cross Refinery were each granted a one-year small refinery exemption from the EPA for the 2018 calendar year, at which time we recorded a total $36.6 million reduction to our cost of products sold. 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 in 2018.

Sales and Other Revenues
Sales and other revenues decreased 1% from $17,714.7 million for the year ended December 31, 2018 to $17,486.6 million for the year ended December 31, 2019 due to a year-over-year decrease in sales prices and lower refined product volumes. Sales and other revenues for the years ended December 31, 2019 and 2018 include $121.0 million and $108.4 million, respectively, in HEP revenues attributable to pipeline and transportation services provided to unaffiliated parties. Additionally, sales and other revenues included $2,081.2 million and $1,799.5 million in unaffiliated revenues related to our Lubricants and Specialty Products segment for the years ended December 31, 2019 and 2018, respectively. Sonneborn contributed $340.3 million in sales and other revenues for the year ended December 31, 2019.

Cost of Products Sold
Total cost of products sold decreased 2% from $14,077.1 million for the year ended December 31, 2018 to $13,798.6 million for the year ended December 31, 2019, due principally to lower crude oil costs and lower refined product volumes. Additionally, for the year ended December 31, 2019, we recognized a $119.8 million lower of cost or market inventory valuation benefit compared to a charge of $136.3 million for the same period of 2018, resulting in a new $240.4 million inventory reserve at December 31, 2019. The reserve at December 31, 2019 is based on market conditions and prices at that time. Cost of products sold included $217.7 million in costs attributable to our Sonneborn operations for the year ended December 31, 2019. During the years ended December 31, 2019 and 2018, we recorded $36.6 million and $97.0 million, respectively, RINs cost reduction as a result of our Cheyenne Refinery and Woods Cross Refinery small refinery exemptions. Also, during the year ended December 31, 2019, we recorded an $18.0 million reduction to cost of products sold as a result of U.S. blender's tax credit legislation that was signed in December 2019 and applied retroactively for the years 2019 and 2018.

Gross Refinery Margins
Gross refinery margin per barrel sold decreased 10% from $17.71 for the year ended December 31, 2018 to $15.96 for the year ended December 31, 2019. This was due to the effects of a decrease in the average per barrel sold sales price, partially offset by decreased 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 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 8% from $1,285.8 million for the year ended December 31, 2018 to $1,394.1 million for the year ended December 31, 2019 due principally to higher repair and maintenance costs related to a February 2019 fire in an FCC unit at our El Dorado Refinery. Prior year period operating expenses included higher repair and maintenance costs as a result of the Woods Cross Refinery fire and resulting damage in March 2018. Current year operating expenses include $54.3 million in costs attributable to our Sonneborn operations.

Selling, General and Administrative Expenses
Selling, general and administrative expenses increased 22% from $290.4 million for the year ended December 31, 2018 to $354.2 million for the year ended December 31, 2019. Current year selling, general and administrative expenses include $29.7 million in costs attributable to our Sonneborn operations. Additionally, direct integration and regulatory costs of our recently acquired Sonneborn operations were $24.2 million for the year ended December 31, 2019. We incurred $3.6 million in integration costs of our Petro-Canada Lubricants business during the year ended December 31, 2018.

Depreciation and Amortization Expenses
Depreciation and amortization increased 17% from $437.3 million for the year ended December 31, 2018 to $509.9 million for the year ended December 31, 2019. This increase was due principally to depreciation and amortization attributable to capitalized improvement projects and capitalized refinery turnaround costs. Current year depreciation and amortization expenses include $33.6 million in costs attributable to our Sonneborn operations.

Goodwill Impairment
During the year ended December 31, 2019, we recorded goodwill impairment charges of $152.7 million that relate to PCLI. See Note 11 "Goodwill, Long-lived Assets and Intangibles" in the Notes to Consolidated Financial Statements for additional information on the PCLI impairment.

Interest Income
Interest income for the year ended December 31, 2019 was $22.1 million compared to $16.9 million for the year ended December 31, 2018. This increase was due to higher interest rates during 2019.

Interest Expense
Interest expense was $143.3 million for the year ended December 31, 2019 compared to $131.4 million for the year ended December 31, 2018. This increase was due to interest attributable to higher HEP debt levels during the current year relative to the same period of 2018. For the years ended December 31, 2019 and 2018, interest expense included $74.8 million and $71.9 million, respectively, in interest costs attributable to HEP operations.

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 gains of $5.4 million and $6.2 million for the years ended December 31, 2019 and 2018, respectively. For the years ended December 31, 2019 and 2018, gain on foreign currency translation included a loss of $17.4 million and a gain of $41.8 million, respectively, on foreign exchange forward contracts (utilized as an economic hedge).

Income Taxes
For the year ended December 31, 2019, we recorded an income tax expense of $299.2 million compared to $347.2 million for the year ended December 31, 2018. Our effective tax rates, before consideration of earnings attributable to the noncontrolling interest, were 25.5% and 22.8% for the years ended December 31, 2019 and 2018, respectively. Our current year effective tax rate reflects the effects of the $152.7 million goodwill impairment charge 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, 2019, we were in compliance with all covenants, had no outstanding borrowings and had outstanding letters of credit totaling $4.9 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. The leases mature on February 1, 2021. Upon maturity, we must either satisfy the obligation at fair market value or refinance to extend the maturity.

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, 2019, HEP received advances totaling $365.5 million and repaid $323.0 million under the HEP Credit Agreement. At December 31, 2019, HEP was in compliance with all of its covenants, had outstanding borrowings of $965.5 million and no outstanding letters of credit under the HEP Credit Agreement.

HEP Senior Notes
On February 4, 2020, HEP closed a private placement of $500 million in aggregate principal amount of 5.0% HEP senior unsecured notes maturing in February 2028. On February 5, 2020, HEP redeemed its existing $500 million 6.0% senior notes at a redemption cost of $522.5 million. HEP will record any early extinguishment losses associated with this redemption during the first quarter of 2020. HEP funded the $522.5 million redemption with proceeds from the issuance of its 5.0% senior notes and borrowing under the HEP Credit Agreement.

See Note 13 "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, 2019, HEP did not issue any common units under this program. As of December 31, 2019, HEP has issued 2,413,153 common units under this program, providing $82.3 million in gross proceeds.

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. We also expect to use cash for payment of cash dividends, support of our master limited partnership and repurchases of our common stock under our share repurchase program.

As of December 31, 2019, our cash and cash equivalents totaled $885.2 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 November 2019, our Board of Directors approved a $1.0 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, 2019, we had remaining authorization to repurchase up to $1.0 billion 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 decreased $269.6 million for the year ended December 31, 2019. Net cash used by investing and financing activities of $972.9 million and $848.3 million, respectively, exceeded cash provided by operating activities of $1,548.6 million.

Cash Flows – Operating Activities

Year Ended December 31, 2019 Compared to Year Ended December 31, 2018

Net cash flows provided by operating activities were $1,548.6 million for the year ended December 31, 2019 compared to $1,554.4 million for the year ended December 31, 2018, a decrease of $5.8 million. Net income for the year ended December 31, 2019 was $872.4 million, a decrease of $304.9 million compared to $1,177.2 million for the year ended December 31, 2018. Non-cash adjustments to net income consisting of depreciation and amortization, goodwill impairment, lower of cost or market inventory valuation adjustment, earnings of equity method investments, inclusive of distributions, loss on sale of assets, deferred income taxes, equity-based compensation expense and fair value changes to derivative instruments totaled $700.5 million for the year ended December 31, 2019 compared to $663.3 million for the same period in 2018. Changes in working capital items increased operating cash flows by $312.8 million and decreased operating cash flows by $87.7 million for the years ended December 31, 2019 and 2018, respectively. For the year ended December 31, 2019, turnaround expenditures increased to $318.4 million from $217.2 million for the same period of 2018.

Cash Flows – Investing Activities and Planned Capital Expenditures

Year Ended December 31, 2019 Compared to Year Ended December 31, 2018

Net cash flows used for investing activities were $972.9 million for the year ended December 31, 2019 compared to $360.5 million for the year ended December 31, 2018, an increase of $612.4 million. Current year investing activities reflect a net cash outflow of $662.7 million upon the acquisition of Sonneborn, and prior year investing activities reflect a net cash outflow of $54.2 million upon the acquisition of Red Giant Oil. HEP invested $17.9 million in the Cushing Connect Pipeline & Terminal LLC joint venture. Cash expenditures for properties, plants and equipment for 2019 decreased to $293.8 million from $311.0 million for the same period in 2018. These include HEP capital expenditures of $30.1 million and $54.1 million for the years ended December 31, 2019 and 2018, respectively. We received proceeds of $0.2 million and $3.1 million from the sale of assets during the years ended December 31, 2019 and 2018, respectively.

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. Refinery turnaround spending is amortized over the useful life of the turnaround.

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. HEP expects the majority of the expansion capital budget in 2020 to be invested in the Cushing Connect joint venture. 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.

Expected capital and turnaround cash spending for 2020 is as follows:

	Expected Cash Spending Range	
	(In millions)	
HollyFrontier Capital Expenditures		
Refining	$ 270.0	$ 300.0
Renewable Diesel Unit	130.0	150.0
Lubricants and Specialty Products	40.0	60.0
Turnarounds and catalyst	125.0	150.0
Total HollyFrontier	565.0	660.0
HEP		
Maintenance	8.0	12.0
Expansion and joint venture investment	45.0	50.0
Refining unit turnarounds	5.0	7.0
Total HEP	58.0	69.0
Total	$ 623.0	$ 729.0

Cash Flows – Financing Activities

Year Ended December 31, 2019 Compared to Year Ended December 31, 2018

Net cash flows used for financing activities were $848.3 million for the year ended December 31, 2019 compared to $664.3 million for the year ended December 31, 2018, an increase of $183.9 million. During the year ended December 31, 2019, we purchased $533.1 million of treasury stock and paid $225.2 million in dividends. Also during this period, HEP received $365.5 million and repaid $323.0 million under the HEP Credit Agreement, paid distributions of $132.3 million to noncontrolling interests and received a contribution of $3.2 million from a noncontrolling interest. During 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. 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.

Contractual Obligations and Commitments

The following table presents our long-term contractual obligations as of December 31, 2019 in total and by period due beginning in 2020. 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."

Contractual Obligations and Commitments	Total	Payments Due by Period 2020	2021 & 2022	2023 & 2024	Thereafter
			(In thousands)		
HollyFrontier Corporation					
Long-term debt - principal	$ 1,000,000	$ —	$ —	$ —	$ 1,000,000
Long-term debt - interest (1)	367,188	58,750	117,500	117,500	73,438
Financing arrangements	39,971	—	39,971	—	—
Supply agreements (2)	2,882,811	884,034	1,055,896	648,595	294,286
Transportation and storage agreements (3)	1,274,852	137,457	227,116	224,338	685,941
Operating and finance leases (4)	447,665	115,255	176,889	110,114	45,407
Other long-term obligations	13,296	8,494	2,696	1,106	1,000
	6,025,783	1,203,990	1,620,068	1,101,653	2,100,072
Holly Energy Partners					
Long-term debt - principal (5)	1,465,500	—	965,500	500,000	—
Long-term debt - interest (6)	227,200	64,900	114,800	47,500	—
Operating and finance leases (4)	119,413	8,383	15,295	14,273	81,462
Other agreements	4,931	1,820	3,111	—	—
	1,817,044	75,103	1,098,706	561,773	81,462
Total	$ 7,842,827	$ 1,279,093	$ 2,718,774	$ 1,663,426	$ 2,181,534

(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 2020 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 2020 and 2039.
(4) Operating and finance lease obligations include options to extend terms that are reasonably certain of being exercised.
(5) HEP's long-term debt consists of the $500.0 million principal balance on the 6% HEP senior notes and $965.5 million of outstanding borrowings under the HEP Credit Agreement. The HEP Credit Agreement expires in 2022.
(6) 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 3.61% at December 31, 2019.

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, 2019 and 2018, market values had fallen below historical LIFO inventory costs and, as a result, we recorded lower of cost or market inventory valuation reserves of $240.4 million and $360.1 million, respectively.

At December 31, 2019, our lower of cost or market inventory valuation reserve was $240.4 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.

Inventories consisting of process chemicals, materials and maintenance supplies and RINs are stated at the lower of weighted-average cost or net realizable value. Inventories of our Petro-Canada Lubricants and Sonneborn businesses are stated at the lower of cost, using the FIFO method, or net realizable value.

Goodwill and Long-lived Assets
As of December 31, 2019, our goodwill balance was $2.4 billion, with goodwill assigned to our Refining, Lubricants and Specialty Products and HEP segments of $1,733.5 million, $327.6 million and $312.9 million, 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 either a quantitative assessment or an optional qualitative assessment to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying amount. If we determine that based on the qualitative factors that it is more likely than not that the fair value of the reporting unit is greater than its carrying amount, a quantitative test is performed in which we estimate the fair value of the related reporting unit. If the carrying amount of a reporting unit exceeds its fair value, the goodwill of that reporting unit is impaired, and we measure goodwill impairment as the excess of the carrying amount of the reporting unit over the related fair value.

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.

During the second quarter of 2019, we performed interim goodwill impairment testing of the PCLI reporting unit included in our Lubricants and Specialty Products segment. We elected to perform this interim assessment due to the recent reorganization of our reporting unit structure within the Lubricants and Specialty Products segment, combined with the identification of events and circumstances which were indicators of potential goodwill impairment at PCLI, including recent declines in gross margins to lower than historic levels. These recent lower gross margins are in the base oil market which is largely attributed to the increase in global supply of base oils with a current outlook for continued near-term softness.

Our interim goodwill impairment testing was performed as of May 31, 2019. The estimated fair values of our goodwill reporting units within our Lubricants and Specialty Products segment were derived using a combination of both income and market approaches. The income approach reflects expected future cash flows based on estimated future production volumes, selling prices, gross margins, operating costs and capital expenditures. Our market approach includes both the guideline public company and guideline transaction methods. Both methods utilize pricing multiples derived from historical market transactions of other like-kind assets.

As a result of our impairment testing, we determined that the carrying value of the PCLI reporting unit's goodwill within our Lubricants and Specialty Products segment was fully impaired and a goodwill impairment charge of $152.7 million was recorded. Our testing did not identify any other impairments.

We performed our annual goodwill impairment testing as of July 1, 2019 and determined there was no additional 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.

