2019 ANNUAL REPORT

Green Plains Inc. (NASDAQ:GPRE) is a diversified commodity-processing business with operations that include corn processing, grain handling and storage and commodity marketing and logistics services. The company is one of the leading corn processors in the world and, through its adjacent businesses, is focused on the production of sustainable biofuels and sustainable high-protein and novel feed ingredients. Green Plains owns a 50% interest in Green Plains Cattle Company LLC and owns a 49.0% limited partner interest and a 2.0% general partner interest in Green Plains Partners LP. For more information about Green Plains, visit www.gpreinc.com.

Forward-Looking Statement
This Annual Report contains "forward-looking statements" within the meaning of the federal securities laws. See the discussion under "Cautionary Statement Regarding Forward-Looking Statements" in our 2019 Form 10-K for matters to be considered in this regard.

Selected Financial Data

Statement of Operations Data	Year Ended December 31,				
(in thousands, except per share information)	2019 [1]	2018 [1][2]	2017 [1]	2016 [1]	2015 [1]
Revenues	$ 2,417,238	$ 2,983,932	$ 3,289,475	$ 3,159,313	$ 2,746,471
Costs and expenses	2,559,808	2,893,978	3,265,727	3,080,101	2,684,447
Operating income (loss) from continuing operations[3]	(142,570)	89,954	23,748	79,212	62,024
Total other expense	30,372	84,310	78,902	50,918	36,979
Net income (loss) from continuing operations including noncontrolling interest	(148,829)	25,195	76,633	24,669	17,097
Net income (loss) from discontinued operations, net of income taxes	829	11,539	4,998	5,822	(1,869)
Net income (loss)	(148,000)	36,734	81,631	30,491	15,228
Net income (loss) attributable to Green Plains	$ (166,860)	$ 15,923	$ 61,061	$ 10,663	$ 7,064
Basic earnings per share					
Earnings (loss) per share from continuing operations	$ (4.40)	$ 0.11	$ 1.43	$ 0.13	$ 0.24
Earnings (loss) per share from discontinued operations	0.02	0.28	0.13	0.15	(0.05)
Earnings (loss) per share attributable to Green Plains	$ (4.38)	$ 0.39	$ 1.56	$ 0.28	$ 0.19
Diluted earnings per share					
Earnings (loss) per share from continuing operations	$ (4.40)	$ 0.11	$ 1.37	$ 0.13	$ 0.23
Earnings (loss) per share from discontinued operations	0.02	0.28	0.10	0.15	(0.05)
Earnings (loss) per share attributable to Green Plains	$ (4.38)	$ 0.39	$ 1.47	$ 0.28	$ 0.18
Cash dividend declared per share [4]	$ 0.24	$ 0.48	$ 0.48	$ 0.40	$ 0.40
Other Data: (Non-GAAP)					
Adjusted EBITDA (in thousands)	$ (35,141)	$ 225,780	$ 154,451	$ 175,106	$ 128,356

Balance Sheet Data	December 31,				
(in thousands)	2019[1]	2018[1]	2017 [1]	2016 [1]	2015 [1]
Cash and cash equivalents	$ 245,977	$ 251,681	$ 266,619	$ 303,449	$ 384,866
Current assets	667,913	1,206,642	1,211,965	1,000,576	912,577
Total assets	1,698,218	2,216,432	2,790,144	2,506,492	1,917,920
Current liabilities	541,791	833,700	891,755	594,946	438,669
Long-term debt	243,990	298,110	767,278	782,610	429,139
Total liabilities	832,932	1,153,443	1,731,008	1,527,301	959,011
Stockholders' equity	865,286	1,062,989	1,059,136	979,191	958,909

The following table reconciles net income to adjusted EBITDA for the periods indicated (in thousands):

	Year Ended December 31,				
	2019	2018	2017	2016	2015
Net income (loss) from continuing operations including noncontrolling interest	$ (148,829)	$ 25,195	$ 76,633	$ 24,669	$ 17,097
Interest expense	40,200	87,449	83,700	49,935	37,638
Income tax expense (benefit)	(21,316)	(20,147)	(132,061)	3,625	7,948
Depreciation and amortization [5]	72,127	98,258	103,582	83,137	64,946
EBITDA	(57,818)	190,755	131,854	161,366	127,629
EBITDA adjustments related to discontinued operations	17,703	33,897	22,516	13,615	223
Proportional share of EBITDA adjustments to equity method investees	4,974	1,128	81	125	504
Adjusted EBITDA (unaudited)	$ (35,141)	$ 225,780	$ 154,451	$ 175,106	$ 128,356

(1) The assets and liabilities and results of operations of Green Plains Cattle Company prior to its divesture on September 1, 2019 have been reclassified as discontinued operations.
(2) Fiscal year 2018 includes approximately eleven months of operations of the Bluffton, Indiana, Lakota, Iowa, Riga, Michigan and the Hopewell, Virginia ethanol plants, as well as Fleischmann's Vinegar.
(3) Fiscal year 2018 includes the $150.4 million gain on the sale of the Bluffton, Indiana, Lakota, Iowa, and Riga, Michigan ethanol plants, as well as Fleischmann's Vinegar during the fourth quarter.
(4) On June 18, 2019, the company announced that its board of directors decided to suspend its future quarterly cash dividend following the June 14, 2019 dividend payment.
(5) Excludes the amortization of operating lease right-of-use assets and amortization of debt issuance costs.

2019 Form 10-K

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

FORM 10-K

☒ **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 001-32924

GREEN PLAINS INC.

(Exact name of registrant as specified in its charter)

Iowa	**84-1652107**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
1811 Aksarben Drive, Omaha, NE 68106	**(402) 884-8700**
(Address of principal executive offices, including zip code)	(Registrant's telephone number, including area code)

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

Title of each class	Trading Symbol	Name of each exchange on which registered
Common Stock, par value $0.001 per share	GPRE	The Nasdaq Stock Market LLC

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

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.
Yes ☒ 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 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 ☐ (Do not check if a smaller reporting company)

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 Act). Yes ☐ No ☒

The aggregate market value of the company's voting common stock held by non-affiliates of the registrant as of June 28, 2019 (the last business day of the second quarter), based on the last sale price of the common stock on that date of $10.78, was approximately $388.6 million. For purposes of this calculation, executive officers and directors are deemed to be affiliates of the registrant.

As of February 13, 2020, there were 35,140,905 shares of the registrant's common stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive Proxy Statement for the 2020 Annual Meeting of Shareholders are incorporated by reference in Part III herein. The company intends to file such Proxy Statement with the Securities and Exchange Commission no later than 120 days after the end of the period covered by this report on Form 10-K.

TABLE OF CONTENTS

		Page
Commonly Used Defined Terms		1
	PART I	
Item 1.	Business.	3
Item 1A.	Risk Factors.	14
Item 1B.	Unresolved Staff Comments.	30
Item 2.	Properties.	30
Item 3.	Legal Proceedings.	30
Item 4.	Mine Safety Disclosures.	30
	PART II	
Item 5.	Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities.	31
Item 6.	Selected Financial Data.	33
Item 7.	Management's Discussion and Analysis of Financial Condition and Results of Operations.	34
Item 7A.	Quantitative and Qualitative Disclosures About Market Risk.	53
Item 8.	Financial Statements and Supplementary Data.	54
Item 9.	Changes in and Disagreements With Accountants on Accounting and Financial Disclosure.	54
Item 9A.	Controls and Procedures.	55
Item 9B.	Other Information.	57
	PART III	
Item 10.	Directors, Executive Officers and Corporate Governance.	57
Item 11.	Executive Compensation.	57
Item 12.	Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.	57
Item 13.	Certain Relationships and Related Transactions, and Director Independence.	57
Item 14.	Principal Accounting Fees and Services.	57
	PART IV	
Item 15.	Exhibits, Financial Statement Schedules.	58
Item 16.	Form 10-K Summary.	69
Signatures.		70

Commonly Used Defined Terms

Green Plains Inc. and Subsidiaries:

Green Plains; the company	Green Plains Inc. and its subsidiaries
BioProcess Algae	BioProcess Algae LLC
Birmingham BioEnergy	Birmingham BioEnergy Partners LLC, a subsidiary of BlendStar LLC
BlendStar	BlendStar LLC and its subsidiaries, the partnership's predecessor for accounting purposes
Fleischmann's Vinegar	Fleischmann's Vinegar Company, Inc.
Green Plains Cattle; GPCC	Green Plains Cattle Company LLC
Green Plains Grain	Green Plains Grain Company LLC
Green Plains Partners; the partnership	Green Plains Partners LP and its subsidiaries
Green Plains Processing	Green Plains Processing LLC and its subsidiaries
Green Plains Trade	Green Plains Trade Group LLC

Accounting Defined Terms:

ASC	Accounting Standards Codification
EBITDA	Earnings before interest, income taxes, depreciation and amortization
EPS	Earnings per share
Exchange Act	Securities Exchange Act of 1934, as amended
GAAP	U.S. Generally Accepted Accounting Principles
IPO	Initial public offering of Green Plains Partners LP
JV	Joint venture
LIBOR	London Interbank Offered Rate
LTIP	Green Plains Partners LP 2015 Long-Term Incentive Plan
Nasdaq	The Nasdaq Global Market
NMTC	New Markets Tax Credit
R&D Credits	Research and development tax credits
SEC	Securities and Exchange Commission
Securities Act	Securities Act of 1933, as amended