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, 2019, 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**	**2020**	**2021**	**Unit of Measure**
Natural gas price swaps - long	3,600,000	1,800,000	1,800,000	MMBTU
Crude oil price swaps (basis spread) - long	6,222,000	6,222,000	—	Barrels
NYMEX futures (WTI) - short	1,365,000	1,365,000	—	Barrels
Forward gasoline and diesel contracts - long	1,251,200	1,251,200	—	Barrels
Foreign currency forward contracts	434,340,348	434,340,348	—	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 13 "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:

Commodity-based Derivative Contracts	Estimated Change in Fair Value at December 31, 2019	2018
	(In thousands)	
Hypothetical 10% change in underlying commodity prices	$ 7,420	$ 1,485

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.

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, 2019 is presented below:

	Outstanding Principal	Estimated Fair Value	Estimated Change in Fair Value
		(In thousands)	
HollyFrontier Senior Notes	$ 1,000,000	$ 1,127,610	$ 22,552
HEP Senior Notes	$ 500,000	$ 522,045	$ 10,892

For the variable rate HEP Credit Agreement, changes in interest rates would affect cash flows, but not the fair value. At December 31, 2019, outstanding borrowings under the HEP Credit Agreement were $965.5 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 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.

Set forth below is our calculation of EBITDA.

	Years Ended December 31,		
	2019	2018	2017
		(In thousands)	
Net income attributable to HollyFrontier stockholders	$ 772,388	$ 1,097,960	$ 805,395
Add (subtract) income tax provision	299,152	347,243	(12,379)
Add interest expense	143,321	131,363	117,597
Subtract interest income	(22,139)	(16,892)	(3,736)
Add depreciation and amortization	509,925	437,324	409,937
EBITDA	$ 1,702,647	$ 1,996,998	$ 1,316,814

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, 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,		
	2019	2018	2017
	(Dollars in thousands, except per barrel amounts)		
Consolidated			
Net operating margin per produced barrel sold	$ 9.28	$ 11.32	$ 5.45
Add average refinery operating expenses per produced barrel sold	6.68	6.39	6.11
Refinery gross margin per produced barrel sold	15.96	17.71	11.56
Times produced barrels sold (BPD)	449,190	452,630	452,270
Times number of days in period	365	365	365
Refining segment gross margin	2,616,711	2,925,868	1,908,308
Add (subtract) rounding	(429)	(154)	335
Total refining segment gross margin	2,616,282	2,925,714	1,908,643
Add refining segment cost of products sold	12,980,506	13,250,849	11,009,419
Refining segment sales and other revenues	15,596,788	16,176,563	12,918,062
Add lubricants and specialty products segment sales and other revenues	2,092,528	1,812,703	1,594,036
Add HEP segment sales and other revenues	532,777	506,220	454,362
Subtract corporate, other and eliminations	(735,515)	(780,820)	(715,161)
Sales and other revenues	$ 17,486,578	$ 17,714,666	$ 14,251,299

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

	Years Ended December 31,		
	2019	2018	2017
	(Dollars in thousands, except per barrel amounts)		
Consolidated			
Average refinery operating expenses per produced barrel sold	$ 6.68	$ 6.39	$ 6.11
Times produced barrels sold (BPD)	449,190	452,630	452,270
Times number of days in period	365	365	365
Refinery operating expenses	1,095,215	1,055,692	1,008,630
Add (subtract) rounding	273	(483)	229
Total refining segment operating expenses	1,095,488	1,055,209	1,008,859
Add lubricants and specialty products segment operating expenses	231,523	167,820	222,461
Add HEP segment operating expenses	161,996	146,430	137,856
Subtract corporate, other and eliminations	(94,955)	(83,621)	(72,507)
Operating expenses (exclusive of depreciation and amortization)	$ 1,394,052	$ 1,285,838	$ 1,296,669

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.

On February 1, 2019, we completed the acquisition of Sonneborn US Holdings, Inc. and Sonneborn Coöperatief U.A. (collectively, "Sonneborn"). We are in the process of integrating operations of Sonneborn, including internal controls over financial reporting and, therefore, management's evaluation and conclusion as to the effectiveness of our internal control over financial reporting as of the end of the period covered by this Annual Report on Form 10-K excludes any evaluation of the internal control over financial reporting of the Sonneborn business. The Sonneborn business accounted for 6% of the Company's total assets and 2% of total revenues of the Company as of and for the year ended December 31, 2019.

Management assessed the Company's internal control over financial reporting as of December 31, 2019 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, 2019, 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, 2019. That report appears on page 56.

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, 2019, 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, 2019, based on the COSO criteria.

As indicated in the accompanying Management's Report on its Assessment of the Company's Internal Control Over Financial Reporting, management's assessment of and conclusion on the effectiveness of internal control over financial reporting did not include the internal controls of the Sonneborn business acquired on February 1, 2019, which is included in the 2019 consolidated financial statements of the Company and constituted 6% of total assets as of December 31, 2019 and 2% of revenues for the year then ended. Our audit of internal control over financial reporting of the Company also did not include an evaluation of the internal control over financial reporting of the Sonneborn business.

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, 2019 and 2018, the related consolidated statements of income, comprehensive income, cash flows, and equity for each of the three years in the period ended December 31, 2019, and the related notes of the Company and our report dated February 20, 2020 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, 2020

Index to Consolidated Financial Statements

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, 2019 and 2018, the related consolidated statements of income, comprehensive income, cash flows, and equity for each of the three years in the period ended December 31, 2019, 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, 2019 and 2018, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2019, 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, 2019, 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, 2020 expressed an unqualified opinion thereon.

Adoption of ASU No. 2016-02 (Topic 842)

As discussed in Note 1 to the consolidated financial statements, the Company changed its method of accounting for leases in the 2019 financial statements to reflect the accounting method change due to the adoption of ASU 2016-02, Leases (Topic 842).

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.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the consolidated financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Valuation of Goodwill

Description of the Matter

At December 31, 2019, the Company's goodwill was $2,374 million, including goodwill assigned to the Refining, Lubricants and Specialty Products, and HEP segments of $1,733 million, $328 million, and $313 million, respectively. As discussed in Note 1 and Note 11 of the financial statements, goodwill is tested for impairment at least annually on July 1 at the reporting unit level or more frequently if events or changes in circumstances indicate the asset might be impaired. During the second quarter of 2019, the Company performed interim goodwill impairment testing of the PCLI reporting unit included in the Lubricants and Specialty Products segment, resulting in a full impairment charge of $152.7 million on this reporting unit.

Auditing management's goodwill impairment tests was complex and highly judgmental for the Company's PCLI and El Dorado Refinery reporting units due to the significant estimation required to determine the fair value of these reporting units. In particular, the fair value estimates were sensitive to significant assumptions, such as revenue growth rates, refining margins, profitability, and weighted average cost of capital, which are affected by expectations about future market or economic conditions. These assumptions have a significant effect on the fair value estimates.

How We Addressed the Matter in Our Audit

We obtained an understanding, evaluated the design and tested the operating effectiveness of controls over the Company's goodwill impairment testing process. For example, we tested controls over management's review of the significant inputs and assumptions used in determining the reporting unit fair values.

To test the estimated fair value of the Company's PCLI and El Dorado Refinery reporting units, we performed audit procedures with the support of a valuation specialist that included, among others, assessing methodologies and testing the significant assumptions discussed above and the underlying data used by the Company in its analysis. We compared the significant assumptions used by management to relevant industry and economic trends, published forward prices, third party analyst reports, historical operating results and other relevant factors. We performed sensitivity analyses of significant assumptions to evaluate the changes in the fair value of the reporting units that would result from changes in the assumptions. We also tested management's reconciliation of the fair value of the reporting units to the market capitalization of the Company.

Environmental Liabilities

Description of the Matter

At December 31, 2019, the Company's accrual for environmental liabilities was $117.7 million, of which $95.6 million was classified as other long-term liabilities. As discussed in Note 1 and Note 12 of the consolidated financial statements, these accruals include remediation and monitoring costs expected to be incurred over an extended period of time. Liabilities are recorded when site restoration and environmental remediation, cleanup and other obligations are either known or considered probable and can be reasonably estimated.

Auditing management's estimates for environmental liabilities was challenging and highly judgmental due to the significant judgment required to develop assumptions related to future costs expected for the remediation of environmental obligations. In particular, the liability estimates require judgment with respect to costs, time frame and extent of required remedial and clean-up activities.

How We Addressed the Matter in Our Audit

We obtained an understanding, evaluated the design and tested the operating effectiveness of controls over the Company's accrued environmental liability cost estimate and review process.

To test management's accrued environmental liabilities, we performed audit procedures that included, among others, obtaining a rollforward of the environmental liabilities reflecting activity in the accruals for the past year, performing a look back analysis comparing the prior year short-term accrual estimates to actual current year expenditures, and comparing actual expenditures made to supporting invoices and cash payments. We also utilized an environmental specialist to assist in our evaluation of certain environmental site accruals, including the testing of a sample of cost estimates by inspecting relevant supporting documentation and performing a search of publicly filed records with environmental agencies to test the completeness of environmental liabilities.

Valuation of Intangible Assets in the Sonneborn Acquisition

Description of the Matter	During 2019, the Company completed its acquisition of Sonneborn for net consideration of $662.7 million, as disclosed in Note 2 to the consolidated financial statements. The transaction was accounted for as a business combination. Auditing the Company's accounting for its acquisition of Sonneborn was complex due to the significant estimation uncertainty in determining the fair value of the acquired intangible assets of $214.6 million, which primarily consisted of customer relationships and trademarks. The significant estimation uncertainty was primarily due to the sensitivity of the respective fair values to the significant underlying assumptions utilized in the measurement of the fair values of the intangible assets. The significant assumptions used to estimate the values of the intangible assets included discount rates, revenue growth rates, customer attrition rates, royalty rates as a percentage of revenue, and the economic life of trademarks. These significant assumptions are forward looking and could be affected by future economic and market conditions.
How We Addressed the Matter in Our Audit	We obtained an understanding, evaluated the design and tested the operating effectiveness of the Company's controls over the valuation of intangible assets related to the acquisition. For example, we tested controls over management's review of the valuation models and the underlying assumptions used to develop estimated values of intangible assets. To test the estimated fair values of the intangible assets, our audit procedures included, among others, evaluating the Company's selection of the valuation methodology, evaluating the significant assumptions used by the Company's valuation specialist, and evaluating the completeness and accuracy of the underlying data supporting the significant assumptions and estimates. For example, we compared the significant assumptions to current industry and market trends and to the historical results of the acquired business. We also performed sensitivity analyses of significant assumptions to evaluate the changes in the fair value of the acquired trademarks and customer relationship intangible assets that would result from changes in the assumptions. In addition, we involved our valuation specialists to assist with our evaluation of the methodologies used by the Company and significant assumptions included in the fair value estimates.

/s/ Ernst & Young LLP

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

Dallas, Texas
February 20, 2020

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

	December 31, 2019	December 31, 2018
ASSETS		
Current assets:		
Cash and cash equivalents *(HEP: $13,287 and $3,045, respectively)*	$ 885,162	$ 1,154,752
Accounts receivable: Product and transportation *(HEP: $18,732 and $12,332, respectively)*	834,771	635,623
Crude oil resales	44,914	36,078
	879,685	671,701
Inventories: Crude oil and refined products	1,282,789	1,166,404
Materials, supplies and other *(HEP: $833 and $858, respectively)*	191,413	187,975
	1,474,202	1,354,379
Income taxes receivable	5,478	34,040
Prepayments and other *(HEP: $6,795 and $3,452, respectively)*	61,662	81,507
Total current assets	3,306,189	3,296,379
Properties, plants and equipment, at cost *(HEP: $2,047,674 and $2,058,388, respectively)*	7,237,297	6,780,980
Less accumulated depreciation *(HEP: $(552,786) and $(489,217), respectively)*	(2,414,585)	(2,098,446)
	4,822,712	4,682,534
Operating lease right-of-use assets *(HEP: $2,652)*	467,109	—
Other assets: Turnaround costs	521,278	339,861
Goodwill *(HEP: $312,873 and $314,229, respectively)*	2,373,907	2,246,435
Intangibles and other *(HEP: $319,569 and $176,291, respectively)*	673,646	429,392
	3,568,831	3,015,688
Total assets	$ 12,164,841	$ 10,994,601
LIABILITIES AND EQUITY		
Current liabilities:		
Accounts payable *(HEP: $18,050 and $16,723, respectively)*	$ 1,215,555	$ 872,627
Income taxes payable	27,965	17,636
Operating lease liabilities *(HEP $3,608)*	104,415	—
Accrued liabilities *(HEP: $30,418 and $27,240, respectively)*	337,993	277,892
Total current liabilities	1,685,928	1,168,155
Long-term debt *(HEP: $1,462,031 and $1,418,900, respectively)*	2,455,640	2,411,540
Noncurrent operating lease liabilities *(HEP $72,000)*	364,420	—
Deferred income taxes *(HEP: $424 and $488, respectively)*	889,270	722,576
Other long-term liabilities *(HEP: $59,021 and $63,534, respectively)*	260,157	233,271
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; 256,042,554 and 256,036,788 shares issued as of December 31, 2019 and December 31, 2018	2,560	2,560
Additional capital	4,204,547	4,196,125
Retained earnings	4,744,120	4,196,902
Accumulated other comprehensive income	14,774	13,623
Common stock held in treasury, at cost – 94,196,029 and 83,915,297 shares as of December 31, 2019 and December 31, 2018, respectively	(2,987,808)	(2,490,639)
Total HollyFrontier stockholders' equity	5,978,193	5,918,571
Noncontrolling interest	531,233	540,488
Total equity	6,509,426	6,459,059
Total liabilities and equity	$ 12,164,841	$ 10,994,601

Parenthetical amounts represent asset and liability balances attributable to Holly Energy Partners, L.P. ("HEP") as of December 31, 2019 and 2018. HEP is a variable interest entity.

See accompanying notes.

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

	Years Ended December 31,		
	2019	2018	2017
Sales and other revenues	$ 17,486,578	$ 17,714,666	$ 14,251,299
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)	13,918,384	13,940,782	11,467,873
Lower of cost or market inventory valuation adjustment	(119,775)	136,305	(108,685)
	13,798,609	14,077,087	11,359,188
Operating expenses (exclusive of depreciation and amortization)	1,394,052	1,285,838	1,296,669
Selling, general and administrative expenses (exclusive of depreciation and amortization)	354,236	290,424	265,721
Depreciation and amortization	509,925	437,324	409,937
Goodwill and long-lived asset impairment	152,712	—	19,247
Total operating costs and expenses	16,209,534	16,090,673	13,350,762
Income from operations	1,277,044	1,623,993	900,537
Other income (expense):			
Earnings of equity method investments	5,180	5,825	12,510
Interest income	22,139	16,892	3,736
Interest expense	(143,321)	(131,363)	(117,597)
Loss on early extinguishment of debt	—	—	(12,225)
Gain on foreign currency transactions	5,449	6,197	16,921
Gain on foreign currency swap contracts	—	—	24,545
Remeasurement gain on HEP pipeline interest acquisitions	—	—	36,254
Other, net	5,013	2,923	4,182
	(105,540)	(99,526)	(31,674)
Income before income taxes	1,171,504	1,524,467	868,863
Income tax expense (benefit):			
Current	220,486	270,274	125,143
Deferred	78,666	76,969	(137,522)
	299,152	347,243	(12,379)
Net income	872,352	1,177,224	881,242
Less net income attributable to noncontrolling interest	99,964	79,264	75,847
Net income attributable to HollyFrontier stockholders	$ 772,388	$ 1,097,960	$ 805,395
Earnings per share attributable to HollyFrontier stockholders:			
Basic	$ 4.64	$ 6.25	$ 4.54
Diluted	$ 4.61	$ 6.19	$ 4.52
Average number of common shares outstanding:			
Basic	166,287	175,009	176,174
Diluted	167,385	176,661	177,196

See accompanying notes.

HOLLYFRONTIER CORPORATION
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(In thousands)

	Years Ended December 31,		
	2019	2018	2017
Net income	$ 872,352	$ 1,177,224	$ 881,242
Other comprehensive income (loss):			
Foreign currency translation adjustment	13,337	(38,227)	22,151
Unrealized loss on marketable securities available for sale	—	—	(4)
Hedging instruments:			
Change in fair value of cash flow hedging instruments	14,364	5,166	2,919
Reclassification adjustments to net income on settlement of cash flow hedging instruments	(19,713)	6,055	10,448
Amortization of unrealized loss attributable to discontinued cash flow hedges	—	—	1,080
Net unrealized gain (loss) on hedging instruments	(5,349)	11,221	14,447
Other post-retirement benefit obligations:			
Actuarial loss on pension plans	(990)	(923)	(1,162)
Actuarial gain (loss) on post-retirement healthcare plans	(2,412)	2,612	(1,058)
Post-retirement healthcare plans gain reclassified to net income	(3,587)	(3,481)	(3,481)
Actuarial gain (loss) on retirement restoration plan	(224)	258	(123)
Retirement restoration plan loss reclassified to net income	6	27	17
Net change in other post-retirement benefit obligations	(7,207)	(1,507)	(5,807)
Other comprehensive income (loss) before income taxes	781	(28,513)	30,787
Income tax expense (benefit)	(370)	(5,585)	11,349
Other comprehensive income (loss)	1,151	(22,928)	19,438
Total comprehensive income	873,503	1,154,296	900,680
Less noncontrolling interest in comprehensive income	99,964	79,264	75,790
Comprehensive income attributable to HollyFrontier stockholders	$ 773,539	$ 1,075,032	$ 824,890

See accompanying notes.

HOLLYFRONTIER CORPORATION
CONSOLIDATED STATEMENTS OF CASH FLOWS
(In thousands)

	Years Ended December 31,		
	2019	2018	2017
Cash flows from operating activities:			
Net income	$ 872,352	$ 1,177,224	$ 881,242
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization	509,925	437,324	409,937
Goodwill and long-lived asset impairment	152,712	—	19,247
Lower of cost or market inventory valuation adjustment	(119,775)	136,305	(108,685)
Earnings of equity method investments, inclusive of distributions	(213)	(149)	1,450
Loss on early extinguishment of debt attributable to unamortized discount	—	—	2,475
Remeasurement gain on HEP pipeline interest acquisitions	—	—	(36,254)
Loss on sale of assets	50	2,171	508
Deferred income taxes	78,666	76,969	(137,522)
Equity-based compensation expense	42,269	42,172	42,337
Change in fair value – derivative instruments	36,888	(31,515)	(4,265)
(Increase) decrease in current assets:			
Accounts receivable	(150,437)	35,793	(115,322)
Inventories	91,599	136,551	(162,297)
Income taxes receivable	32,368	7,752	50,601
Prepayments and other	3,633	(10,340)	(6,753)
Increase (decrease) in current liabilities:			
Accounts payable	312,794	(326,030)	188,975
Income taxes payable	9,048	15,281	(18,525)
Accrued liabilities	13,748	53,281	57,227
Turnaround expenditures	(318,415)	(217,228)	(135,104)
Other, net	(18,601)	18,855	22,118
Net cash provided by operating activities	1,548,611	1,554,416	951,390
Cash flows from investing activities:			
Additions to properties, plants and equipment	(263,651)	(256,888)	(227,449)
Additions to properties, plants and equipment – HEP	(30,112)	(54,141)	(44,810)
Acquisitions, net of cash acquired	(662,665)	(54,179)	(870,627)
Purchase of pipeline interests, net of cash acquired - HEP	—	—	(245,446)
Investment in joint venture	(17,886)	—	—
Proceeds from sale of assets	194	3,100	1,377
Purchases of marketable securities	—	—	(41,565)
Sales and maturities of marketable securities	—	—	465,716
Other, net	1,206	1,588	3,134
Net cash used for investing activities	(972,914)	(360,520)	(959,670)
Cash flows from financing activities:			
Borrowings under credit agreements	365,500	337,000	995,000
Repayments under credit agreements	(323,000)	(426,000)	(536,000)
Proceeds from issuance of senior notes – HEP	—	—	101,750
Redemption of senior notes - HEP	—	—	(309,750)
Proceeds of financing arrangements	—	32,547	—
Proceeds from issuance of common units - HEP	—	114,759	52,110
Purchase of treasury stock	(533,083)	(363,437)	(15,926)
Dividends	(225,170)	(233,544)	(235,508)
Distributions to noncontrolling interest	(132,268)	(125,653)	(110,351)
Contribution from noncontrolling interest	3,210	—	—
Payments on finance leases	(1,551)	—	—
Other, net	(1,893)	—	(13,955)
Net cash used for financing activities	(848,255)	(664,328)	(72,630)
Effect of exchange rate on cash flow	2,968	(5,573)	1,088
Cash and cash equivalents:			
Increase (decrease) for the period	(269,590)	523,995	(79,822)
Beginning of period	1,154,752	630,757	710,579
End of period	$ 885,162	$ 1,154,752	$ 630,757
Supplemental disclosure of cash flow information:			
Cash paid during the period for:			
Interest	$ (133,809)	$ (130,106)	$ (124,375)
Income taxes, net	$ (178,967)	$ (252,644)	$ (93,272)

See accompanying notes.

HOLLYFRONTIER CORPORATION
CONSOLIDATED STATEMENTS OF EQUITY
(In thousands)

	HollyFrontier Stockholders' Equity						
	Common Stock	Additional Capital	Retained Earnings	Accumulated Other Comprehensive Income	Treasury Stock	Non-controlling Interest	Total Equity
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 ($1.32 declared per common share)	—	—	(235,508)	—	—	—	(235,508)
Distributions to noncontrolling interests	—	—	—	—	—	(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 compensation plans, net of forfeitures	—	(10,326)	—	—	10,326	—	—
Equity-based compensation, inclusive of tax expense	—	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 ($1.32 declared per common share)	—	—	(233,544)	—	—	—	(233,544)
Distributions to noncontrolling interests	—	—	—	—	—	(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
Net income	—	—	772,388	—	—	99,964	872,352
Dividends ($1.34 declared per common share)	—	—	(225,170)	—	—	—	(225,170)
Distributions to noncontrolling interests	—	—	—	—	—	(132,268)	(132,268)
Other comprehensive income, net of tax	—	—	—	1,151	—	—	1,151
Equity attributable to HEP common unit issuances, net of tax	—	—	—	—	—	(139)	(139)
Issuance of common stock under incentive compensation plans, net of forfeitures	—	(31,314)	—	—	31,314	—	—
Equity-based compensation	—	39,736	—	—	—	2,533	42,269
Purchase of treasury stock	—	—	—	—	(528,483)	—	(528,483)
Purchase of HEP units for restricted grants	—	—	—	—	—	(1,893)	(1,893)
Contributions from joint venture partner	—	—	—	—	—	22,548	22,548
Balance at December 31, 2019	$ 2,560	$ 4,204,547	$4,744,120	$ 14,774	$ (2,987,808)	$ 531,233	$ 6,509,426

See accompanying notes.

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 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 petroleum refineries that serve markets throughout the Mid-Continent, Southwest and Rocky Mountain regions of the United States. In addition, we produce base oils and other specialized lubricants in the United States, Canada and the Netherlands, with retail and wholesale marketing of our products through a global sales network with locations in Canada, the United States, Europe, China and Latin America. As of December 31, 2019, 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 specialty lubricant products;
- owned and operated Sonneborn with manufacturing facilities in Petrolia, Pennsylvania and the Netherlands, which produce specialty lubricant products, such as white oils, petrolatums and waxes;
- owned and operated Red Giant Oil Company LLC ("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, a variable interest entity ("VIE"). 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.

In 2019, HEP Cushing LLC, a wholly-owned subsidiary of HEP, and Plains Marketing, L.P., a wholly-owned subsidiary of Plains All American Pipeline, L.P. ("Plains"), formed a 50/50 joint venture, Cushing Connect Pipeline & Terminal LLC. Cushing Connect Pipeline & Terminal LLC and its two subsidiaries, Cushing Connect Pipeline and Cushing Connect Terminal are each VIE's because they do not have sufficient equity at risk to finance their activities without additional financial support. HEP is the primary beneficiary of two of these entities as HEP is constructing and will operate the Cushing Connect Pipeline, and HEP has more ability to direct the activities that most significantly impact the financial performance of Cushing Connect Pipeline & Terminal LLC and Cushing Connect Pipeline.Therefore, HEP consolidates these two entities. HEP is not the primary beneficiary of Cushing Connect Terminal, which HEP accounts for using the equity method of accounting.

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 $4.5 million at December 31, 2019 and $3.6 million at December 31, 2018.

Accounts receivable attributable to crude oil resales generally represent the sale 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 and Sonneborn businesses are stated at the lower of cost, using the first-in, first-out ("FIFO") method, or net realizable value.

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

Leases: At inception, we determine if an arrangement is or contains a lease. Right-of-use ("ROU") assets represent our right to use an underlying asset for the lease term and lease liabilities represent our payment obligation under the leasing arrangement. ROU assets and lease liabilities are recognized at the commencement date based on the present value of lease payments over the lease term. We use our estimated incremental borrowing rate ("IBR") to determine the present value of lease payments as most of our leases do not contain an implicit rate. Our IBR represents the interest rate which we would pay to borrow, on a collateralized basis, an amount equal to the lease payments over a similar term in a similar economic environment. We use the implicit rate when readily determinable.

Operating leases are recorded in operating lease right-of-use assets and current and noncurrent operating lease liabilities on our consolidated balance sheet. Finance leases are included in properties, plants and equipment and accrued liabilities and other long-term liabilities on our consolidated balance sheet.

Our lease term includes an option to extend the lease when it is reasonably certain that we will exercise that option. Leases with a term of 12 months or less are not recorded on our balance sheet and lease expense is accounted for on a straight-line basis. For certain equipment leases, we apply a portfolio approach for the operating lease ROU assets and liabilities. Also, as a lessee, we separate non-lease components that are identifiable and exclude them from the determination of net present value of lease payment obligations. In addition, HEP, as a lessor, does not separate the non-lease (service) component in contracts in which the lease component is the dominant component. HEP treats these combined components as an operating lease.

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 14 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.

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 $35.9 million and $28.7 million at December 31, 2019 and 2018, respectively, which are included in "Other long-term liabilities" in our consolidated balance sheets. Accretion expense was insignificant for the years ended December 31, 2019, 2018 and 2017.

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. Our goodwill impairment testing first entails either a quantitative assessment or an optional qualitative assessment to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying amount. If we determine that based on the qualitative factors that it is more likely than not that the fair value of the reporting unit is greater than its carrying amount, a quantitative test is performed in which we estimate the fair value of the related reporting unit. If the carrying amount of a reporting unit exceeds its fair value, the goodwill of that reporting unit is impaired, and we measure goodwill impairment as the excess of the carrying amount of the reporting unit over the related fair value. 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 the assets of our Lubricants and Specialty Products asset groups. 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.

See Note 11 for additional information regarding our goodwill and long-lived assets including impairment charges recorded during the years ended December 31, 2019 and 2017.

Equity Method Investments: 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"). HEP also accounts for Cushing Connect Terminal, a subsidiary of the Cushing Connect Pipeline & Terminal LLC joint venture, using the equity method of accounting, as HEP does not have the ability to direct the activities that most significantly impact the entity. As of December 31, 2019, HEP's underlying equity and recorded investment balances in the joint ventures are $90.8 million and $120.1 million respectively. The differences are being amortized as adjustments to HEP's pro-rata share of earnings in the joint ventures.

Revenue Recognition: Revenues 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.

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. Our lubricants and specialty products business also has agreements that create an obligation to deliver products at a future date for which consideration has already been received and recorded as deferred revenue. This revenue is recognized when the products are delivered to the customer.

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 $141.9 million, $110.9 million and $112.9 million for the years ended December 31, 2019, 2018 and 2017, 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: Assets and liabilities recorded in foreign currencies 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.

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 inventory repurchase obligations that are subsequently reversed when the inventories are repurchased. For the years ended December 31, 2019, 2018 and 2017, we received proceeds of $52.1 million, $51.2 million and $47.4 million and subsequently repaid $49.2 million, $52.5 million and $49.8 million, respectively, under these sell / buy transactions.

Accounting Pronouncements - Recently Adopted

Goodwill Impairment Testing
In January 2017, Accounting Standard Update ("ASU") 2017-04, "Simplifying the Test for Goodwill Impairment," was issued amending the testing for goodwill impairment by eliminating Step 2 from the goodwill impairment test. Step 2 measures a goodwill impairment loss by comparing the implied fair value of a reporting unit's goodwill with the carrying amount of that goodwill. We adopted this standard effective in the second quarter of 2019, and the adoption of this standard resulted in no change to the amount of goodwill impairment recorded in the second quarter of 2019.