Industry Defined Terms:

Bgy	Billion gallons per year
BTU	British Thermal Units
CAFE	Corporate Average Fuel Economy
CARB	California Air Resources Board
CFTC	Commodity Futures Trading Commission
DOT	U.S. Department of Transportation
E15	Gasoline blended with up to 15% ethanol by volume
E85	Gasoline blended with up to 85% ethanol by volume
EIA	U.S. Energy Information Administration
EISA	Energy Independence and Security Act of 2007, as amended
EPA	U.S. Environmental Protection Agency
EU	European Union
FDA	U.S. Food and Drug Administration
FSMA	Food Safety Modernization Act of 2011
ILUC	Indirect land usage charge
LCFS	Low Carbon Fuel Standard
MMBTU	Million British Thermal Units
Mmg	Million gallons
Mmgy	Million gallons per year
MTBE	Methyl tertiary-butyl ether
MVC	Minimum volume commitment
RFS II	Renewable Fuels Standard II
RIN	Renewable identification number
RVO	Renewable volume obligation
TTB	Alcohol and Tobacco Tax and Trade Bureau
U.S.	United States
USDA	U.S. Department of Agriculture

Cautionary Statement Regarding Forward-Looking Statements

The SEC encourages companies to disclose forward-looking information so investors can better understand future prospects and make informed investment decisions. As such, forward-looking statements are included in this report or incorporated by reference to other documents filed with the SEC.

Forward-looking statements are made in accordance with safe harbor provisions of the Private Securities Litigation Reform Act of 1995. These statements are based on current expectations which involve a number of risks and uncertainties and do not relate strictly to historical or current facts, but rather to plans and objectives for future operations. These statements include words such as “anticipate,” “believe,” “continue,” “estimate,” “expect,” “intend,” “outlook,” “plan,” “predict,” “may,” “could,” “should,” “will” and similar words and phrases as well as statements regarding future operating or financial performance or guidance, business strategy, environment, key trends and benefits of actual or planned acquisitions.

Factors that could cause actual results to differ from those expressed or implied are discussed in this report under “Risk Factors” or incorporated by reference. Specifically, we may experience fluctuations in future operating results due to a number of economic conditions, including: competition in the ethanol industry and other industries in which we operate; commodity market risks, including those that may result from weather conditions; financial market risks; counterparty risks; risks associated with changes to government policy or regulation, including changes to tax laws; risks related to acquisitions and disposition activities and achieving anticipated results; risks associated with merchant trading; risks related to our equity method investees and other factors detailed in reports filed with the SEC. Additional risks related to Green Plains Partners LP include compliance with commercial contractual obligations, potential tax consequences related to our investment in the partnership and risks disclosed in the partnership’s SEC filings associated with the operation of the partnership as a separate, publicly traded entity.

We believe our expectations regarding future events are based on reasonable assumptions; however, these assumptions may not be accurate or account for all risks and uncertainties. Consequently, forward-looking statements are not guaranteed. Actual results may vary materially from those expressed or implied in our forward-looking statements. In addition, we are not obligated and do not intend to update our forward-looking statements as a result of new information unless it is required by applicable securities laws. We caution investors not to place undue reliance on forward-looking statements, which represent management’s views as of the date of this report or documents incorporated by reference.

PART I

Item 1. Business.

References to “we,” “us,” “our,” “Green Plains,” or the “company” refer to Green Plains Inc. and its subsidiaries.

Overview

Green Plains is an Iowa corporation, founded in June 2004 as a producer of low carbon fuels. We have grown through acquisitions of ethanol production facilities and adjacent commodity processing businesses to be one of the leading corn processors in the world. We are in the process of transforming ourselves to be focused on the production of high-protein feed ingredients and export growth opportunities. Additionally, we have taken advantage of opportunities to divest certain assets in recent years. We are focused on generating stable operating margins through our business segments and risk management strategy. We own and operate assets throughout the ethanol value chain: upstream, with grain handling and storage; through our ethanol production facilities; and downstream, with marketing and distribution services to mitigate commodity price volatility, which differentiates us from companies focused only on ethanol production. Our other businesses leverage our supply chain, production platform and expertise.

We formed Green Plains Partners LP, a master limited partnership, to be our primary downstream storage and logistics provider since its assets are the principal method of storing and delivering the ethanol we produce. The partnership completed its IPO on July 1, 2015. As of December 31, 2019, we own a 49.0% limited partner interest, a 2.0% general partner interest and all of the partnership’s incentive distribution rights. The public owns the remaining 49.0% limited partner interest. The partnership is consolidated in our financial statements. In addition, we own a 50% interest in GPCC which is accounted for under the equity method of accounting.

We group our business activities into the following four operating segments to manage performance:

- *Ethanol Production.* Our ethanol production segment includes the production of ethanol, distillers grains and corn oil at 13 ethanol plants in Illinois, Indiana, Iowa, Minnesota, Nebraska, Tennessee and Texas. At capacity, our facilities are capable of processing approximately 387 million bushels of corn per year and producing approximately 1.1 billion gallons of ethanol, 2.9 million tons of distillers grains and 292 million pounds of industrial grade corn oil, making us one of the largest ethanol producers in North America. On November 15, 2018, we completed the sale of three ethanol plants located in Bluffton, Indiana, Lakota, Iowa and Riga, Michigan and announced the permanent closure of our ethanol plant located in Hopewell, Virginia.

- *Agribusiness and Energy Services.* Our agribusiness and energy services segment includes grain procurement, with approximately 43.5 million bushels of grain storage capacity, and our commodity marketing business, which markets, sells and distributes ethanol, distillers grains and corn oil produced at our ethanol plants. We also market ethanol for a third-party producer as well as buy and sell ethanol, distillers grains, corn oil, grain, natural gas and other commodities in various markets.

- *Food and Ingredients.* Our food and ingredients segment currently includes our food-grade corn oil operations. Fleischmann’s Vinegar, one of the world’s largest producers of food-grade industrial vinegar, was also included in the food and ingredients segment until its sale on November 27, 2018. On September 1, 2019, we formed a joint venture and sold 50% of our cattle feeding operations which has the capacity to support approximately 355,000 head of cattle and grain storage capacity of approximately 24.1 million bushels. The assets and liabilities and results of operations of GPCC prior to its divesture have been reclassified as discontinued operations for all periods presented. Our continued investment in GPCC is accounted for under the equity method of accounting. For more information about GPCC, refer to *Note 5 - Acquisitions, Dispositions and Discontinued Operations* and *Note 21 – Equity Method Investments* included as part of the notes to consolidated financial statements.

- *Partnership.* Our master limited partnership provides fuel storage and transportation services by owning, operating, developing and acquiring ethanol and fuel storage tanks, terminals, transportation assets and other related assets and businesses. The partnership’s assets include 32 ethanol storage facilities, seven fuel terminal facilities and approximately 2,630 leased railcars.

Risk Management and Hedging Activities

Our margins our highly dependent on commodity prices, particularly for ethanol, corn, distillers grains, corn oil and natural gas. Since market price fluctuations among these commodities are not always correlated, ethanol production may be unprofitable at times. We use a variety of risk management tools and hedging strategies to monitor real-time operating price risk exposure at each of our operations to obtain favorable margins, when available.

We use forward contracts to sell a portion of our ethanol, distillers grains, and corn oil production or buy some of the corn, natural gas, or ethanol we need to partially offset commodity price volatility. We also engage in other hedging transactions involving exchange-traded futures contracts for corn, natural gas, ethanol and other commodities. The financial impact of these activities depends on the price of the commodities involved and our ability to physically receive or deliver those commodities.

Hedging arrangements expose us to risk of financial loss when the counterparty defaults on its contract or, in the case of exchange-traded contracts, when the expected differential between the price of the underlying commodity and physical commodity changes. Hedging activities can result in losses when a position is purchased in a declining market or sold in a rising market. Hedging losses may be offset by a decreased cash price for corn and natural gas and an increased cash price for ethanol, distillers grains and corn oil. Depending on the circumstance, we vary the amount of hedging or other risk mitigation strategies we undertake and sometimes choose not to engage in hedging transactions at all.

Competitive Strengths

We are focused on managing commodity price risks, improving operational efficiencies and optimizing market opportunities to create an efficient platform with diversified income streams. Our competitive strengths include:

Disciplined Risk Management. Risk management is a core competency and we use a variety of risk management tools and hedging strategies to maintain a disciplined approach. Our internally developed operating margin management system allows us to monitor commodity price risk exposure at each of our operations and lock in favorable margins, when available, or temporarily reduce production levels during periods of compressed margins.

Operational Excellence. Our facilities are staffed with experienced industry personnel who share operational knowledge and expertise. We focus on making incremental operational improvements to enhance performance using real-time production data and systems to monitor our operations and optimize performance. Additionally, our operational expertise helps us improve the operating margins of acquired facilities.

Technology Integration. Over our history, we have incorporated new technologies like corn oil extraction and Selective Milling Technology™ into our manufacturing processes that have enabled us to run more efficiently and improve our financial results. We are currently undergoing a number of project initiatives to improve margins. Through our Project 24 initiative, we anticipate reductions in operating expense per gallon across our non-ICM plants as a result of these investments. In addition, through our high-protein initiative, we expect to achieve increased margins per gallon as a result of the ability to produce various high protein animal feed products. We continue to evaluate additional technological opportunities to expand our capabilities and product offerings in the coming years.

Proven Management Team. Our senior management team averages approximately 25 years of commodity risk management and related industry experience. We have specific expertise across all of our businesses, including plant operations and management, commodity markets and risk management, and ethanol marketing and distribution. Our management team's level of operational and financial expertise is essential to successfully executing our business strategies.

Business Strategy

We believe ethanol could become an increasingly larger portion of the global fuel supply driven by heightened environmental concerns and energy independence goals, supported by government policies and regulations. In the 1990's, federal law required the use of oxygenates in reformulated gasoline to reduce vehicle emissions in cities with unhealthy levels of air pollution. Today, ethanol is the primary oxygenate used by the U.S. refining industry to meet various federal and state air emission standards. The high octane value of ethanol has also made it the primary additive used by refiners to increase octane value, which improves engine performance. Accordingly, ethanol has become a valuable blend component that comprises approximately 10% of the domestic gasoline supply with the potential to grow with higher blends and increased gasoline demand. Ethanol usage is further supported by federal government mandates under RFS II, which assigns individual refiners, blenders and importers the volume of renewable fuels they are obligated to use based on their percentage

of total fuel sales. Advances in domestic corn yields have helped the U.S. ethanol industry become the lowest-cost producer of ethanol, surpassing Brazil, creating demand for U.S. ethanol worldwide.

We also believe that the world will continue to increase its demand for protein for human consumption, driving the need to produce larger amounts of high protein feed for animals and aquaculture. With new technologies introduced in the ethanol industry, we believe that ethanol production facilities can increasingly become high-protein feed producers. We have begun to deploy one of these new technologies in an effort to capture higher co-product returns, which could lead to an accelerated deployment of additional high-protein process technology installments at a number of our ethanol production facilities to take advantage of the world's growing demand for protein.

In light of the ethanol industry's environment, we are focused on continued improvement of our low-cost ethanol production platform and driving costs out where possible. Owning grain storage at or near our ethanol plants allows us to develop relationships with local producers and originate corn more effectively at a lower average cost. We purchase approximately two-thirds of our corn volume directly from farmers and have approximately 45 production days of storage capacity at or near our ethanol plants. We use our performance data to develop strategies that can be applied across our platform and embrace technological advances to improve operational efficiencies and yields, such as Selective Milling Technology™ and Enogen® corn enzyme technology, to lower our processing cost per gallon and increase production volumes. We are executing on our Project 24 initiative at our non-ICM plants to reduce energy consumption and increase operational reliability at these plants, reducing our operating expense per gallon which we anticipate completing during the third quarter of 2020.

We believe there is untapped value across our businesses and we intend to further develop and strengthen our business by identifying projects that maximize our production capabilities and lower existing costs at our production facilities. We also seek to leverage our core competencies in adjacent businesses such as cattle feedlots, high protein animal feed and other commodity processing operations that maximize our operational and risk management expertise.

Recent Developments

The following is a summary of our significant developments during 2019. Additional information about these items can be found elsewhere in this report or in previous reports filed with the SEC.

Suspension of Quarterly Cash Dividend

On June 18, 2019, we announced that our board of directors decided to suspend our quarterly cash dividend in order to retain and redirect cash flow to our Project 24 operating expense equalization plan, the deployment of high-protein technology and our stock repurchase program.

4.00% Convertible Notes due in 2024

During June and July 2019, we issued $115.0 million of 4.00% convertible senior notes due in 2024, or the 4.00% notes. We used approximately $57.8 million of the net proceeds to repurchase the $56.8 million outstanding principal amount of our 3.25% convertible senior notes due October 1, 2019, including accrued and unpaid interest, in privately negotiated transactions concurrently with the offering. We used remaining net proceeds to repurchase our common stock as part of our share repurchase program, for continued investment into our high-protein initiative and for general corporate purposes.

The 4.00% notes are senior, unsecured obligations, with interest payable on January 1 and July 1 of each year, beginning January 1, 2020, at a rate of 4.00% per annum. The initial conversion rate is 64.1540 shares of common stock per $1,000 of principal, which is equal to a conversion price of approximately $15.59 per share. The conversion rate will be subject to adjustment upon the occurrence of certain events. In addition, we may be obligated to increase the conversion rate for any conversion that occurs in connection with certain corporate events, including the calling of the 4.00% notes for redemption. We may settle the 4.00% notes in cash, common stock or a combination of cash and common stock. For additional information related to the 4.00% notes, see *Note 12 – Debt* included as part of the notes to consolidated financial statements.

Ninth Amendment to Credit Agreement – Green Plains Grain Company LLC

On June 28, 2019, we entered into an amendment of our senior secured asset-based revolving credit facility. This Ninth Amendment to the Credit Agreement was completed to renew and extend the existing maturity date from July 26, 2019 to June 28, 2022 and lower the senior secured asset-based revolving credit facility from $125.0 million to $100.0 million.

Formation of Green Plains Cattle Company LLC Joint Venture

On September 1, 2019, we formed a joint venture with TGAM Agribusiness Fund Holdings-B LP ("TGAM") and StepStone Atlantic Fund, L.P. ("StepStone") at which time the parties entered into the Second Amended and Restated Limited Liability Company Agreement ("LLC Agreement") of GPCC. GPCC was previously a wholly owned subsidiary of Green Plains. We also entered into a Securities Purchase Agreement with TGAM and StepStone, whereby TGAM and StepStone purchased an aggregate of 50% of the membership interests of GPCC from the company. After closing, GPCC is no longer included in the consolidated financial statements and the GPCC investment is accounted for using the equity method of accounting. Under this method, an investment is recorded at the acquisition cost plus the company's share of equity in undistributed earnings or losses since acquisition and the company's share of equity method investees other comprehensive income arising during the period, reduced by distributions received. See *Note 5 - Acquisitions, Dispositions and Discontinued Operations* for further details.

Under the LLC Agreement, we have certain rights and obligations, including but not limited to, the right or obligation: (i) to designate two Managers to the Board of Managers of GPCC (the "GPCC Board"), or in the event the size of the GPCC Board is increased, the number of Managers equal to two-fifths of the GPCC Board, rounded up, and (ii) to fund additional capital contributions in accordance with their percentage interest upon mutual agreement by the company TGAM and StepStone. Additionally, TGAM and StepStone both have the right or obligation to designate one Manager, or in the event the size of the GPCC Board is increased, the number of Managers equal to one-fifths of the GPCC Board, rounded up. Each Manager serving on the GPCC Board shall have one vote and a majority of the Managers serving on the GPCC Board shall constitute a quorum for the transaction of business of the GPCC Board. Our allocation under the LLC Agreement will be subject to certain adjustments.

Increase of Share Repurchase Authorization

On October 30, 2019, our board of directors authorized an additional $100.0 million share repurchase taking the previously authorized amount from $100.0 million to $200.0 million.

Disposition of JGP Energy Partners

On December 11, 2019, we completed the sale of our 50% joint venture interest in JGP Energy Partners LLC to our partner, Jefferson Energy Holdings LLC, a subsidiary of Fortress Transportation and Infrastructure Investors LLC, for $29 million plus estimated working capital. In addition, we recognized a gain within other income of $4.8 million related to the sale of our 50% interest in JGP Energy Partners LLC.

Operating Segments

Ethanol Production Segment

Industry Overview. Ethanol, also known as ethyl alcohol or grain alcohol, is a colorless liquid produced by fermenting carbohydrates found in a number of different types of grains, such as corn, wheat and sorghum, and other cellulosic matter found in plants. Most of the ethanol produced in the United States is made from corn because it contains large quantities of carbohydrates that convert into glucose more easily than most other kinds of biomass, which can be handled efficiently and is in greater supply than other grains. According to the USDA, on average, one bushel, or 56 pounds, of corn, produces approximately 2.7 gallons of ethanol, 15 pounds of distillers grains and 0.7 pounds of corn oil. Outside of the United States, sugarcane is the primary feedstock used to produce ethanol.

Ethanol is a significant component of the biofuels industry, which includes all transportation fuels derived from renewable biological materials. Biofuels are an excellent oxygenate and source of octane. When added to petroleum-based transportation fuels, oxygenates reduce vehicle emissions. Ethanol is the most economical oxygenate and source of octane available on the market and its production costs are competitive with gasoline.

Ethanol Plants. We operate 13 dry mill ethanol production plants, located in seven states, that produce ethanol, distillers grains and corn oil:

Plant Location	Initial Operation or Acquisition Date	Technology	Plant Production Capacity (mmgy)
Atkinson, Nebraska	June 2013	Delta-T	55
Central City, Nebraska	July 2009	ICM	116
Fairmont, Minnesota	Nov. 2013	Delta-T	119
Hereford, Texas	Nov. 2015	ICM/Lurgi	100
Madison, Illinois	Sept. 2016	Vogelbusch	90
Mount Vernon, Indiana	Sept. 2016	Vogelbusch	90
Obion, Tennessee (1)	Nov. 2008	ICM	120
Ord, Nebraska	July 2009	ICM	65
Otter Tail, Minnesota	Mar. 2011	Delta-T	55
Shenandoah, Iowa (1)	Aug. 2007	ICM	82
Superior, Iowa (1)	July 2008	Delta-T	60
Wood River, Nebraska	Nov. 2013	Delta-T	121
York, Nebraska	Sept. 2016	Vogelbusch	50
Total			1,123

(1) We constructed these three plants; all other ethanol plants were acquired.