Leases
In February 2016, ASU 2016-02, "Leases," was issued requiring leases to be measured and recognized as a lease liability, with a corresponding ROU asset on the balance sheet. We adopted this standard effective January 1, 2019 using the optional 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 also elected practical expedients provided by the new standard, including the package of practical expedients, whereby we did not reassess lease classification or initial indirect lease cost under the new standard. In addition, we elected to exclude short-term leases, which at inception have a lease term of 12 months or less, from the amounts recognized on our balance sheet. In addition, HEP elected an expedient whereby a lessor does not have to separate non-lease (service) components from lease components under certain contracts. Under this expedient, HEP treated the combined components of its leases with third parties (i.e., the contracts that are not eliminated upon consolidation of HEP by HFC) as an operating lease in which the dominant component was a lease in accordance with ASC 842. Upon adoption of this standard, we recognized $433.4 million of lease liabilities and corresponding ROU assets on our consolidated balance sheet. Adoption of this standard did not have a material impact on our results of operations or cash flows. In addition, upon our acquisition of Sonneborn on February 1, 2019, we recognized $15.6 million of lease liabilities and corresponding ROU assets.

Accounting Pronouncements - Not Yet Adopted

Credit Losses Measurement
In June 2016, ASU 2016-13, "Measurement of Credit Losses on Financial Instruments," was issued requiring measurement of all expected credit losses for certain types of financial instruments, including trade receivables, held at the reporting date based on historical experience, current conditions and reasonable and supportable forecasts. This standard is effective January 1, 2020, and our preliminary review of historic and expected credit losses indicates the amount of expected credit losses upon adoption would not be materially different from the current allowance for doubtful accounts balance.

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. Sonneborn is a producer of specialty hydrocarbon chemicals such as white oils, petrolatums and waxes with manufacturing facilities in the United States and Europe.

Aggregate consideration totaled $701.6 million and consisted of $662.7 million in cash paid at acquisition, net of cash acquired.

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 Sonneborn 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.

The following summarizes our valuation of the Sonneborn assets and liabilities acquired on February 1, 2019:

		(In millions)
Cash and cash equivalents	$	38.9
Accounts receivable and other current assets		58.4
Inventories		81.0
Properties, plants and equipment		168.2
Goodwill		282.3
Intangibles and other noncurrent assets		231.5
Accounts payable and accrued liabilities		(47.9)
Deferred income tax liabilities		(83.0)
Other long-term liabilities		(27.8)
	$	701.6

The purchase price allocation resulted in the recognition of $282.3 million in goodwill, which relates to the established workforce and global market presence of the acquired business as well as the expected synergies to be gained upon combining with our existing operations to form an expanded lubricants and specialty products business. This goodwill is not deductible for income tax purposes.

Intangibles include customer relationships, trademarks, patents and technical know-how totaling $214.6 million that are being amortized on a straight-line basis over a 12-year period.

Our consolidated financial and operating results reflect the Sonneborn operations beginning February 1, 2019. Our results of operations include revenue and income before income taxes of $340.3 million and $5.1 million, respectively, for the period from February 1, 2019 through December 31, 2019 related to these operations.

The following unaudited pro forma information for the years ended December 31, 2019 and 2018 presents the revenues and operating income for our Lubricants and Specialty Products segment assuming the acquisition of Sonneborn had occurred as of January 1, 2018. The proforma effects on consolidated HFC revenue and operating income are not material.

	Years Ended December 31,			
	2019		**2018**	
	(In thousands)			
Sales and other revenues	$	2,124,778	$	2,195,690
Operating income [(1)]	$	(116,254)	$	99,371

(1) The year ended December 31, 2019, includes goodwill impairment of $152.7 million from the PCLI reporting unit of our Lubricants and Specialty Products segment. See Note 11 for additional information on this goodwill impairment.

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.

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 $24.2 million, $3.6 million and $27.9 million, for the years ended December 31, 2019, 2018 and 2017, respectively, in incremental direct integration and regulatory costs that principally relate to legal, advisory, regulatory and other professional fees and are presented as selling, general and administrative expenses.

NOTE 3: Leases

We have operating and finance leases for land, buildings, pipelines, storage tanks, transportation and other equipment for our operations. Our leases have remaining terms of one to 60 years, some of which include options to extend the leases for up to 10 years. Certain of our leases for pipeline assets include provisions for variable payments which are based on a measure of throughput and also contain a provision for the lessor to adjust the rate per barrel periodically over the life of the lease. These variable costs are not included in the initial measurement of ROU assets and lease liabilities.

The following table presents the amounts and balance sheet locations of our operating and financing leases recorded on our consolidated balance sheet.

	December 31, 2019	
	(In thousands)	
Operating leases:		
Operating lease right-of-use assets	$	467,109
Operating lease liabilities		104,415
Noncurrent operating lease liabilities		364,420
Total operating lease liabilities	$	468,835
Finance leases:		
Properties, plants and equipment, at cost	$	13,406
Accumulated amortization		(6,233)
Properties, plants and equipment, net	$	7,173
Accrued liabilities	$	1,567
Other long-term liabilities		5,163
Total finance lease liabilities	$	6,730

Supplemental balance sheet information related to our leases was as follows:

	December 31, 2019
Weighted average remaining lease term (in years)	
Operating leases	7.2
Finance leases	8.1
Weighted average discount rate	
Operating leases	4.0%
Finance leases	5.2%

The components of lease expense were as follows:

	Year Ended December 31, 2019
	(In thousands)
Operating lease expense	$ 112,770
Finance lease expense:	
Amortization of right-of-use assets	1,543
Interest on lease liabilities	334
Variable lease cost	4,449
Total lease expense	$ 119,096

Supplemental cash flow information related to leases was as follows:

	Year Ended December 31, 2019
	(In thousands)
Cash paid for amounts included in the measurement of lease liabilities:	
Operating cash flows from operating leases	$ 116,980
Operating cash flows from finance leases	$ 334
Financing cash flows from finance leases	$ 1,551
Right-of-use assets obtained in exchange for lease obligations:	
Operating leases	$ 121,750

As of December 31, 2019, minimum future lease payments of our operating and finance lease obligations were as follows:

	Operating	Finance
	(In thousands)	
2020	$ 121,511	$ 2,128
2021	102,480	1,304
2022	87,344	1,056
2023	72,751	1,110
2024	49,901	626
2025 and thereafter	124,612	2,255
Future minimum lease payments	558,599	8,479
Less: imputed interest	89,764	1,749
Total lease obligations	468,835	6,730
Less: current obligations	104,415	1,567
Long-term lease obligations	$ 364,420	$ 5,163

As of December 31, 2019, we have entered into certain leases that have not yet commenced. Such leases include a 15-year lease for plant equipment, with estimated future lease payments of $6.8 million, expected to commence in the second quarter of 2020, and a 5-year lease for office equipment, with estimated future lease payments of $0.4 million, expected to commence in the first quarter of 2020.

Our consolidated income statement reflects lease revenue recognized by HEP for contracts with third parties in which HEP is the lessor. Lease income recognized for the year ended December 31, 2019 was $33.2 million for operating leases.

Annual minimum undiscounted lease payments in which HEP is a lessor to third-party contracts as of December 31, 2019 were as follows:

	(In thousands)
2020	$ 18,839
2021	12,794
2022	11,377
2023	11,248
2024	11,248
Thereafter	2,812
Total	$ 68,318

The following are disclosures related to periods prior to our adoption of ASC 842.

We leased certain office and storage facilities, rail cars and other equipment under long-term operating leases, most of which contained renewal options. At December 31, 2018, the minimum future rental commitments under operating leases having non-cancellable lease terms in excess of one year were 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 and $95.7 million for the years ended December 31, 2018 and 2017, respectively.

NOTE 4: 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 US Holdings, Inc's (“Delek”) refinery in Big Spring, Texas. Additionally, as of December 31, 2019 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; 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”); Cheyenne Pipeline, LLC, the owner of a pipeline running from Fort Laramie, Wyoming to Cheyenne, Wyoming (the “Cheyenne Pipeline”) and Cushing Connect Pipeline & Terminal LLC (“Cushing Connect”), the owner of a crude oil storage terminal in Cushing, Oklahoma and a to-be-constructed pipeline that will run from Cushing, Oklahoma to our Tulsa Refineries.

At December 31, 2019, 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 by 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 77% of HEP’s total revenues for the year ended December 31, 2019. 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 13 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.

Cushing Connect Joint Venture

On October 2, 2019, HEP Cushing LLC, a wholly-owned subsidiary of HEP, and Plains Marketing, L.P., a wholly-owned subsidiary of Plains, formed a 50/50 joint venture, Cushing Connect, for (i) the development and construction of a new 160,000 barrel per day common carrier crude oil pipeline (the “Cushing Connect Pipeline”) that will connect the Cushing, Oklahoma crude oil hub to our Tulsa Refineries and (ii) the ownership and operation of 1.5 million barrels of crude oil storage in Cushing, Oklahoma (the “Cushing Connect Terminal”). The Cushing Connect Terminal is expected to be placed in service during the second quarter of 2020, and the Cushing Connect Pipeline is expected to be placed in service during the first quarter of 2021. Long-term commercial agreements have been entered into to support the Cushing Connect assets.

Cushing Connect will contract with an affiliate of HEP to manage the construction and operation of the Cushing Connect Pipeline and with an affiliate of Plains to manage the operation of the Cushing Connect Terminal. The total investment in Cushing Connect will be shared proportionately among the partners, and HEP estimates its share of the cost of the Cushing Connect Terminal contributed by Plains and Cushing Connect Pipeline construction costs are approximately $65.0 million.

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 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.

Transportation Agreements
HEP serves our refineries under long-term pipeline, terminal and tankage throughput agreements and refinery processing tolling agreements expiring from 2021 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, 2019, these agreements result in minimum annualized payments to HEP of $348.1 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, 2019, HEP did not issue any common units under this program. As of December 31, 2019, HEP has issued 2,413,153 common units under this program, providing $82.3 million in gross proceeds.

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 5: 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.

Disaggregated revenues are as follows:

	Years Ended December 31,		
	2019	2018	2017
		(In thousands)	
Revenues by type			
Refined product revenues			
Transportation fuels [1]	$ 12,952,899	$ 13,326,654	$ 11,056,038
Specialty lubricant products [2]	1,864,450	1,636,859	1,415,842
Asphalt, fuel oil and other products [3]	1,025,663	985,234	743,394
Total refined product revenues	15,843,012	15,948,747	13,215,274
Excess crude oil revenues [4]	1,470,148	1,597,321	891,756
Transportation and logistic services	121,027	108,412	77,225
Other revenues [5]	52,391	60,186	67,044
Total sales and other revenues	$ 17,486,578	$ 17,714,666	$ 14,251,299

	Years Ended December 31,		
	2019	2018	2017
		(In thousands)	
Refined product revenues by market			
United States			
Mid-Continent	$ 8,424,191	$ 8,427,200	$ 7,099,754
Southwest	3,621,273	3,772,278	2,952,224
Rocky Mountains	2,208,541	2,476,044	2,055,221
Northeast	578,932	339,407	259,840
Canada	721,169	732,321	673,842
Europe, Asia and Latin America	288,906	201,497	174,393
Total refined product revenues	$ 15,843,012	$ 15,948,747	$ 13,215,274

(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 $808.9 million and $216.8 million, respectively, for the year ended December 31, 2019, $822.6 million and $162.6 million, respectively, for the year ended December 31, 2018, and $565.2 million and $178.2 million, respectively, for the year ended December 31, 2017.
(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 and production agreements from the acquisition of Sonneborn on February 1, 2019. The following table presents changes to contract liabilities for the years ended December 31, 2019 and 2018:

	Years Ended December 31,	
	2019	2018
	(In thousands)	
Balance at January 1	$ 132	$ 179
Sonneborn acquisition	6,463	—
Increase	26,751	6,748
Recognized as revenue	(28,694)	(6,795)
Balance at December 31	$ 4,652	$ 132

As of December 31, 2019, 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 2024. 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:

	2020	2021	2022	Thereafter	Total
			(In thousands)		
Refined product sales volumes (barrels)	21,051	14,622	12,775	24,465	72,913

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 2025. Annual minimum revenues attributable to HEP's third-party contracts as of December 31, 2019 are presented below:

	2020	2021	2022	Thereafter	Total
			(In thousands)		
HEP contractual minimum revenues	$ 29,536	$ 22,822	$ 13,267	$ 25,308	$ 90,933

We have no customers which had accounted for over 10% of our annual revenues for the years ended December 31, 2019, 2018 or 2017.

NOTE 6: 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.

The carrying amounts of derivative instruments and RINs credit obligations at December 31, 2019 and 2018 were as follows:

Financial Instrument	Carrying Amount	Fair Value by Input Level		
		Level 1	Level 2	Level 3
		(In thousands)		
December 31, 2019				
Assets:				
Commodity price swaps	$ 13,455	$ —	$ 13,455	$ —
Commodity forward contracts	4,133	—	4,133	—
Total assets	$ 17,588	$ —	$ 17,588	$ —
Liabilities:				
NYMEX futures contracts	$ 2,578	$ 2,578	$ —	$ —
Foreign currency forward contracts	6,722	—	6,722	—
Commodity price swaps	1,230	—	1,230	—
Commodity forward contracts	3,685	—	3,685	—
Total liabilities	$ 14,215	$ 2,578	$ 11,637	$ —

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	$ —

(1) Represent obligations for RINs credits for which we did not have sufficient quantities at December 31, 2018 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.

NOTE 7: Earnings Per Share

Basic earnings per share is calculated as net income 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 attributable to HollyFrontier stockholders:

	Years Ended December 31,		
	2019	2018	2017
	(In thousands, except per share data)		
Net income attributable to HollyFrontier stockholders	$ 772,388	$ 1,097,960	$ 805,395
Participating securities' (restricted stock) share in earnings	1,034	3,714	5,047
Net income attributable to common shares	$ 771,354	$ 1,094,246	$ 800,348
Average number of shares of common stock outstanding	166,287	175,009	176,174
Effect of dilutive variable restricted shares and performance share units (1)	1,098	1,652	1,022
Average number of shares of common stock outstanding assuming dilution	167,385	176,661	177,196
Basic earnings per share	$ 4.64	$ 6.25	$ 4.54
Diluted earnings per share	$ 4.61	$ 6.19	$ 4.52
(1) Excludes anti-dilutive restricted and performance share units of:	302	238	543

NOTE 8: 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 $41.5 million, $39.0 million and $39.8 million for the years ended December 31, 2019, 2018 and 2017, 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 $2.5 million, $3.2 million and $2.5 million for the years ended December 31, 2019, 2018 and 2017, 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, which are payable in stock or cash and generally vest 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.