Our business is directly affected by the supply and demand for ethanol and other fuels in the markets served by our assets. Miles driven typically increases during the spring and summer months related to vacation travel, followed closely by the fall season due to holiday travel.

The majority of our plants are equipped with industry-leading ICM or Delta-T ethanol processing technology. Our years of experience building, acquiring and operating these technologies provides us with a deep understanding of how to effectively and efficiently manage both platforms for maximum performance.

Corn Feedstock and Ethanol Production. Our plants use corn as feedstock in a dry mill ethanol production process. Each of our plants requires approximately 17 million to 42 million bushels of corn annually, depending on its production capacity. The price and availability of corn are subject to significant fluctuations driven by a number of factors that affect commodity prices in general, including crop conditions, weather, governmental programs, freight costs and global demand. Ethanol producers are generally unable to pass increased corn costs to customers.

Our corn supply is obtained primarily from local markets. We use cash and forward purchase contracts with grain producers and elevators to buy corn. We maintain direct relationships with local farmers, grain elevators and cooperatives, which serve as our primary sources of grain feedstock, at 11 of our ethanol plants. This allows us to purchase much of the corn we need directly from farmers throughout the year. At two of our ethanol plants, we contract with a third-party grain originator to supply the corn necessary for ethanol production. These contracts terminate in November 2023. Each of our plants is also situated on rail lines or has other logistical solutions to access corn supplies from other regions of the country should local supplies become insufficient.

Corn is received at the plant by truck or rail then weighed and unloaded into a receiving building. Grain storage facilities are used to inventory grain that is passed through a scalper to remove rocks and debris prior to processing. The corn is then transported to a hammer mill where it is ground into flour and conveyed into a slurry tank for enzymatic processing. Water, heat and enzymes are added to convert the complex starch molecules into simpler carbohydrates. The slurry is heated to reduce the potential of microbial contamination and pumped into a liquefaction tank where additional enzymes are added. Next, the grain slurry is pumped into fermenters, where yeast, enzymes, and nutrients are added and the fermentation process is started. A beer column, within the distillation system, separates the alcohol from the spent grain mash. The alcohol is dehydrated to 200-proof alcohol and either pumped into a holding tank and blended with approximately 2% denaturant as it is pumped into finished product storage tanks, or marketed as undenatured ethanol.

Distillers Grains. The spent grain mash is pumped from the beer column into a decanter-type centrifuge for dewatering. The water, or thin stillage, is pumped from the centrifuge into an evaporator, where it is concentrated into a thick syrup. The solids, or wet cake, that exit the centrifuge are conveyed to the dryer system and dried at varying temperatures to produce distillers grains. Syrup is reapplied to the wet cake prior to drying to provide additional nutrients. Distillers grains, the principal co-product of the ethanol production process, are used as high-protein, high-energy animal feed and marketed to the dairy, beef, swine and poultry industries.

We can produce three forms of distillers grains, depending on the number of times the solids are passed through the dryer system:

- wet distillers grains, which contain approximately 65% to 70% moisture, have a shelf life of approximately three days and is therefore sold to dairies or feedlots within the immediate vicinity;
- modified wet distillers grains, which is dried further to approximately 50% to 55% moisture, have a shelf life of approximately three weeks and are marketed to regional dairies and feedlots; and
- dried distillers grains, which have been dried more extensively to approximately 10% to 12% moisture, have an almost indefinite shelf life and may be stored, sold and shipped to any market.

Corn Oil. Corn oil systems extract non-edible corn oil from the thin stillage evaporation process immediately before the production of distillers grains. Corn oil is produced by processing the syrup through a decanter-style, or disk-stack, centrifuge. The centrifuges separate the relatively light corn oil from the heavier components of the syrup. We extract approximately 0.7 pounds of corn oil per bushel of corn used to produce ethanol. Industrial uses for corn oil include feedstock for renewable diesel, biodiesel, livestock feed additives, rubber substitutes, rust preventatives, inks, textiles, soaps and insecticides. The syrup is blended into wet, modified wet or dried distillers grains.

Natural Gas. Depending on production parameters, our ethanol plants use approximately 20,000 to 45,000 BTUs of natural gas per gallon of production. We have service agreements to acquire the natural gas we need and transport the gas through pipelines to our plants.

Electricity. Our plants require between 0.5 and 1.7 kilowatt hours of electricity per gallon of production. Local utilities supply the necessary electricity to all of our ethanol plants.

Water. While some of our plants satisfy a majority of their water requirements from wells located on their respective properties, each plant also obtains drinkable water from local municipal water sources. Each facility either uses city water or operates a filtration system to purify the well water that is used for its operations. Local municipalities supply all of the necessary water for our plants that do not have onsite wells. Most of the water used in an ethanol plant is recycled in the production process.

Agribusiness and Energy Services Segment

Our agribusiness and energy services segment includes three grain elevators in three states with combined grain storage capacity of approximately 7.6 million bushels, and grain storage at our ethanol plants of approximately 35.9 million bushels, detailed in the following table:

Facility Location	**On-Site Grain Storage Capacity (thousands of bushels)**
Grain Elevators	
Archer, Nebraska	1,246
Essex, Iowa	3,651
Hopkins, Missouri	2,713
Ethanol Plants	
Atkinson, Nebraska	5,109
Central City, Nebraska	1,400
Fairmont, Minnesota	1,611
Hereford, Texas	4,913
Madison, Illinois	1,015
Mount Vernon, Indiana	1,034
Obion, Tennessee	8,168
Ord, Nebraska	2,571
Otter Tail, Minnesota	2,772
Shenandoah, Iowa	886
Superior, Iowa	2,804
Wood River, Nebraska	3,293
York, Nebraska	347
Total	43,533

We buy bulk grain, primarily corn and soybeans, from area producers, and provide grain drying and storage services to those producers. The grain is used as feedstock for our ethanol plants or sold to grain processing companies and area livestock producers. Bulk grain commodities are traded on commodity exchanges. Inventory values are affected by changes in these markets and spreads. To mitigate risks related to market fluctuations from purchase and sale commitments of grain, as well as grain held in inventory, we enter into exchange-traded futures and options contracts that function as economic hedges at times.

Seasonality is present within our agribusiness operations. The fall harvest period typically results in higher handling margins and stronger financial results during the fourth quarter of each year.

Through Green Plains Trade, we market the ethanol we and a third party produce to local, regional, national and international customers. We also purchase ethanol from independent producers for pricing arbitrage. We sell to various markets under sales agreements with integrated energy companies; retailers, traders and resellers in the United States and buyers for export to Brazil, Canada, Europe, China and other international markets. Under these agreements, ethanol is priced under fixed and indexed pricing arrangements.

Also through Green Plains Trade, we market wet and modified wet distillers grains to local markets and dried distillers grains to local, national and international markets. The bulk of our demand is delivered to geographic regions that do not have significant local corn or distillers grains production.

Our markets can be further segmented by geographic region and livestock industry. Most of our wet and modified wet distillers grains are sold to midwestern feedlot markets. A substantial amount of dried distillers grains are shipped by barge, containers and rail to regional and national markets, as well as international markets. Our dried distillers grains are shipped to feedlots and poultry markets, as well as Texas and West Coast rail markets. Some of our distillers grains are shipped by truck to dairy, beef, and poultry operations in the eastern United States. We also ship by railcar to eastern and southeastern feed mills, poultry and dairy operations, and domestic trade companies. We sell dried distillers grains directly to international markets and indirectly to exporters for shipment. Access to diversified markets allows us to sell product to customers offering the highest net price.

Our corn oil is sold primarily to renewable diesel and biodiesel plants and, to a lesser extent, feedlot and poultry markets. We transport our corn oil by truck to locations in a close proximity to our ethanol plants primarily in the southeastern and midwestern regions of the United States. We also transport corn oil by rail and barges to national markets as well as to exporters for shipment on vessels to international markets.

Through Green Plains Trade, we provide marketing services of natural gas to our ethanol plants and to other third parties including the procurement of both the pipeline capacity and natural gas. We also enhance the value by aggregating volumes at various storage facilities which can be sold to either the plants or various intermediary markets and end markets.

Our railcar fleet for the agribusiness and energy services segment consists of approximately 400 leased hopper cars to transport distillers grains and approximately 150 leased tank cars to transport corn oil and crude oil. The initial terms of the lease contracts are for periods up to ten years.

Food and Ingredients Segment

Food-grade corn oil production. Our food-grade corn oil operations focus on shipping corn oil from facilities across the Midwest by rail or barge to terminal facilities located in the southern United States. Once the corn oil arrives at the terminal facility, it is unloaded and consolidated into set volumes and prepared for shipment by vessel. The corn oil is then shipped to independent refiners outside the United States for refining into a refined, bleached, dewaxed and deodorized food-grade product. This finished product is then shipped by vessel or container to our various customers. In addition, we also execute trade volumes of corn oil and soybean oil in both domestic and international markets.