A summary of restricted stock and restricted stock unit activity during the year ended December 31, 2019 is presented below:

Restricted Stock and Restricted Stock Units	Grants	Weighted Average Grant Date Fair Value	Aggregate Intrinsic Value ($000)
Outstanding at January 1, 2019	1,196,914	$ 46.81	
Granted	661,329	$ 52.62	
Vested	(739,613)	$ 41.74	
Forfeited	(60,234)	$ 46.30	
Converted from performance share units	43,385	$ 35.80	
Outstanding at December 31, 2019	1,101,781	$ 53.30	$ 55,871

For the years ended December 31, 2019, 2018 and 2017, restricted stock and restricted stock units vested having a grant date fair value of $30.9 million, $30.0 million and $24.9 million, respectively. For the years ended December 31, 2018 and 2017, we granted restricted stock units having a weighted average grant date fair value of $64.96 and $35.02, respectively. As of December 31, 2019, there was $36.2 million of total unrecognized compensation cost related to non-vested restricted stock unit grants. That cost is expected to be recognized over a weighted-average period of 1.5 years. For the years ended December 31, 2019 and 2018, we paid $1.7 million and $0.1 million, respectively, in cash equal to the value of the stock award on the vest date, to certain employees to settle 32,648 and 2,481, respectively, restricted stock units. No restricted stock units were settled in cash in 2017.

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, 2019 is presented below:

Performance Share Units	Grants
Outstanding at January 1, 2019	662,431
Granted	177,428
Vested	(427,715)
Forfeited	(11,046)
Converted to restricted stock units	(25,510)
Outstanding at December 31, 2019	375,588

For the year ended December 31, 2019, we issued 592,602 shares of common stock, representing a 200% payout on vested performance share units having a grant date fair value of $7.3 million. For the years ended December 31, 2018 and 2017, we issued common stock upon the vesting of the performance share units having a grant date fair value of $8.8 million and $6.6 million, respectively. As of December 31, 2019, there was $11.7 million of total unrecognized compensation cost related to non-vested performance share units having a grant date fair value of $58.50 per unit. That cost is expected to be recognized over a weighted-average period of 2.1 years. In addition, for the year ended December 31, 2019, 131,414 shares of common stock, representing target payout on performance share units having a grant date fair value of $8.9 million, vested and will be settled in 2020.

NOTE 9: Inventories

Inventory consists of the following components:

	December 31, 2019	December 31, 2018
	(In thousands)	
Crude oil	$ 489,169	$ 503,705
Other raw materials and unfinished products(1)	394,045	360,124
Finished products(2)	639,938	662,713
Lower of cost or market reserve	(240,363)	(360,138)
Process chemicals(3)	36,786	31,413
Repairs and maintenance supplies and other (4)	154,627	156,562
Total inventory	$ 1,474,202	$ 1,354,379

(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 $240.4 million and $360.1 million at December 31, 2019 and 2018, respectively. The December 31, 2018 market reserve of $360.1 million was reversed due to the sale of inventory quantities that gave rise to the 2018 reserve. A new market reserve of $240.4 million was established as of December 31, 2019 based on market conditions and prices at that time. The effect of the change in the lower of cost or market reserve was a decrease to cost of products sold totaling $119.8 million for the year ended December 31, 2019 , an increase of $136.3 million for the year ended December 31, 2018 and a decrease of $108.7 million for the year ended December 31, 2017.

At December 31, 2019, 2018 and 2017, the LIFO value of inventory, net of the lower of cost or market reserve, was equal to current costs.

During the three months ended September 30, 2019, the EPA granted the Cheyenne Refinery and the Woods Cross Refinery each a one-year small refinery exemption from the Renewable Fuel Standard ("RFS") program requirements for the 2018 calendar year end. As a result, the Cheyenne Refinery's and the Woods Cross Refinery's gasoline and diesel production are not subject to the Renewable Volume Obligation ("RVO") for 2018. In the third quarter of 2019, we increased our inventory of RINs and reduced our cost of products sold by $36.6 million representing the net cost of the RINs charge to cost of products sold in 2018, less the loss incurred for selling 2018 vintage RINs in excess of those which we can use subject to the 20% carryover limit.

During the three months ended June 30, 2018, the EPA granted the Woods Cross Refinery a one-year small refinery exemption from the 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 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.

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.

Various subsidiaries of HollyFrontier moved to intervene in four lawsuits brought by renewable fuel interest groups against the EPA in federal courts alleging violations of the Renewable Fuel Standard under the Clean Air Act and challenging the EPA's handling of small refinery exemptions. We intervened to vigorously defend the EPA's position on small refinery exemptions because we believe the EPA correctly applied applicable law to the matters at issue. The U.S. Court of Appeals for the DC Circuit dismissed one of these four lawsuits on November 12, 2019 for lack of jurisdiction. On January 24, 2020, the U.S. Court of Appeals for the 10th Circuit vacated the small refinery exemptions granted to two of our refineries for 2016 and remanded the case to the EPA for further proceedings. It is not clear at this time what steps the EPA will take with respect to our 2016 small refinery exemptions, and we are unable to estimate costs we may incur, if any, at this time. It is also not clear how the case will impact future small refinery exemptions. It is too early to assess whether the remaining two cases are expected to have any impact on us.

NOTE 10: Properties, Plants and Equipment

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

	December 31,	
	2019	2018
	(In thousands)	
Land, buildings and improvements	\$ 447,547	\$ 455,508
Refining facilities	4,258,764	4,034,546
Pipelines and terminals	1,775,657	1,729,994
Transportation vehicles	27,214	20,311
Other fixed assets	540,953	296,843
Construction in progress	187,162	243,778
	7,237,297	6,780,980
Accumulated depreciation	(2,414,585)	(2,098,446)
	\$ 4,822,712	\$ 4,682,534

We capitalized interest attributable to construction projects of \$2.5 million, \$4.8 million and \$5.0 million for the years ended December 31, 2019, 2018 and 2017, respectively.

Depreciation expense was \$334.2 million, \$309.0 million and \$286.5 million for the years ended December 31, 2019, 2018 and 2017, respectively.

NOTE 11: Goodwill, Long-lived Assets and Intangibles

Goodwill and long-lived assets

As of December 31, 2019, our goodwill balance was $2.4 billion. During 2019, we recognized $282.3 million in goodwill as a result of our Sonneborn acquisition, all of which has been assigned to our Lubricants and Specialty Products segment. 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, 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
Additional goodwill acquired	—	282,273	—	282,273
Current year impairment losses	—	(152,712)	—	(152,712)
Current year adjustments	—	—	(1,356)	(1,356)
Foreign currency translation adjustment	—	(733)	—	(733)
Balance at December 31, 2019				
Goodwill	2,042,790	480,274	312,873	2,835,937
Accumulated impairment losses	(309,318)	(152,712)	—	(462,030)
	$ 1,733,472	$ 327,562	$ 312,873	$ 2,373,907

During the second quarter of 2019, we performed interim goodwill impairment testing of the PCLI reporting unit included in our Lubricants and Specialty Products segment. We elected to perform this interim assessment due to the recent reorganization of our reporting unit structure within the Lubricants and Specialty Products segment, combined with the identification of events and circumstances which were indicators of potential goodwill impairment at PCLI, including recent declines in gross margins to lower than historic levels. These recent lower gross margins are in the base oil market which is largely attributed to the increase in global supply of base oils with a current outlook for continued near-term softness.

Our interim goodwill impairment testing was performed as of May 31, 2019. The estimated fair values of our goodwill reporting units within our Lubricants and Specialty Products segment were derived using a combination of both income and market approaches. The income approach reflects expected future cash flows based on estimated future production volumes, selling prices, gross margins, operating costs and capital expenditures. Our market approach includes 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). See Note 6 for further discussion of Level 3 inputs.

As a result of our impairment testing, we determined that the carrying value of the PCLI reporting unit's goodwill within our Lubricants and Specialty Products segment was fully impaired and a goodwill impairment charge of $152.7 million was recorded. Our testing did not identify any other impairments.

We performed our annual goodwill impairment testing as of July 1, 2019 and determined there was no additional impairment of goodwill attributable to our reporting units. There was no impairment of goodwill during the years ended December 31, 2018 and 2017.

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.

There was no impairment of long-lived assets during the years ended December 31, 2019 and 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	**2019**	**2018**
		(In thousands)	
Customer relationships	10 - 20 years	$ 245,479	$ 91,941
Transportation agreements	30 years	59,933	59,933
Trademarks, patents and other	10 - 20 years	154,863	83,326
		460,275	235,200
Accumulated amortization		(86,768)	(52,834)
Total intangibles, net		$ 373,507	$ 182,366

Amortization expense was $33.8 million, $16.6 million and $9.1 million for the years ended December 31, 2019, 2018 and 2017, respectively and expected to approximate $33.8 million for each of the next five years.

NOTE 12: Environmental

We expensed $11.2 million, $14.8 million and $13.1 million for the years ended December 31, 2019, 2018 and 2017, respectively, for environmental remediation obligations. The accrued environmental liability reflected in our consolidated balance sheets was $117.7 million and $110.2 million at December 31, 2019 and 2018, respectively, of which $95.6 million and $93.8 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). The amount of our accrued liability included $4.9 million of environmental obligations assumed in connection with our February 1, 2019 Sonneborn acquisition. Estimated liabilities could increase in the future when the results of ongoing investigations become known, are considered probable and can be reasonably estimated.

NOTE 13: 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, 2019, we were in compliance with all covenants, had no outstanding borrowings and had outstanding letters of credit totaling $4.9 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, 2019, HEP received advances totaling $365.5 million and repaid $323.0 million under the HEP Credit Agreement. At December 31, 2019, HEP was in compliance with all of its covenants, had outstanding borrowings of $965.5 million and no outstanding letters of credit under the HEP Credit Agreement.

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 was 4.24% for both December 31, 2019 and 2018.

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
HFC's 5.875% senior notes ($1 billion aggregate principal amount 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. The leases mature on February 1, 2021. Upon maturity, we must either satisfy the obligation at fair market value or refinance to extend the maturity. These financing arrangements are recorded at a Level 2 fair value totaling $40.0 million at December 31, 2019 and included in “Accrued liabilities” in our consolidated balance sheets. See Note 6 for additional information on Level 2 inputs.

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 maturing in August 2024 in a private placement. HEP used the net proceeds to repay indebtedness under the HEP Credit Agreement.

On February 4, 2020, HEP closed a private placement of $500 million in aggregate principal amount of 5.0% HEP senior unsecured notes maturing in February 2028. On February 5, 2020, HEP redeemed its existing $500 million 6.0% senior notes at a redemption cost of $522.5 million. HEP will record any early extinguishment losses associated with this redemption during the first quarter of 2020. HEP funded the $522.5 million redemption with proceeds from the issuance of its 5.0% senior notes and borrowing under the HEP Credit Agreement.

HEP's 5.0% senior notes (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 either Moody’s or 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.

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

	December 31, 2019	December 31, 2018
	(In thousands)	
HollyFrontier 5.875% Senior Notes		
Principal	$ 1,000,000	$ 1,000,000
Unamortized discount and debt issuance costs	(6,391)	(7,360)
	993,609	992,640
HEP Credit Agreement	965,500	923,000
HEP 6% Senior Notes		
Principal	500,000	500,000
Unamortized discount and debt issuance costs	(3,469)	(4,100)
	496,531	495,900
Total HEP long-term debt	1,462,031	1,418,900
Total long-term debt	$ 2,455,640	$ 2,411,540

The fair values of the senior notes are as follows:

	December 31, 2019	December 31, 2018
	(In thousands)	
HollyFrontier senior notes	$ 1,127,610	$ 1,019,160
HEP senior notes	$ 522,045	$ 488,310

These fair values are based on a Level 2 input. See Note 6 for additional information on Level 2 inputs.

Principal maturities of long-term debt as of December 31, 2019 are as follows:

Years Ending December 31,	(In thousands)
2020	$ —
2021	—
2022	965,500
2023	—
2024	500,000
Thereafter	1,000,000
Total	$ 2,465,500

NOTE 14: 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.

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. 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:

Derivatives Designated as Cash Flow Hedging Instruments	Net Unrealized Gain (Loss) Recognized in OCI			Gain (Loss) Reclassified into Earnings			
	Years Ended December 31,			Income Statement Location	Years Ended December 31,		
	2019	2018	2017		2019	2018	2017
	(In thousands)						
Commodity contracts	$ (5,349)	$ 11,221	$ 14,538	Sales and other revenues	$ (1,799)	$ (5,093)	$ 7,836
				Cost of products sold	22,876	—	(299)
				Operating expenses	(1,364)	(962)	(19,244)
Interest rate contracts (1)	—	—	(91)	Interest expense	—	—	179
Total	$ (5,349)	$ 11,221	$ 14,447		$ 19,713	$ (6,055)	$ (11,528)

(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 contracts to lock in basis spread differentials on forecasted purchases of crude oil, swap contracts to lock in the crack spread of WTI and gasoline, NYMEX futures contracts to lock in prices on forecasted purchases and sales of inventory and forward purchase and sell contracts 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. In addition, our catalyst financing arrangements discussed in Note 13 could require repayment under certain conditions based on the future pricing of platinum, 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:

Derivatives Not Designated as Hedging Instruments	Gain (Loss) Recognized in Earnings: Income Statement Location	Years Ended December 31, 2019	2018	2017
			(In thousands)	
Commodity contracts	Cost of products sold	$ (8,475)	$ 16,655	$ (12,327)
	Operating expenses	—	—	(6,697)
	Interest expense	(6,427)	(198)	—
Foreign currency contracts	Gain on foreign currency transactions	(17,430)	41,834	—
	Gain on foreign currency swap contracts [1]	—	—	24,545
	Total	$ (32,332)	$ 58,291	$ 5,521

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

As of December 31, 2019, we have the following notional contract volumes related to outstanding derivative instruments:

	Total Outstanding Notional	Notional Contract Volumes by Year of Maturity: 2020	2021	Unit of Measure
Derivatives designated as hedging instruments:				
Natural gas price swaps - long	3,600,000	1,800,000	1,800,000	MMBTU
Crude oil price swaps (basis spread) - long	4,758,000	4,758,000	—	Barrels
Derivatives not designated as hedging instruments:				
NYMEX futures (WTI) - short	1,365,000	1,365,000	—	Barrels
Crude oil price swaps (basis spread) - long	1,464,000	1,464,000	—	Barrels
Forward gasoline and diesel contracts - long	1,251,200	1,251,200	—	Barrels
Foreign currency forward contracts	434,340,348	434,340,348	—	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, 2019						
Derivatives designated as cash flow hedging instruments:						
Commodity price swap contracts	$ 7,526	$ (1,784)	$ 5,742	$ 1,230	$ —	$ 1,230
	$ 7,526	$ (1,784)	$ 5,742	$ 1,230	$ —	$ 1,230
Derivatives not designated as cash flow hedging instruments:						
NYMEX futures contracts	$ —	$ —	$ —	$ 2,578	$ —	$ 2,578
Commodity price swap contracts	7,713	—	7,713	—	—	—
Commodity forward contracts	4,133	—	4,133	3,685	—	3,685
Foreign currency forward contracts	—	—	—	6,722	—	6,722
	$ 11,846	$ —	$ 11,846	$ 12,985	$ —	$ 12,985
Total net balance			$ 17,588			$ 14,215
Balance sheet classification:		Prepayment and other	$ 17,588		Accrued liabilities	$ 12,985
			—		Other long-term liabilities	1,230
			$ 17,588			$ 14,215

	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
		Prepayments and other	$ 37,982		Accrued liabilities	$ 1,137
		Intangibles and other	2,298		Other long-term liabilities	956
Balance sheet classification:			$ 40,280			$ 2,093

At December 31, 2019, we had a pre-tax net unrealized gain of $4.5 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 $5.7 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 15: Income Taxes

The provision for income taxes is comprised of the following:

	Years Ended December 31,		
	2019	2018	2017
		(In thousands)	
Current			
Federal	$ 187,134	$ 239,566	$ 102,786
State	29,547	40,788	2,760
Foreign	3,805	(10,080)	19,597
Deferred			
Federal	77,916	46,434	(156,767)
State	26,073	27,845	28,527
Foreign	(25,323)	2,690	(9,282)
	$ 299,152	$ 347,243	$ (12,379)

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

	Years Ended December 31,		
	2019	2018	2017
		(In thousands)	
Tax computed at statutory rate	$ 246,013	$ 320,138	$ 304,102
Effect of the Tax Cuts and Jobs Act	—	(7,800)	(307,101)
State income taxes, net of federal tax benefit	47,259	56,936	21,343
Domestic production activities deduction	—	—	(9,937)
Noncontrolling interest in net income	(25,494)	(20,215)	(29,357)
Effect of nondeductible goodwill impairment charge	32,069	—	—
Other	(695)	(1,816)	8,571
	$ 299,152	$ 347,243	$ (12,379)

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, 2019 and 2018 are as follows:

	December 31, 2019		
	Assets	Liabilities	Total
		(In thousands)	
Deferred income taxes			
Properties, plants and equipment (due primarily to tax in excess of book depreciation)	$ —	$ (809,966)	$ (809,966)
Lease obligation	120,435	—	120,435
Accrued employee benefits	13,635	—	13,635
Accrued post-retirement benefits	11,027	—	11,027
Accrued environmental costs	28,708	—	28,708
Hedging instruments	—	(2,439)	(2,439)
Inventory differences	—	(43,500)	(43,500)
Deferred turnaround costs	—	(135,920)	(135,920)
Net operating loss and tax credit carryforwards	22,912	—	22,912
Investment in HEP	—	(95,037)	(95,037)
Valuation allowance	—	(4,600)	(4,600)
Other	5,475	—	5,475
Total	$ 202,192	$ (1,091,462)	$ (889,270)

	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)

We have Kansas income tax credits of $6.8 million that can be carried forward for 16 tax years. We have an $18.4 million net operating loss in Luxembourg that we do not anticipate utilizing. We have reflected a valuation allowance of $4.6 million in 2019 and $3.1 million in 2018 related to net operating carry forwards that we do not anticipate utilizing, primarily in Luxembourg. We also have a $30.9 million net operating loss in Canada that can be carried forward for 20 years. We expect to fully utilize this loss.

Tax Cuts and Jobs Act

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%.

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 was completed. Our one-time transition tax calculation was finalized during 2018 and the resulting liability determined to be $6.6 million.

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

	Years Ended December 31,		
	2019	2018	2017
		(In thousands)	
Balance at January 1	$ 53,752	$ 53,752	$ 22,137
Additions based on tax positions related to the current year	—	—	31,615
Additions for tax positions of prior years	2,893	—	—
Reductions for tax positions of prior years	(24)	—	—
Balance at December 31	$ 56,621	$ 53,752	$ 53,752

At December 31, 2019, 2018 and 2017, there were $56.6 million, $53.8 million, and $53.8 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 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 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 2014. Other than the federal claim noted above, we have materially concluded all U.S. federal income tax matters for tax years through December 31, 2016.

NOTE 16: Stockholders' Equity

Shares of our common stock outstanding and activity for the years ended December 31, 2019, 2018 and 2017 are presented below:

	Years Ended December 31,		
	2019	2018	2017
Common shares outstanding at January 1	172,121,491	177,407,622	177,345,266
Issuance of restricted stock, excluding restricted stock with performance feature	—	—	55,626
Vesting of performance units	592,602	115,596	138,374
Vesting of restricted stock with performance feature	412,465	543,396	350,063
Forfeitures of restricted stock	(13,807)	(58,497)	(139,634)
Purchase of treasury stock (1)	(11,266,226)	(5,886,626)	(342,073)
Common shares outstanding at December 31	161,846,525	172,121,491	177,407,622

(1) Includes 415,466, 369,255 and 342,073 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.

In November 2019, our Board of Directors approved a $1.0 billion share repurchase program, which replaced all existing share repurchase programs, including $281.0 million remaining under the previously existing $1.0 billion share repurchase program. This program authorizes 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, 2019, we had remaining authorization to repurchase up to $1.0 billion 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, 2019, 2018 and 2017, we withheld shares of our common stock from certain employees in the amounts of $21.9 million, $19.6 million and $15.9 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 17: 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, 2019			
Net change in foreign currency translation adjustment	$ 13,337	$ 2,848	$ 10,489
Net unrealized loss on hedging instruments	(5,349)	(1,365)	(3,984)
Net change in pension and other post-retirement benefit obligations	(7,207)	(1,853)	(5,354)
Other comprehensive income attributable to HollyFrontier stockholders	$ 781	$ (370)	$ 1,151
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

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,			
	2019	2018	2017	
	(In thousands)			
Hedging instruments:				
Commodity price swaps	$ (1,799)	$ (5,093)	$ 7,836	Sales and other revenues
	22,876	—	(299)	Cost of products sold
	(1,364)	(962)	(19,244)	Operating expenses
Interest rate swaps	—	—	179	Interest expense
	19,713	(6,055)	(11,528)	
	5,027	(1,544)	(4,490)	Income tax benefit
	14,686	(4,511)	(7,038)	Net of tax
	—	—	(74)	Noncontrolling interest
	14,686	(4,511)	(7,112)	Net of tax and noncontrolling interest
Other post-retirement benefit obligations:				
Post-retirement healthcare obligations	3,587	3,481	3,481	Other, net
	915	888	1,347	Income tax expense
	2,672	2,593	2,134	Net of tax
Retirement restoration plan	(6)	(27)	(17)	Other, net
	(2)	(7)	(7)	Income tax benefit
	(4)	(20)	(10)	Net of tax
Total reclassifications for the period	$ 17,354	$ (1,938)	$ (4,988)	

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

	Years Ended December 31,	
	2019	2018
	(In thousands)	
Foreign currency translation adjustment	$ (2,187)	$ (12,676)
Unrealized loss on pension obligation	(1,733)	(1,404)
Unrealized gain on post-retirement benefit obligations	15,333	20,358
Unrealized gain on hedging instruments	3,361	7,345
Accumulated other comprehensive income	$ 14,774	$ 13,623

NOTE 18: Pension and Post-retirement Plans

In connection with our PCLI acquisition, we established 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 and are closed to new entrants. In September 2018, Suncor made a cash transfer to these newly established plans in accordance with our agreement.

Sonneborn employees in the Netherlands have a defined benefit pension plan which was frozen and all plan participants became inactive in 2016. The plan assets are in the form of a third-party insurance contract that is valued based on the assets held by the insurer and insures a value which approximates the accrued benefits related to the plan's accumulated benefit obligation. At that time, a new plan was established to provide future indexation benefits to participants who had accrued benefits under the expiring arrangements.

The following table sets forth the changes in the benefit obligation and plan assets of our PCLI pension plans for the years ended December 31, 2019 and 2018, and for our Sonneborn Netherlands plans for the period February 1, 2019 to December 31, 2019:

	Years Ended December 31,	
	2019	2018
	(In thousands)	
Change in plans' benefit obligations		
Pension plans benefit obligation - beginning of period	$ 64,435	$ 63,582
Acquisition of Sonneborn	31,686	—
Service cost	4,135	4,420
Interest cost	3,026	2,249
Actuarial loss	5,161	1,058
Benefits paid	(1,132)	(1,429)
Transfer from other plans	330	—
Foreign currency exchange rate changes	2,769	(5,445)
Pension plans benefit obligation - end of year	$ 110,410	$ 64,435
Change in pension plans assets		
Fair value of plans assets - beginning of period	$ 62,462	$ 59,261
Acquisition of Sonneborn	29,376	—
Actual return on plans assets	7,947	3,599
Employer contributions	3,681	6,239
Benefits paid	(1,132)	(1,429)
Transfer payments	330	—
Foreign currency exchange rate changes	2,694	(5,208)
Fair value of plans assets - end of year	$ 105,358	$ 62,462
Funded status		
Under-funded balance	$ (5,052)	$ (1,973)
Amounts recognized in consolidated balance sheets		
Other long-term liabilities	$ (5,052)	$ (1,973)
Amounts recognized in accumulated other comprehensive income		
Cumulative actuarial loss	$ 3,155	$ 1,977

The accumulated benefit obligation was $100.5 million and $52.5 million at December 31, 2019 and 2018, respectively, which are also the measurement dates used for our pension plans.

The weighted average assumptions used to determine end of period benefit obligations for the PCLI plan for the years ended December 31, 2019 and 2018 were discount rates of 3.10% and 3.70%, respectively, and rates of future compensation increases of 3.00% for each year. For the year ended December 31, 2019, the weighted average assumption used to determine end of period benefit obligations for Sonneborn was a discount rate of 1.50%.

Net periodic pension expense consisted of the following components:

	Years Ended December 31,	
	2019	2018
	(In thousands)	
Service cost - benefit earned during the period	$ 4,135	$ 4,420
Interest cost on projected benefit obligations	3,026	2,249
Expected return on plans assets	(3,840)	(3,464)
Net periodic pension expense	$ 3,321	$ 3,205

The components, other than service cost, of our net periodic pension expense are recorded in Other, net in our consolidated statements of income.

At December 31, 2019 and 2018, PCLI's pension plans assets were allocated as follows:

	Percentage of Plan Assets at Year End	
Asset Category	**December 31, 2019**	**December 31, 2018**
Canadian equities	47%	—%
Fixed income	29%	—%
Real estate and infrastructure	14%	—%
Other	9%	—%
Cash	1%	100%
Total	100%	100%

The equity investments are valued using quoted market prices, a Level 1 input. Fixed income, real estate and infrastructure and other investments are valued using quoted market prices for similar type investments, a Level 2 input. See Note 6 for additional information on Level 1 and 2 inputs.

The expected long-term rate of return on plan assets is 5.75% for the PCLI pension plan, and is based on a target investment mix of 46% Canadian equities, 30% fixed income, 14% real estate and infrastructure and 10% other.

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 2020.

We expect to contribute $3.6 million to the PCLI and Sonneborn pensions plans in 2020. Benefit payments, which reflect expected future service, are expected to be paid as follows: $1.8 million in 2020, $2.1 million in 2021, $2.5 million in 2022, $2.9 million in 2023, $3.2 million in 2024 and $21.7 million in 2025 to 2029.

Post-retirement Healthcare Plans

We have post-retirement healthcare and other benefits plans that are available to certain of our employees who satisfy certain age and service requirements. These plans are unfunded and provide 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, 2019.

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, 2019 and 2018:

	Years Ended December 31,	
	2019	2018
	(In thousands)	
Change in plans' benefit obligation		
Post-retirement plans' benefit obligation - beginning of year	$ 26,880	$ 29,499
Sonneborn acquisition	877	—
Service cost	1,582	1,648
Interest cost	1,029	938
Participant contributions	—	178
Benefits paid	(2,028)	(1,931)
Actuarial loss (gain)	2,412	(2,643)
Foreign currency exchange rate changes	521	(809)
Post-retirement plans' benefit obligation - end of year	$ 31,273	$ 26,880
Change in plan assets		
Fair value of plan assets - beginning of year	$ —	$ —
Employer contributions	2,003	1,676
Participant contributions	25	255
Benefits paid	(2,028)	(1,931)
Fair value of plan assets - end of year	$ —	$ —
Funded status		
Under-funded balance	$ (31,273)	$ (26,880)
Amounts recognized in consolidated balance sheets		
Accrued liabilities	$ (1,817)	$ (1,909)
Other long-term liabilities	(29,456)	(24,971)
	$ (31,273)	$ (26,880)
Amounts recognized in accumulated other comprehensive income		
Cumulative actuarial (loss) gain	$ (197)	$ 2,379
Prior service credit	21,992	25,473
Total	$ 21,795	$ 27,852

Benefit payments, which reflect expected future service, are expected to be paid as follows: $1.8 million in 2020; $1.8 million in 2021; $1.9 million in 2022; $1.9 million in 2023; $2.0 million in 2024; and $9.8 million in 2025 through 2029.

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

	December 31,	
	2019	2018
Discount rate	2.94% - 3.20%	3.70% - 3.95%
Current health care trend rate	6.00% - 6.50%	6.50%
Ultimate health care trend rate	4.50% - 5.00%	5.00%
Year rate reaches ultimate trend rate	2022 - 2023	2022 - 2028

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

	Years Ended December 31,		
	2019	2018	2017
		(In thousands)	
Service cost – benefit earned during the year	$ 1,582	$ 1,648	$ 1,511
Interest cost on projected benefit obligations	1,029	938	987
Amortization of prior service credit	(3,481)	(3,481)	(3,481)
Amortization of gain	(106)	—	—
Net periodic post-retirement credit	$ (976)	$ (895)	$ (983)

The components, other than service cost, of our net periodic post-retirement credit are recorded in Other, net in our consolidated statements of income. Prior service credits are amortized over the average remaining effective period to obtain full benefit eligibility for participants.