Vinegar operations. Fleischmann's Vinegar, one of the world's largest producers of food-grade industrial vinegar, was also included in the food and ingredients segment until its sale on November 27, 2018.

Partnership Segment

Our partnership segment provides fuel storage and transportation services through (i) 32 ethanol storage facilities located at or near our 13 operational ethanol production plants and one non-operational ethanol production plant, (ii) seven fuel terminal facilities located near major rail lines, and (iii) a leased railcar fleet and other transportation assets.

Transportation and Delivery. Most of our ethanol plants are situated near major highways or rail lines to ensure efficient movement. We are able to move product from our ethanol plants to bulk terminals via truck, railcar or barge. We also manage the logistics and transportation requirements of our customers to improve our fleet's efficiency and reduce operating costs.

Deliveries within 150 miles of our plants and the partnership's fuel terminal facilities are generally transported by truck. Deliveries to distant markets are shipped using major U.S. rail carriers that can switch cars to other major railroads, allowing our plants to ship product throughout the United States.

To meet the challenge of marketing ethanol and distillers grains to diverse market segments, several of our plants are capable of simultaneously handling more than 150 railcars. Some of our locations have large loop tracks with unit train loading capabilities for both ethanol and dried distillers grains and spurs to connect the loop to the mainline or allow the movement and storage of railcars on site.

The partnership's railcar fleet consists of approximately 2,630 leased tank cars for the transportation of ethanol. The initial terms of the railcar lease agreements range from one to seven years and the weighted average remaining term of all railcar lease agreements is 3.1 years.

To optimize the partnership's railcar assets, we transport products other than ethanol depending on market opportunities and have used a portion of our railcar fleet to transport crude oil for third parties and to lease railcars to other users.

Terminal and Distribution Services. Ethanol is transported from the partnership's terminals to third-party terminal racks where it is blended with gasoline and transferred to the loading rack for delivery by truck to retail gas stations. The partnership owns and operates fuel holding tanks and terminals, and provide terminal services and logistics solutions to markets that do not have efficient access to renewable fuels. The partnership owns and operates fuel terminals at seven locations in six states with combined storage capacity of approximately 7.3 mmg and throughput capacity of approximately 762 mmgy. We also have 32 ethanol storage facilities located at or near our 13 operational ethanol production plants and one non-operational ethanol production plant with a combined storage capacity of approximately 31.9 mmg to support current ethanol production capacity of approximately 1.1 bgy.

Facility Location	Storage Capacity (thousands of gallons)
Fuel Terminals	
Birmingham, Alabama - Unit Train Terminal	6,542
Birmingham, Alabama - Other	120
Bossier City, Louisiana	180
Collins, Mississippi	180
Little Rock, Arkansas	30
Louisville, Kentucky	60
Oklahoma City, Oklahoma	150
Ethanol Plants	
Atkinson, Nebraska (1)	2,074
Central City, Nebraska	2,250
Fairmont, Minnesota	3,124
Hereford, Texas	4,406
Hopewell, Virginia (2)	761
Madison, Illinois	2,855
Mount Vernon, Indiana	2,855
Obion, Tennessee	3,000
Ord, Nebraska	1,550
Otter Tail, Minnesota	2,000
Shenandoah, Iowa	1,524
Superior, Iowa	1,238
Wood River, Nebraska	3,124
York, Nebraska	1,100
Total	39,123

(1) The ethanol storage facilities are located approximately 16 miles from the ethanol plant.

(2) Production at the Hopewell, Virginia facility ceased during the fourth quarter of 2018, however the facility is still being utilized for trans-loading purposes.

For more information about our segments, refer to *Item 7. - Management's Discussion and Analysis of Financial Condition and Results of Operations* in this report.

Our Competition

Domestic Ethanol Competitors

We are one of the largest consolidated owners' of ethanol plants in the United States. We compete with other domestic ethanol producers in a highly fragmented industry. Our competitors also include plants owned by farmers, cooperatives, oil refiners and retail fuel operators. These competitors may continue to operate their plants even when market conditions are not favorable due to the benefits realized from their other operations.

As of December 31, 2019, the top five producers operated 70 plants and accounted for approximately 42% of the domestic production capacity with production capacities ranging from 800 mmgy to 1,700 mmgy. Approximately half of the 209 plants in the United States are standalone facilities and accounted for approximately 34% of domestic production capacity.

Demand for corn from ethanol plants and other corn consumers exists in all areas and regions in which we operate. According to the Renewable Fuels Association, there were 124 operational plants in the states where we have production facilities, including Illinois, Indiana, Iowa, Minnesota, Nebraska, Tennessee and Texas, as of December 31, 2019. The largest concentration of operational plants is located in Iowa, Nebraska and Illinois, where approximately 51% of all operational production capacity is located.

Foreign Ethanol Competitors

We also compete globally with production from other countries. Brazil is the second largest ethanol producer in the world after the United States. Brazil primarily produces ethanol made from sugarcane, which may be less expensive to produce than ethanol made from corn depending on feedstock prices. Under RFS II, certain parties are obligated to meet an advanced biofuel standard. In recent years, sugarcane ethanol imported from Brazil has been one of the most economical

means for obligated parties to meet this standard. Any significant additional ethanol production capacity could create excess supply in world markets, resulting in lower ethanol prices throughout the world, including the United States.

Other Competition

Alternative fuels, gasoline oxygenates and ethanol production methods are continually under development. Ethanol production technologies also continue to evolve. We expect changes to occur primarily in the area of cellulosic ethanol, which is made from biomass such as switch grass or fast-growing poplar trees. Since all of our plants are designed as single-feedstock facilities, adapting our plants for a different feedstock or process system would require additional capital investments and retooling which could be cost prohibitive. In addition, through our investment in GPCC, we compete with other cattle feeding operations in competitive markets.

Regulatory Matters

Government Ethanol Programs and Policies

We are sensitive to government programs and policies that affect the supply and demand for ethanol and other fuels, which in turn may affect the volume of ethanol and other fuels we handle. In the United States, the federal government mandates the use of renewable fuels under the RFS II. The EPA assigns individual refiners, blenders and importers the volume of renewable fuels they are obligated to blend into the fuel supply each year based on their percentage of total fuel sales. The EPA has the authority to waive the mandates in whole or in part if there is inadequate domestic renewable fuel supply or the requirement severely harms the economy or the environment.

The RFS II has been a driving factor in the growth of ethanol usage in the United States. When the RFS II was established in 2010, the required volume of “conventional” corn-based ethanol to be blended with gasoline was to increase each year until it reached 15.0 billion gallons in 2015, which left the EPA to address existing limitations in both supply (ethanol production) and demand (usage of ethanol blends in older vehicles). On December 19, 2019, the EPA announced the final 2020 RVO for conventional ethanol, which met the 15.0-billion-gallon congressional target.

According to the RFS II, if mandatory renewable fuel volumes are reduced by at least 20% for two consecutive years, the EPA is required to modify, or reset, statutory volumes through 2022 – the year through which the statutorily prescribed volumes run. While conventional ethanol maintained 15 billion gallons, 2019 was the second consecutive year that the total proposed RVO was more than 20% below statutory volumes levels. Thus, the EPA was expected to initiate a “reset” rulemaking, and modify statutory volumes through 2022, and do so based on the same factors they are to use in setting the RVOs post-2022. These factors include environmental impact, domestic energy security, expected production, infrastructure impact, consumer costs, job creation, price of agricultural commodities, food prices, and rural economic development. However, on December 19, 2019, the EPA announced it would not be moving forward with a reset rulemaking in 2020.

Under the RFS II, obligated parties use RINs to show compliance with the RFS II mandated volumes. RINs are created by renewable fuel producers and are detached when the renewable fuel is blended into the transportation fuel supply. The market price of detached RINs affects the price of ethanol in certain markets and influences the purchasing decisions of obligated parties. Higher RIN prices generally encourage more ethanol blending.

Under the RFS II, a small refinery is defined as one that processes fewer than 75,000 barrels of petroleum per day. Small refineries can petition the EPA for a waiver of their portion of the annual RVO requirements. The EPA, through consultation with the Department of Energy and the Department of Agriculture, can grant them a full or partial waiver, or deny it outright within 90 days of submittal. The EPA granted significantly more of these waivers for 2016, 2017 and 2018 than they had in the past, totaling 790 million gallons of waived requirements for the 2016 compliance year, 1.82 billion gallons for 2017 and 1.43 billion gallons for 2018. In doing so, the EPA effectively reduced the RFS II mandated volumes for those compliance years by those amounts respectively, and as a result, RIN values have declined significantly.

Biofuels groups have filed a lawsuit in the Court of Appeals for the D.C. Circuit, challenging the 2019 RVO rule over the EPA’s failure to address small refinery exemptions in the rulemaking. This was the first RFS II rulemaking since the expanded use of the exemptions came to light, however the EPA had declined to cap the number of waivers it grants and until late 2019 had declined to alter how it accounts for the retroactive waivers in its annual volume calculations. The EPA has a statutory mandate to ensure the volume requirements are met, which are achieved by setting the percentage standards for obligated parties. The EPA’s recent approach accomplished the opposite. Even if all the obligated parties complied with their respective percentage obligations for 2019, the nation’s overall supply of renewable fuel would not meet the total volume requirements set by the EPA. This undermines Congressional intent to increase the consumption of renewable fuels in the domestic transportation fuel supply. Biofuels groups have argued the EPA must therefore adjust its percentage standard

calculations to make up for past retroactive waivers and adjust the standards to account for any waivers it reasonably expects to grant in the future.