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

	1% Point Increase	1% Point Decrease
	(In thousands)	
Service and interest costs	$ 502	$ (396)
Year-end accumulated post-retirement benefit obligation	$ 3,489	$ (2,990)

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 for each of the years ended December 31, 2019, 2018 and 2017 in connection with this plan. The accrued liability reflected in the consolidated balance sheets was $2.4 million and $2.3 million at December 31, 2019 and 2018, respectively. As of December 31, 2019, the projected benefit obligation under this plan was $2.4 million. Annual benefit payments of $0.2 million are expected to be paid through 2029, which reflect expected future service.

Defined Contribution Plans

We have defined contribution plans that cover substantially all qualified employees in the U.S, Canada and the Netherlands. Our contributions are based on an employee's eligible compensation and years of service. We also partially match our employees' contributions. We expensed $30.3 million, $19.1 million and $17.6 million for the years ended December 31, 2019, 2018 and 2017, respectively, in connection with this plan

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 filed a business interruption claim with our insurance carriers related to a fire at our Woods Cross Refinery that occurred in the first quarter 2018. As of December 31, 2019, we have collected interim payments totaling $56.0 million, but have not reached a final agreement regarding the amounts owed to us pursuant to our business interruption coverage. We have accounted for this claim as a gain contingency and accordingly, we have deferred revenue recognition for the interim payments received until such time that uncertainties regarding the amounts owed to us have been resolved.

On January 24, 2020, the small refinery exemptions granted to two of our refineries for 2016 were vacated by the U.S. Court of Appeals for the 10th Circuit, and the case was remanded to the EPA for further proceedings. It is not clear at this time what steps the EPA will take, and we are unable to estimate costs we may incur, if any, at this time. See Note 9 for additional information.

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 2020 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 2020 through 2039. At December 31, 2019, the minimum future transportation and storage fees under transportation agreements having terms in excess of one year are as follows:

	(In thousands)
2020	$ 137,457
2021	116,058
2022	111,058
2023	112,399
2024	111,939
Thereafter	685,941
Total	$ 1,274,852

Transportation and storage costs incurred under these agreements totaled $144.8 million, $143.3 million and $140.5 million for the years ended December 31, 2019, 2018 and 2017, 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.

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 the 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, and effective with our acquisition that closed February 1, 2019, includes Sonneborn, a producer of specialty hydrocarbon chemicals such as white oils, petrolatums and waxes with manufacturing facilities in the United States and Europe.

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 refinery processing units in the Mid-Continent, Southwest and Rocky Mountain regions of the United States. As of December 31, 2019, 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, the Cheyenne Pipeline and Cushing Connect. 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).

	Refining	Lubricants and Specialty Products	HEP	Corporate, Other and Eliminations	Consolidated Total
			(In thousands)		
Year Ended December 31, 2019					
Sales and other revenues:					
Revenues from external customers	$ 15,284,110	$ 2,081,221	$ 121,027	$ 220	$ 17,486,578
Intersegment revenues	312,678	11,307	411,750	(735,735)	—
	$ 15,596,788	$ 2,092,528	$ 532,777	$ (735,515)	$ 17,486,578
Cost of products sold (exclusive of lower of cost or market inventory valuation adjustment)	$ 12,980,506	$ 1,580,036	$ —	$ (642,158)	$ 13,918,384
Lower of cost or market inventory valuation adjustment	$ (119,775)	$ —	$ —	$ —	$ (119,775)
Operating expenses	$ 1,095,488	$ 231,523	$ 161,996	$ (94,955)	$ 1,394,052
Selling, general and administrative expenses	$ 120,518	$ 168,595	$ 10,251	$ 54,872	$ 354,236
Depreciation and amortization	$ 309,932	$ 88,781	$ 96,706	$ 14,506	$ 509,925
Goodwill impairment	$ —	$ 152,712	$ —	$ —	$ 152,712
Income (loss) from operations	$ 1,210,119	$ (129,119)	$ 263,824	$ (67,780)	$ 1,277,044
Earnings of equity method investments	$ —	$ —	$ 5,180	$ —	$ 5,180
Capital expenditures	$ 199,002	$ 40,997	$ 30,112	$ 23,652	$ 293,763
Total assets	$ 7,189,094	$ 2,223,418	$ 2,205,437	$ 546,892	$ 12,164,841

	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

NOTE 21: Quarterly Information (Unaudited)

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year
	(In thousands, except per share data)				
Year Ended December 31, 2019					
Sales and other revenues	$ 3,897,247	$ 4,782,615	$ 4,424,828	$ 4,381,888	$ 17,486,578
Operating costs and expenses	$ 3,507,906	$ 4,450,874	$ 3,998,049	$ 4,252,705	$ 16,209,534
Income from operations (1) (2)	$ 389,341	$ 331,741	$ 426,779	$ 129,183	$ 1,277,044
Income before income taxes	$ 363,991	$ 306,153	$ 401,001	$ 100,359	$ 1,171,504
Net income attributable to HollyFrontier stockholders	$ 253,055	$ 196,915	$ 261,813	$ 60,605	$ 772,388
Net income per share attributable to HollyFrontier stockholders - basic	$ 1.48	$ 1.16	$ 1.60	$ 0.38	$ 4.64
Net income per share attributable to HollyFrontier stockholders - diluted	$ 1.47	$ 1.15	$ 1.58	$ 0.37	$ 4.61
Dividends per common share	$ 0.33	$ 0.33	$ 0.33	$ 0.35	$ 1.34
Average number of shares of common stock outstanding:					
Basic	170,851	169,356	163,676	161,398	166,287
Diluted	172,239	170,547	165,011	162,898	167,385
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 (3)	$ 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

(1) For 2019, income from operations reflects non-cash lower of cost or market inventory valuation reductions of $232.3 million for the first quarter, and charges of $47.8 million, $34.1 million and $30.7 million for the second, third and fourth quarters, respectively.

(2) For 2019, income from operations reflects goodwill impairment charges of $152.7 million in the second quarter.

(3) 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 charges of $17.8 million and $329.2 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, 2019.

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 2019 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 13, 2020 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 13, 2020 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 13, 2020 and is incorporated herein by reference.

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 13, 2020 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 13, 2020 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

(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 109 to 113 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.

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 (incorporated by reference to Exhibit 2.7 of Registrant's Annual Report on Form 10-K for its fiscal year ended December 31, 2018. File No. 1-03876).
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).

Exhibit Number	Description
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).
4.7*	Description of Capital Stock pursuant to Item 601(b)(4) of Reg. S-K.
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	First Amendment to Third Amended and Restated Crude Pipelines and Tankage Agreement, dated April 22, 2019, by and among HollyFrontier Navajo Refining LLC, HollyFrontier Woods Cross Refining 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 10.1 of Registrant's Current Report on Form 10-Q for the quarterly period ended March 31, 2019, File No. 1-03876).
10.10	Twentieth Amended and Restated Omnibus Agreement, dated as of October 2, 2019, by and between 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 October 3, 2019, File No. 1-03876).
10.11	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).

Exhibit Number	Description
10.12	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).
10.13	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).
10.14	Amended and Restated Limited Liability Company Agreement of HEP UNEV Holdings LLC, dated July 12, 2012, among HEP UNEV Holdings LLC, HollyFrontier Holdings LLC and Holly Energy Partners, L.P. (incorporated by reference to Exhibit 10.5 to the Registrant's Quarterly Report on Form 10-Q for the quarterly period ended June 30, 2012, File No. 1-03876).
10.15	Amended and Restated Unloading and Blending Services Agreement, dated January 18, 2017, effective September 16, 2016, by and between HollyFrontier Refining & Marketing LLC, Holly Energy Partners - Operating, L.P. and HEP Refining L.L.C. (incorporated by reference to Exhibit 10.26 of Registrant's Annual Report on Form 10-K for the fiscal year ended December 31, 2016, File No. 1-03876).
10.16	Sixth Amended and Restated Master Throughput Agreement, dated as of October 2, 2019, by and between HollyFrontier Refining & Marketing LLC and Holly Energy Partners - Operating, L.P. (incorporated by reference to Exhibit 10.1 of Registrant's Current Report on Form 8-K filed October 3, 2019, File No. 1-03876).
10.17	Construction Payment Agreement, dated as of October 16, 2015, by and between HEP Refining, L.L.C. and HollyFrontier Refining & Marketing LLC (incorporated by reference to Exhibit 10.3 of Registrant's Current Report on Form 8-K filed October 21, 2015, File No. 1-03876).
10.18	Third Amended and Restated Services and Secondment Agreement, dated October 3, 2016, by and among Holly Logistic Services, L.L.C., certain subsidiaries of Holly Energy Partners, L.P. and certain subsidiaries of HollyFrontier Corporation (incorporated by reference to Exhibit 10.4 to Registrant's Current Report on Form 8-K filed October 4, 2016, File No. 1-03876).
10.19	Fifth Amended and Restated Master Lease and Access Agreement, dated effective October 29, 2018, by and among certain subsidiaries of Holly Energy Partners, L.P. and certain subsidiaries of HollyFrontier Corporation (incorporated by reference to Exhibit 10.4 of Registrant's Current Report on Form 8-K filed November 1, 2018, File No. 1-03876).
10.20	Master Tolling Agreement (Refinery Assets), dated as of November 2, 2015, by and between Frontier El Dorado Refining LLC and Holly Energy Partners-Operating L.P. (incorporated by reference to Exhibit 10.2 of Registrant's Current Report on Form 8-K filed November 3, 2015, File No. 1-03876).
10.21	Amendment to Master Tolling Agreement (Refinery Assets), dated effective January 1, 2017, by and among HollyFrontier El Dorado Refining LLC, HollyFrontier Woods Cross Refining LLC, and Holly Energy Partners-Operating, L.P. (incorporated by reference to Exhibit 10.7 to the Registrant's Quarterly Report on Form 10-Q for the quarterly period ended March 31, 2017, File No. 1-03876).
10.22	Amended and Restated Master Tolling Agreement (Operating Assets), dated October 3, 2016, by and between HollyFrontier El Dorado Refining LLC, HollyFrontier Woods Cross Refining LLC, Holly Energy Partners - Operating L.P., HollyFrontier Corporation and Holly Energy Partners, L.P. (incorporated by reference to Exhibit 10.2 to Registrant's Current Report on Form 8-K filed October 4, 2016, File No. 1-03876).
10.23	Amendment to Amended and Restated Master Tolling Agreement (Operating Assets), dated effective January 1, 2017, by and among HollyFrontier El Dorado Refining LLC, HollyFrontier Woods Cross Refining LLC, and Holly Energy Partners-Operating, L.P. (incorporated by reference to Exhibit 10.6 to the Registrant's Quarterly Report on Form 10-Q for the quarterly period ended March 31, 2017, File No. 1-03876).
10.24	Second Amendment to Amended and Restated Master Tolling Agreement (Operating Assets), dated effective October 29, 2018, by and between HollyFrontier El Dorado Refining LLC, HollyFrontier Woods Cross Refining LLC and Holly Energy Partners - Operating L.P. (incorporated by reference to Exhibit 10.7 of Registrant's Current Report on Form 8-K filed November 1, 2018, File No. 1-03846).
10.25	LLC Interest Purchase 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 10.67 of Registrant's Annual Report on Form 10-K for its fiscal year ended December 31, 2015, File No. 1-03876).

Exhibit Number	Description
10.26	Refined Products Terminal Transfer Agreement, dated February 22, 2016, by and among HEP Refining Assets, L.P., Holly Energy Partners, L.P., El Paso Logistics LLC, HollyFrontier Corporation and Holly Energy Partners - Operating, L.P. (incorporated by reference to Exhibit 10.68 of Registrant's Annual Report on Form 10-K for its fiscal year ended December 31, 2015, File No. 1-03876).
10.27	Second Amended and Restated 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).
10.28	Pipeline Deficiency Agreement, dated August 8, 2016, by and between HollyFrontier Refining & Marketing LLC and Holly Energy Partners - Operating, L.P. (incorporated by reference to Exhibit 10.5 to Registrant's Current Report on Form 8-K filed August 10, 2016, File No. 1-03876).
10.29	LLC Interest Purchase Agreement, dated October 3, 2016, by and between HollyFrontier Corporation, HollyFrontier Woods Cross Refining LLC, Holly Energy Partners - Operating, L.P. and Holly Energy Partners, L.P. (incorporated by reference to Exhibit 10.1 to Registrant's Current Report on Form 8-K filed October 4, 2016, File No. 1-03876).
10.30	Construction Payment Agreement, dated October 29, 2018, effective December 13, 2017, by and among HEP Tulsa, LLC and HollyFrontier Refining & Marketing LLC (incorporated by reference to Exhibit 10.3 of Registrant's Current Report on Form 8-K filed November 1, 2018, File No. 1-03876).
10.31+	HollyFrontier Corporation Long-Term Incentive Compensation Plan (formerly the Holly Corporation Long-Term Incentive Compensation Plan), as amended and restated on May 24, 2007 as approved at the Annual Meeting of Stockholders of Holly Corporation on May 24, 2007 (incorporated by reference to Exhibit 10.4 of Registrant's Annual Report on Form 10-K for its fiscal year ended December 31, 2008, File No. 1-03876).
10.32+	First Amendment to the HollyFrontier Corporation Long-Term Incentive Compensation Plan (incorporated by reference to Exhibit 10.5 of Registrant's Annual Report on Form 10-K for its fiscal year ended December 31, 2008, File No. 1-03876).
10.33+	Second Amendment to the HollyFrontier Corporation Long-Term Incentive Compensation Plan (incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed May 18, 2011, File No. 1-03876).
10.34+	Third Amendment to the HollyFrontier Corporation Long-Term Incentive Compensation Plan (incorporated by reference to Exhibit 4.6 of the Registrant's Registration Statement on Form S-8 filed November 9, 2012, File No. 333-184877).
10.35+	Fourth Amendment to the HollyFrontier Corporation Long-Term Incentive Compensation Plan (incorporated by reference to Exhibit 10.2 of Registrant's Current Report on Form 8-K filed May 15, 2015, File No. 1-03876).
10.36+	Fifth Amendment to the HollyFrontier Corporation Long-Term Incentive Plan, effective May 11, 2016 (incorporated by reference to Exhibit 10.1 of Registrant's Current Report on Form 8-K filed May 16, 2016, File No. 1-03876).
10.37+	HollyFrontier Corporation Long-Term Incentive Plan UK Sub-Plan, effective February 14, 2017 (incorporated by reference to Exhibit 10.43 of Registrant's Annual Report on Form 10-K for the fiscal year ended December 31, 2016, File No. 1-03876).
10.38+	HollyFrontier Corporation Employee Form of Change in Control Agreement (incorporated by reference to Exhibit 10.46 of Registrant's Annual Report on Form 10-K for its fiscal year ended December 31, 2016, File No. 1-03876).
10.39+	Form of Performance Share Unit Agreement (for 162(m) covered employees) (incorporated by reference to Exhibit 10.52 of Registrant's Annual Report on Form 10-K for its fiscal year ended December 31, 2017, File No. 1-03876).
10.40+	Form of Performance Share Unit Agreement (for non-162(m) covered employees) (incorporated by reference to Exhibit 10.53 of Registrant's Annual Report on Form 10-K for its fiscal year ended December 31, 2017, File No. 1-03876).
10.41+	Form of Performance Share Unit Agreement (incorporated by reference to Exhibit 10.54 of Registrant's Annual Report on Form 10-K for its fiscal year ended December 31, 2018, File No. 1-03876).
10.42+*	Form of Performance Share Unit Agreement.
10.43+	Form of Restricted Stock Unit Agreement (for non-employee directors) (incorporated by reference to Exhibit 10.63 of Registrant's Annual Report on Form 10-K for its fiscal year ended December 31, 2012, File No. 1-03876).
10.44+	Form of Notice of Grant of Restricted Stock Units (for non-employee directors) (incorporated by reference to Exhibit 10.64 of Registrant's Annual Report on Form 10-K for its fiscal year ended December 31, 2012, File No. 1-03876).