In a supplemental rulemaking to the 2020 RVO rule, the EPA changed their approach, and for the first time are accounting for the gallons they anticipate they will be waiving from the blending requirements due to small refinery exemptions. To accomplish this, they are adding in the trailing three year average of gallons the Department of Energy recommended be waived, in effect raising the blending volumes across the board in anticipation of waiving the obligations in whole or in part for certain refineries that qualify for the exemptions. Though the EPA has often disregarded the recommendations of the Department of Energy in years past, they stated in the rule their intent to adhere to these recommendations going forward, including granting partial waivers rather than an all or nothing approach. The EPA will be adjudicating the 2020 compliance year small refinery exemption applications in early 2021, but have indicated they will adhere to Department of Energy recommendations for the 2019 compliance year applications as well, which should be adjudicated in the first half of 2020.

On January 24, 2020, the U.S. Court of Appeals for the 10th Circuit ruled on RFA et. al. vs. EPA in favor of biofuels interests, overturning EPA's grant of refinery exemptions to three refineries on two separate grounds. The Court agreed that, under the Clean Air Act, refineries are eligible for SREs for a given RVO year only if such exemptions are extensions of exemptions granted in previous RVO years. In this case, the three refineries at issue did not qualify for SREs in the year prior to the year that EPA granted them. They were thus ineligible for additional SRE relief because there were no immediately prior SREs to extend. In addition, the Court agreed that the disproportionate economic hardship prong of SRE eligibility should be determined solely by reference to whether compliance with the RFS II creates such hardship, not whether compliance plus other issues create disproportionate economic hardship. The Court thus vacated EPA's grant of SREs for certain years and remanded the grants back to EPA. It is expected the decision will be appealed to the U.S. Supreme Court. If the decision against the EPA is upheld by the Supreme Court, it is uncertain how the EPA will propose to remedy the situation.

On January 29, 2020, the President signed into law the updated North American Free Trade Agreement, known as the United States Mexico Canada Agreement or USMCA. The pact maintains the duty free access of U.S. agricultural commodities, including ethanol, into Canada and Mexico. As of the date of this filing, Mexico has ratified the pact and the Canadian Parliament is widely expected to do the same.

See further discussion in *Item 7 – Management's Discussion and Analysis of Financial Condition and Results of Operations*.

Environmental and Other Regulation

Our ethanol production, agribusiness and energy services, food and ingredients, and partnership segment activities are subject to various and extensive environmental and other regulations. We obtain and maintain various environmental permits to operate our plants and other facilities.

Ethanol production involves the emission of various airborne pollutants, including particulate, carbon dioxide, oxides of nitrogen, hazardous air pollutants and volatile organic compounds. In 2007, the U.S. Supreme Court classified carbon dioxide as an air pollutant under the Clean Air Act in a case seeking to require the EPA to regulate carbon dioxide in vehicle emissions, which the EPA later addressed in RFS II.

While some of our plants operate as grandfathered at their current authorized capacity under the RFS II mandate, expansion above these capacities will require a 20% reduction in greenhouse gas emissions from a 2005 baseline measurement. This may require us to obtain additional permits, achieve the EPA's efficient producer status under the pathway petition program for our grandfathered plants, install advanced technology or reduce drying distillers grains.

CARB adopted LCFS requiring a 10% reduction in average carbon intensity of gasoline and diesel transportation fuels in California from 2010 to 2020. After a series of rulings that temporarily prevented CARB from enforcing these regulations, the State of California Office of Administrative Law approved the LCFS in November 2012, and revised LCFS regulations took effect in January 2013.

We employ maintenance and operations personnel at each of our plants. In addition to the attention we place on the health and safety of our employees, the operations of our facilities are regulated by the Occupational Safety and Health Administration.

See further discussion in *Item 7 – Management's Discussion and Analysis of Financial Condition and Results of Operations*.

BioProcess Algae, Optimal Aquafeed and GPCC Joint Ventures

We are the majority owner of the BioProcess Algae joint venture, which was formed in 2008. The joint venture is focused on growing algae in commercially viable quantities using feedstocks that are created as part of our ethanol production process. The joint venture continues to take steps towards commercialization. We are currently focused on animal nutrition, using proprietary technology to customize specific products, based on proven benefits, for relevant markets.

In 2018, we formed Optimal Aquafeed, a 50/50 joint venture to produce high-quality aquaculture feeds utilizing proprietary techniques and high-protein feed ingredients. The joint venture brings together Green Plains' production capabilities, commodity expertise, and infrastructure and combines that with Optimal Fish Food LLC's intellectual property, industry expertise and customer relationships.

In 2019, we formed the GPCC joint venture with TGAM and StepStone. GPCC conducts the business of the joint venture, including (i) owning and operating the cattle feeding operations and (ii) any other activities approved by GPCC's board of managers. GPCC has the capacity to support 355,000 head of cattle and has approximately 24.1 million bushels of grain storage capacity.

Employees

On December 31, 2019, we had 820 full-time, part-time, temporary and seasonal employees, including 123 employees at our corporate office in Omaha, Nebraska.

Available Information

Our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and amendments to those reports are available on our website at *www.gpreinc.com* shortly after we file or furnish the information with the SEC. You can also find the charters of our audit, compensation and nominating committees, as well as our code of ethics in the corporate governance section of our website. The information found on our website is not part of this or any other report we file with or furnish to the SEC. For more information on our partnership, please visit *www.greenplainspartners.com*. Alternatively, investors may visit the SEC website at *www.sec.gov* to access our reports, proxy and information statements filed with the SEC.

Item 1A. Risk Factors.

We operate in an industry that has numerous risks, many of which are beyond our control or are driven by factors that cannot always be predicted. Investors should carefully consider all of the risk factors in conjunction with the other information included in this report as our financial results and condition or market value could be adversely affected if any of these risks were to occur.

Risks Related to our Business and Industry

Our margins are dependent on managing the spread between the price of corn, natural gas, ethanol, distillers grains, and corn oil.

Our operating results are highly sensitive to commodity prices, including the spread between the corn and natural gas we purchase, and the ethanol, distillers grains and corn oil we sell. Price and supply are subject to various market forces, such as weather, domestic and global demand, shortages, export prices, crude oil prices, currency valuations and government policies in the United States and around the world, over which we have no control. Price volatility of these commodities may cause our operating results to fluctuate substantially. Increases in corn or natural gas prices or decreases in ethanol, distillers grains and corn oil prices may make it unprofitable to operate. No assurance can be given that we will purchase corn and natural gas or sell ethanol, distillers grains and corn oil at or near prices which would provide us with positive margins. Consequently, our results of operations and financial position may be adversely affected by increases in corn or natural gas prices or decreases in ethanol, distillers grains and corn oil prices.

We continuously monitor the margins at our ethanol plants using a variety of risk management tools and hedging strategies, when appropriate. In recent years, the spread between ethanol and corn prices has fluctuated widely, narrowed significantly and been negative at times. Fluctuations are likely to continue. A sustained narrow spread or further reduction in the spread between ethanol and corn prices as a result of increased corn prices or decreased ethanol prices, would adversely affect our results of operations and financial position. Should our combined revenue from ethanol, distillers grains and corn oil fall below our cost of production, we could decide to slow or suspend production at some or all of our ethanol plants, which also could adversely affect our results of operations and financial position.

The commodities we buy and sell are subject to price volatility and uncertainty.

Corn. We are generally unable to pass increased corn costs to our customers since ethanol competes with other fuels. At certain corn prices, ethanol may be uneconomical to produce. Ethanol plants, livestock industries and other corn-consuming enterprises put significant price pressure on local corn markets. In addition, local corn supplies and prices could be adversely affected by prices for alternative crops, increasing input costs, changes in government policies, shifts in global markets or damaging growing conditions, such as plant disease or adverse weather, including drought.

Ethanol. Our revenues are dependent on market prices for ethanol which can be volatile as a result of a number of factors, including: the price and availability of competing fuels; the overall supply and demand for ethanol and corn; the price of gasoline, crude oil and corn; and government policies.

Ethanol is marketed as a fuel additive that reduces vehicle emissions, an economical source of octanes and, to a lesser extent, a gasoline substitute. Consequently, gasoline supply and demand affect the price of ethanol. Should gasoline prices or demand decrease significantly, our results of operations could be materially impacted.

Ethanol imports also affect domestic supply and demand. Imported ethanol is not subject to an import tariff and, under the RFS II, sugarcane ethanol from Brazil is one of the most economical means for obligated parties to meet the advanced biofuel standard.

Distillers Grains. Increased U.S. dry mill ethanol production has resulted in increased distillers grains production. Should this trend continue, distillers grains prices could fall unless demand increases or other market sources are found. The price of distillers grains has historically been correlated with the price of corn. Occasionally, the price of distillers grains will lag behind fluctuations in corn or other feedstock prices, lowering our cost recovery percentage. Additionally, exports of distiller grains could be impacted by the enactment of foreign policy.

Distillers grains compete with other protein-based animal feed products. Downward pressure on other commodity prices, such as corn and soybeans, will generally cause the price of competing animal feed products to decline, resulting in downward pressure on the price of distillers grains.

Natural Gas. The price and availability of natural gas are subject to volatile market conditions. These market conditions are often affected by factors beyond our control, such as weather, drilling economics, overall economic conditions and government regulations. Significant disruptions in natural gas supply could impair our ability to produce ethanol. Furthermore, increases in natural gas price or changes in our cost relative to our competitors cannot be passed on to our customers which may adversely affect our results of operations and financial position.

Corn Oil. Industrial corn oil is generally marketed as a renewable diesel and biodiesel feedstock; therefore, the price of corn oil is affected by demand for renewable diesel and biodiesel. Reduced profitability in the renewable diesel and biodiesel industry due to the lapsed blending tax credit could impact corn oil demand. In general, corn oil prices follow the prices of heating oil and soybean oil. Decreases in the price of corn oil could have an unfavorable impact on our business.

Our risk management and commodity trading strategies could be ineffective and expose us to decreased liquidity.

As market conditions warrant, we use forward contracts to sell some of our ethanol, distillers grains, and corn oil, or buy some of the corn, or natural gas we need to partially offset commodity price volatility. We also engage in other hedging transactions and other commodity trading involving exchange-traded futures contracts for corn, natural gas, ethanol and other agricultural commodities. The financial impact of these activities depends on the price of the commodities involved and/or our ability to physically receive or deliver the commodities.

Hedging arrangements expose us to risk of financial loss when the counterparty defaults on its contract or, in the case of exchange-traded contracts, when the expected differential between the price of the underlying and physical commodity changes. Hedging activities can result in losses when a position is purchased in a declining market or sold in a rising market. Hedging losses may be offset by a decreased cash price for corn, and natural gas and an increased cash price for ethanol, distillers grains, and corn oil. We vary the amount of hedging and other risk mitigation strategies we undertake and sometimes choose not to engage in hedging transactions at all. We cannot provide assurance that our risk management and commodity trading strategies and decisions will be profitable or effectively offset commodity price volatility. If they are not our results of operations and financial position may be adversely affected.

The use of derivative financial instruments frequently involves cash deposits with brokers, or margin calls. Sudden changes in commodity prices may require additional cash deposits immediately. Depending on our open derivative positions, we may need additional liquidity with little advance notice to cover margin calls. While we continuously monitor our

exposure to margin calls, we cannot guarantee we will be able to maintain adequate liquidity to cover margin calls in the future.

Government mandates affecting ethanol could change and impact the ethanol market.

Under the provisions of the Energy Independence and Security Act (EISA), Congress expanded the Renewable Fuel Standard (RFS II). The RFS II mandated the minimum volume of renewable fuels that must be blended into the transportation fuel supply which affects the domestic market for ethanol. The Environmental Protection Agency (EPA) has the authority to waive the requirements, in whole or in part, if there is inadequate domestic renewable fuel supply or the requirement severely harms the economy or the environment. After 2022, volumes shall be determined by the EPA in coordination with the Secretaries of Energy and Agriculture, taking into account such factors as impact on environment, energy security, future rates of production, cost to consumers, infrastructure, and other factors such as impact on commodity prices, job creation, rural economic development, or impact on food prices.

Our operations could be adversely impacted by legislation or EPA actions, as set forth below or otherwise, that may reduce the RFS II mandated volumes of conventional ethanol and other biofuels. Similarly, should federal mandates regarding oxygenated gasoline be repealed, the market for domestic ethanol could be adversely impacted. Economic incentives to blend based on the relative value of gasoline versus ethanol, taking into consideration the octane value of ethanol, environmental requirements and the RFS II mandate, may affect future demand. A significant increase in supply beyond the RFS II mandate could have an adverse impact on ethanol prices. Moreover, changes to RFS II could negatively impact the price of ethanol or cause imported sugarcane ethanol to become more economical than domestic ethanol. Likewise state and regional low carbon fuel standards (LCFS) like that of California could be favorable or harmful to conventional ethanol, depending on how it is crafted.

According to the RFS II, if mandatory renewable fuel volumes are reduced by at least 20% for two consecutive years, the EPA is required to modify, or reset, statutory volumes through 2022, the year through which the statutorily prescribed volumes run. While conventional ethanol maintained 15 billion gallons, 2019 was the second consecutive year that the total proposed RVO was more than 20% below statutory volumes levels. Thus, the EPA was expected to initiate a “reset” rulemaking, and modify statutory volumes through 2022, and do so based on the same factors they are to use in setting the RVOs post-2022. These factors include environmental impact, domestic energy security, expected production, infrastructure impact, consumer costs, job creation, price of agricultural commodities, food prices, and rural economic development. However, on December 19, 2019, the EPA announced it would not be moving forward with a reset rulemaking in 2020.

The U.S. Federal District Court for the D.C. Circuit ruled on July 28, 2017, in favor of the Americans for Clean Energy and its petitioners against the EPA related to its decision to lower the 2016 volume requirements by 500 million gallons. The Court concluded the EPA erred in how it interpreted the “inadequate domestic supply” waiver provision of RFS II, which authorizes the EPA to consider supply-side factors affecting the volume of renewable fuel available to refiners, blenders, and importers to meet the statutory volume requirements. As a result, the Court vacated the EPA’s decision to reduce the total renewable fuel volume requirements for 2016 through its waiver authority, and remanded it to the agency. The EPA declined to address the remand in their annual Renewable Volume Obligation (RVO) rulemaking for 2020, but have indicated they intend to address this in early 2020.

On November 22, 2017, the EPA issued a Notice of Denial of Petitions for rulemaking to change the RFS point of obligation which resulted in the EPA confirming the point of obligation will not change. However, Valero Energy and refining trade group American Fuel and Petrochemical Manufacturers (AFPM) challenged the EPA’s handling of the U.S. biofuel mandate in a series of consolidated actions filed in the U.S. Court of Appeals for the D.C. Circuit. The first set of actions petitioned the Court to review the EPA’s November 2017 decision to reject proposed changes to the structure of the RFS, including moving the point of obligation from refiners and importers of fuel to fuel blenders, and sought review of EPA’s 2017 Renewable Volume Obligation (RVO) rule, which dictates the volumes of renewable fuels to be blended for that year, and for biomass-based diesel for 2018. The second set of actions sought review of the 2018 RVO rule. The third action, brought only by Valero, sought review of EPA’s December 2017 assertion that the agency has fulfilled its duty to periodically review the RFS as directed by statute. The D.C. Circuit denied all of the petitions on various grounds in three decisions issued in 2019. In December 2019, Valero and AFPM filed a petition for certiorari seeking U.S. Supreme Court review of D.C. Circuit decisions on the first two actions.

Future demand may be influenced by economic incentives to blend based on the relative value of gasoline versus ethanol, taking into consideration the octane value of ethanol, environmental requirements and the value of RFS II credits or Renewable Identification Numbers (RINs). A significant increase in supply beyond the RFS II mandate could have an adverse impact on ethanol prices. Moreover, any changes to RFS II originating from issues associated with the market price of RINs could negatively impact the demand for ethanol, discretionary blending of ethanol and/or the price of ethanol. Recent actions by the EPA to grant small refiner exemptions without accounting for the lost gallons has resulted in lower RIN prices.

Under the RFS II, a small refinery is defined as one that processes fewer than 75,000 barrels of petroleum per day. Small refineries can petition the EPA for a waiver of their portion of the annual RVO requirements. The EPA, through consultation with the Department of Energy and the Department of Agriculture, can grant them a full or partial waiver, or deny it outright within 90 days of submittal. The EPA granted significantly more of these waivers for 2016, 2017 and 2018 than they had in the past, totaling 790 million gallons of waived requirements for the 2016 compliance year, 1.82 billion gallons for 2017 and 1.43 billion gallons for 2018. In doing so, the EPA effectively reduced the RFS II mandated volumes for those compliance years by those amounts respectively, and as a result, RIN values have declined significantly.

Biofuels groups have filed a lawsuit in the Court of Appeals for the D.C. Circuit, challenging the 2019 RVO rule over the EPA's failure to address small refinery exemptions in the rulemaking. This was the first RFS rulemaking since the expanded use of the exemptions came to light, however the EPA had declined to cap the number of waivers it grants and until late 2019 had declined to alter how it accounts for the retroactive waivers in its annual volume calculations. The EPA has a statutory mandate to ensure the volume requirements are met, which are achieved by setting the percentage standards for obligated parties. The EPA's recent approach accomplished the opposite. Even if all the obligated parties complied with their respective percentage obligations for 2019, the nation's overall supply of renewable fuel would not meet the total volume requirements set by the EPA. This undermines Congressional intent to increase the consumption of renewable fuels in the domestic transportation fuel supply. Biofuels groups have argued the EPA must therefore adjust its percentage standard calculations to make up for past retroactive waivers and adjust the standards to account for any waivers it reasonably expects to grant in the future.