Exhibit Number	Description
10.45+	Form of Restricted Stock Unit Agreement (for employees) (incorporated by reference to Exhibit 10.58 of Registrant's Annual Report on Form 10-K for its fiscal year ended December 31, 2017, File No. 1-03876).
10.46+	Form of Notice of Grant of Restricted Stock Units (for employees) (incorporated by reference to Exhibit 10.59 of Registrant's Annual Report on Form 10-K for its fiscal year ended December 31, 2017, File No. 1-03876).
10.47+	Form of Restricted Stock Unit Agreement (for employees) (incorporated by reference to Exhibit 10.61 of Registrant's Annual Report on Form 10-K for its fiscal year ended December 31, 2018. File No. 1-03876).
10.48+	Form of Notice of Grant of Restricted Stock Units (for employees) (incorporated by reference to Exhibit 10.62 of Registrant's Annual Report on Form 10-K for its fiscal year ended December 31, 2018. File No. 1-03876).
10.49+*	Form of Restricted Stock Unit Agreement (for employees).
10.50+*	Form of Notice of Grant of Restricted Stock Units (for employees).
10.51+*	Retirement Agreement and Release of Claims between HollyFrontier Corporation, HollyFrontier Payroll Services, Inc. and George Damiris dated December 11, 2019.
10.52+*	Retirement Agreement and Release of Claims between HollyFrontier Corporation, HollyFrontier Payroll Services, Inc. and Denise C. McWatters dated December 31, 2019.
10.53+	Form of Indemnification Agreement entered into with directors and officers of Holly Corporation (incorporated by reference to Exhibit 10.1 of Registrant's Current Report on Form 8-K filed December 13, 2006, File No. 1-03876).
10.54+	HollyFrontier Corporation Executive Nonqualified Deferred Compensation Plan (formerly the Frontier Deferred Compensation Plan) (incorporated by reference to Exhibit 10.73 of Registrant's Annual Report on Form 10-K for its fiscal year ended December 31, 2012, File No. 1-03876).
10.55+	Form of Indemnification Agreement between Frontier and each of its officers and directors (incorporated by reference to Exhibit 10.41 to Frontier Oil Corporation's Annual Report on Form 10-K for its fiscal year ended December 31, 2006, File No. 1-07627).
10.56+	Form of Indemnification Agreement between HollyFrontier Corporation and each of its officers and directors (incorporated by reference to Exhibit 10.79 of Registrant's Annual Report on Form 10-K for its fiscal year ended December 31, 2011, File No. 1-03876).
10.57+	Form of HollyFrontier Corporation Indemnification Agreement to be entered into with officers and directors of HollyFrontier Corporation and its subsidiaries (incorporated by reference to Exhibit 10.2 of registrant's Quarterly Report on Form 10-Q for the quarterly period ended June 30, 2019, File no. 1-03876).
21.1*	Subsidiaries of Registrant
23.1*	Consent of Independent Registered Public Accounting Firm
31.1*	Certification of Chief Executive Officer under Section 302 of the Sarbanes-Oxley Act of 2002.
31.2*	Certification of Chief Financial Officer under Section 302 of the Sarbanes-Oxley Act of 2002.
32.1**	Certification of Chief Executive Officer under Section 906 of the Sarbanes-Oxley Act of 2002.
32.2**	Certification of Chief Financial Officer under Section 906 of the Sarbanes-Oxley Act of 2002.
101	The following financial information from Registrant's Annual Report on Form 10-K for its fiscal year ended December 31, 2019, formatted as inline XBRL (Inline Extensible Business Reporting Language): (i) Consolidated Balance Sheets, (ii) Consolidated Statements of Income, (iii) Consolidated Statements of Comprehensive Income, (iv) Consolidated Statements of Cash Flows, (v) Consolidated Statements of Equity, and (vi) Notes to the Consolidated Financial Statements. The instance document does not appear in the interactive data file because its XBRL tags are embedded within the inline XBRL document.
104	Cover page Interactive Data File (formatted as inline XBRL and contained in exhibit 101).

* Filed herewith.
** Furnished herewith.
+ Constitutes management contracts or compensatory plans or arrangements.
++ Filed electronically herewith.
† Schedules and certain exhibits have been omitted pursuant to Item 601(b)(2) of Regulation S-K. The registrant agrees to furnish supplementally a copy of the omitted schedules and exhibits to the SEC upon request.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

	HOLLYFRONTIER CORPORATION (Registrant)
Date: February 20, 2020	/s/ Michael C. Jennings Michael C. Jennings Chief Executive Officer and President

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and as of the date indicated.

Signature	Capacity	Date
/s/ Michael C. Jennings Michael C. Jennings	Chief Executive Officer, President and Director	February 20, 2020
/s/ Richard L. Voliva III Richard L. Voliva III	Executive Vice President and Chief Financial Officer (Principal Financial Officer)	February 20, 2020
/s/ J.W. Gann, Jr. J.W. Gann, Jr.	Vice President, Controller and Chief Accounting Officer (Principal Accounting Officer)	February 20, 2020
/s/ Franklin Myers Franklin Myers	Chairman of the Board	February 20, 2020
/s/ Anne-Marie N. Ainsworth Anne-Marie N. Ainsworth	Director	February 20, 2020
/s/ Douglas Y. Bech Douglas Y. Bech	Director	February 20, 2020
/s/ Anna C. Catalano Anna C. Catalano	Director	February 20, 2020
/s/ Leldon Echols Leldon Echols	Director	February 20, 2020
/s/ R. Craig Knocke R. Craig Knocke	Director	February 20, 2020
/s/ Robert J. Kostelnik Robert J. Kostelnik	Director	February 20, 2020
/s/ James H. Lee James H. Lee	Director	February 20, 2020
/s/ Michael E. Rose Michael E. Rose	Director	February 20, 2020

Exhibit 31.1

CERTIFICATION

I, Michael C. Jennings, certify that:

1. I have reviewed this annual report on Form 10-K of HollyFrontier Corporation;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant’s other certifying officers and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
    a. designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
    b. designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, 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;
    c. evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
    d. disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and
5. The registrant’s other certifying officers and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of registrant’s board of directors (or persons performing the equivalent functions):
    a. all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and
    b. any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting

Date: February 20, 2020

/s/ Michael C. Jennings
Michael C. Jennings
Chief Executive Officer and President

Exhibit 31.2

CERTIFICATION

I, Richard L. Voliva III, certify that:

1. I have reviewed this annual report on Form 10-K of HollyFrontier Corporation;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officers and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
    a. designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
    b. designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, 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;
    c. evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
    d. disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officers and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of registrant's board of directors (or persons performing the equivalent functions):
    a. all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
    b. any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 20, 2020

/s/ Richard L. Voliva III

Richard L. Voliva III

Executive Vice President and Chief Financial Officer

Exhibit 32.1

CERTIFICATION OF CHIEF EXECUTIVE OFFICER UNDER SECTION 906 OF THE SARBANES OXLEY ACT OF 2002, 18 U.S.C. § 1350

In connection with the accompanying report on Form 10-K for the annual period ending December 31, 2019 and filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Michael C. Jennings, Chief Executive Officer of HollyFrontier Corporation (the "Company") hereby certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to my knowledge:

1. The Report fully complies with the requirements of Section 13(a) or 15(d), as applicable, of the Securities Exchange Act of 1934, as amended; and
2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: February 20, 2020

/s/ Michael C. Jennings

Michael C. Jennings
Chief Executive Officer and President

Exhibit 32.2

CERTIFICATION OF CHIEF FINANCIAL OFFICER UNDER SECTION 906 OF THE SARBANES OXLEY ACT OF 2002, 18 U.S.C. § 1350

In connection with the accompanying report on Form 10-K for the annual period ending December 31, 2019 and filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Richard L. Voliva III, Chief Financial Officer of HollyFrontier Corporation (the "Company") hereby certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to my knowledge:

1. The Report fully complies with the requirements of Section 13(a) or 15(d), as applicable, of the Securities Exchange Act of 1934, as amended; and
2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: February 20, 2020

/s/ Richard L. Voliva III

Richard L. Voliva III

Executive Vice President and Chief Financial Officer

CORPORATE INFORMATION

CORPORATE OFFICERS

Michael C. Jennings
Chief Executive Officer and President

Richard L. Voliva, III
Executive Vice President and Chief Financial Officer

Thomas G. Creery
Senior Vice President, Commercial

James M. Stump
Senior Vice President, Refining

Vaishali S. Bhatia
Senior Vice President, General Counsel and Secretary

BOARD OF DIRECTORS

Franklin Myers
Senior Advisor at Quantum Energy Partners and Chairman of the Board of HollyFrontier Corporation

Michael C. Jennings
Chief Executive Officer and President of HollyFrontier Corporation and Chairman of the Board and Chief Executive Officer of Holly Logistic Services, L.L.C.

Anne-Marie N. Ainsworth
Former President and Chief Executive Officer of the general partner of Oiltanking Partners, L.P. and of Oiltanking Holding Americas, Inc.

Douglas Y. Bech
Chairman and Chief Executive Officer of Raintree Resorts International

Anna C. Catalano
Former Group Vice President, Marketing for BP plc

Leldon E. Echols
Former Executive Vice President and Chief Financial Officer of Centex Corporation

R. Craig Knocke
Director of Turtle Creek Trust Company, Chief Investment Manager and Portfolio Manager of Turtle Creek Management, LLC and Principal and a non-controlling manager and member of TCTC Holdings, L.L.C.

Robert J. Kostelnik
Principal at Glenrock Recovery Partners, LLC

James H. Lee
Managing General Partner and Principal Owner of Lee, Hite & Wisda Ltd.

Michael E. Rose
Former Executive Vice President Finance and Chief Financial Officer of Anadarko Petroleum Corporation

CORPORATE OFFICE

HollyFrontier Corporation
2828 North Harwood, Suite 1300
Dallas, Texas 75201-1507
214.871.3555
www.hollyfrontier.com

AUDITORS

Ernst & Young LLP
Dallas, Texas

STOCK EXCHANGE LISTING

New York Stock Exchange Ticker Symbol: HFC

STOCK TRANSFER AGENT AND REGISTRAR

EQ Shareowner Services
1110 Centre Point Curve, Suite 101
Mendota Heights, Minnesota 55120
1.800.401.1957
www.shareowneronline.com

Correspondence or questions concerning share holdings, transfers, lost certificates, dividends, or address or registration changes should be directed to EQ Shareowner Services.

ANNUAL MEETING

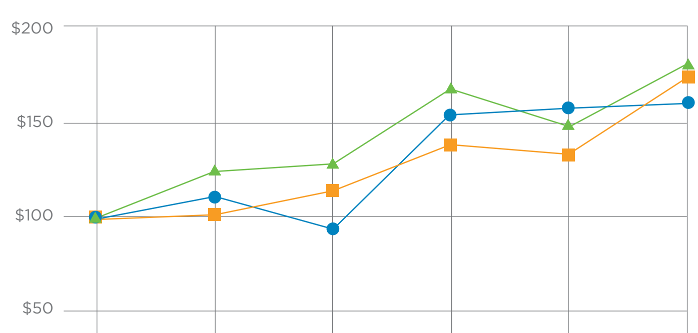
The Annual Meeting of Stockholders will be held at 8:30 a.m. Central Daylight Time, on May 13, 2020, at 2727 North Harwood Street, 5th Floor, Conference Room A, Dallas, Texas 75201.

SEC FILINGS

A direct link to the filings of HollyFrontier Corporation at the U.S. Securities and Exchange Commission website is available on the HollyFrontier Corporation website at www.hollyfrontier.com on the Investor Relations page.

STOCK PERFORMANCE

Set forth is a line graph comparing, for the period commencing December 31, 2014, and ending December 31, 2019, the annual percentage change in cumulative total stockholder return on our common stock to the cumulative total stockholder return of the S&P Composite 500 Stock Index and an industry peer group chosen by the Company. The stock price performance depicted in the following graph is not necessarily indicative of future price performance. The graph will not be deemed to be incorporated by reference in any filing by the Company under the Securities Act of 1933 or the Securities Exchange of 1934, except to the extent that the Company specifically incorporates such graph by reference The amounts shown assume that the value of the investment in HollyFrontier and each index was $100 on December 31, 2014 and that all dividends were reinvested.



	2014	2015	2016	2017	2018	2019
HollyFrontier	100.00	109.62	94.17	153.76	156.83	159.87
S&P 500 Index	100.00	101.38	113.51	138.29	132.23	173.86
Peer Group	100.00	124.84	127.80	167.69	148.08	180.34

The Peer Group consists of CVR Energy, Inc., Delek US Holdings, Inc., Marathon Petroleum Corporation, PBF Energy Inc., Phillips 66 and Valero Energy Corporation.

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