In a supplemental rulemaking to the 2020 RVO rule, the EPA changed their approach, and for the first time are accounting for the gallons they anticipate they will be waiving from the blending requirements due to small refinery exemptions. To accomplish this, they are adding in the trailing three year average of gallons the Department of Energy recommended be waived, in effect raising the blending volumes across the board in anticipation of waiving the obligations in whole or in part for certain refineries that qualify for the exemptions. Though the EPA has often disregarded the recommendations of the Department of Energy in years past, they stated in the rule their intent to adhere to these recommendations going forward, including granting partial waivers rather than an all or nothing approach. The EPA will be adjudicating the 2020 compliance year small refinery exemption applications in early 2021, but have indicated they will adhere to Department of Energy recommendations for the 2019 compliance year applications as well, which should be adjudicated in early 2020.

Flexible-fuel vehicles (FFVs), which are designed to run on a mixture of fuels, including higher blends of ethanol such as E85, receive preferential treatment to meet corporate average fuel economy (CAFE) standards in the form of CAFE credits. There are approximately 21 million FFVs on the road in the U.S. today, 16 million of which are light duty trucks. FFV credits have been decreasing since 2014 and will be completely phased out in 2020. Absent CAFE preferences, auto manufacturers may not be willing to build flexible-fuel vehicles, which has the potential to slow the growth of E85 markets.

To the extent federal or state laws or regulations are modified and/or enacted, it may result in the demand for ethanol being reduced, which could negatively and materially affect our financial performance.

Future demand for ethanol is uncertain and changes in public perception, consumer acceptance and overall consumer demand for transportation fuel could affect demand.

While many trade groups, academics and government agencies support ethanol as a fuel additive that promotes a cleaner environment, others claim ethanol production consumes considerably more energy, emits more greenhouse gases than other fuels and depletes water resources. While we do not agree, some studies suggest ethanol produced from corn is less efficient than ethanol produced from switch grass or wheat grain. Others claim corn-based ethanol negatively impacts consumers by causing the prices of dairy, meat and other food derived from corn-consuming livestock to increase. Ethanol critics also contend the industry redirects corn supplies from international food markets to domestic fuel markets, and contributes to land use change domestically and abroad.

There are limited markets for ethanol beyond the federal mandates. We believe further consumer acceptance of E15 and E85 fuels may be necessary before ethanol can achieve significant market share growth. Discretionary and E85 blending are important secondary markets. Discretionary blending is often determined by the price of ethanol relative to gasoline, and availability to consumers. When discretionary blending is financially unattractive, the demand for ethanol may be reduced.

Demand for ethanol is also affected by overall demand for transportation fuel, which is affected by cost, number of miles traveled and vehicle fuel economy. Miles traveled typically increases during the spring and summer months related to vacation travel, followed closely behind the fall season due to holiday travel. Consumer demand for gasoline may be impacted by emerging transportation trends, such as electric vehicles or ride sharing. Additionally, factors such as over-supply of ethanol, which has been the case in both 2019 and 2018, could negatively impact our business. Reduced demand

for ethanol may depress the value of our products, erode margins, and reduce our ability to generate revenue or operate profitably.

Our business is directly affected by the supply and demand for ethanol and other fuels in the markets served by our assets. Miles traveled typically increases during the spring and summer months related to vacation travel, followed closely behind the fall season due to holiday travel. Additionally, reduced demand for ethanol may erode our margins and reduce our ability to generate revenue and operate profitably.

In the past, we have had operating losses and could incur future operating losses.

In the last four years, we incurred operating losses during certain quarters and could incur operating losses in the future that are substantial. Although we have had periods of sustained profitability, we may not be able to maintain or increase profitability on a quarterly or annual basis, which could impact the market price of our common stock and the value of your investment.

Participating in a JV which owns cattle feeding operations involves numerous external factors that are outside of our control.

Our cattle feeding joint venture involves numerous risks that could lead to increased costs or decreased demand for beef products, which could have an adverse effect on our results of operations and financial condition, including:

- constantly changing and potentially volatile supply and demand, which affect the cost of feeder cattle and feed ingredients and the sales price of our cattle;
- profitability is dependent on managing the spread between the price of feeder cattle the JV purchases and live cattle the JV sells;
- risk management and commodity trading strategies implemented by the cattle JV could be ineffective and expose us to decreased liquidity;
- outbreak of disease in the cattle JV's cattle feeding operations or others, or public perception that an outbreak has occurred, which could lead to inadequate supply, reduced consumer confidence in the safety and quality of beef products, adverse publicity, cancellation of orders and import or export restrictions;
- liabilities in excess of the cattle JV's insurance policy limits or related uninsurable risks if outbreaks of disease or other conditions result in significant losses;
- extended periods of bad weather, including the combination of cold temperatures and precipitation, as well as blizzards or tornados;
- diminished access to international markets, including import trade restrictions due to disease or other perceived health or food safety issues, or changes in political or economic conditions;
- business disruptions due to unforeseen operational failures or factors outside of the JV's control could impact its ability to fulfill contractual obligations.
- reduced red meat consumption due to dietary changes or other issues, leading to depressed cattle prices;
- the closure or extended shutdown of a major cattle packing plant, leading to depressed cattle prices;
- increased water costs due to water use restrictions, including those related to diminishing water table levels;
- operational restrictions resulting from government regulations; and
- risks relating to environmental hazards.

If the United States were to withdraw from or materially modify certain international trade agreements, our business, financial condition and results of operations could be materially adversely affected.

Ethanol and other products that we produce are or have been exported to Canada, Mexico, Brazil, China and other countries. The current administration has expressed antipathy towards certain existing international trade agreements and has significantly increased tariffs on goods imported into the United States, which in turn has led to retaliatory actions on U.S. exports. The current trade situation, the outcome of trade negotiations or lack thereof, has had and/or may continue to have a material effect on our business, financial condition and results of operations.

Our debt exposes us to numerous risks that could have significant consequences to our shareholders.

Risks related to the level of debt we have include:

- requiring a sizeable portion of cash to be dedicated for debt service, reducing the availability of cash flow for working capital, capital expenditures, and other general business activities and limiting our ability to invest in new growth opportunities;
- limiting our ability to obtain additional financing for working capital, capital expenditures, acquisitions and other activities;
- limiting our flexibility to plan for or react to changes in the businesses and industries in which we operate;
- increasing our vulnerability to general and industry-specific adverse economic conditions;
- being at a competitive disadvantage against less leveraged competitors; and
- being vulnerable to increases in prevailing interest rates.

Most of our debt bears interest at variable rates, which creates exposure to interest rate risk. If interest rates increase, our debt service obligations at variable rates would increase even though the amount borrowed remained the same, decreasing net income.

Our ability to make scheduled payments on or to refinance our debt obligations and to fund our planned capital expenditures, acquisitions and other ongoing liquidity needs depends on our financial condition and operating performance, which are subject to prevailing economic and competitive conditions as well as certain financial, business and other factors which are beyond our control. There can be no assurance that we will maintain a level of cash flow from operating activities in an amount sufficient to permit us to pay the principal, premium, if any, and interest on our indebtedness. If our cash flow and capital resources are insufficient to fund our debt service obligations, we may be forced to reduce or delay investments and capital expenditures, or to seek additional capital or restructure our indebtedness. These alternative measures may not be successful and may not permit us to meet our scheduled debt service obligations. In the absence of such operating results and resources, we could face substantial liquidity problems and might be required to dispose of material assets or operations to meet our debt service and other obligations.

We are required to comply with a number of covenants under our existing loan agreements that could hinder our growth.

We are required to maintain specified financial ratios, including minimum cash flow coverage, working capital and tangible net worth under certain loan agreements. A breach of these covenants could result in default, and if such default is not cured or waived, our lenders could accelerate our debt and declare it immediately due and payable. If this occurs, we may not be able to repay or borrow sufficient funds to refinance the debt. Even if financing is available, it may not be on acceptable terms. No assurance can be given that our future operating results will be sufficient to comply with these covenants or remedy default.

In the past, we have received waivers from our lenders for failure to meet certain financial covenants and amended our loan agreements to change these covenants. In the event we are unable to comply with these covenants in the future, we cannot provide assurance that we will be able to obtain the necessary waivers or amend our loan agreements to prevent default. Under our convertible senior notes, default on any loan in excess of $10.0 million could result in the notes being declared due and payable, which would have a material and adverse effect on our ability to operate.

We operate in a capital intensive business and rely on cash generated from operations and external financing, which could be limited.

Increased commodity prices could increase liquidity requirements. Our operating cash flow is dependent on overall commodity market conditions as well as our ability to operate profitably. In addition, we may need to raise additional financing to fund growth. In some market environments, we may have limited access to incremental financing, which could defer or cancel growth projects, reduce business activity or cause us to default on our existing debt agreements if we are unable to meet our payment schedules. These events could have an adverse effect on our operations and financial position.

Our ability to repay current and anticipated future debt will depend on our financial and operating performance and successful implementation of our business strategies. Our financial and operational performance will depend on numerous factors including prevailing economic conditions, commodity prices, and financial, business and other factors beyond our control. If we cannot repay, refinance or extend our current debt at scheduled maturity dates, we could be forced to reduce or

delay capital expenditures, sell assets, restructure our debt or seek additional capital. If we are unable to restructure our debt or raise funds, our operations and growth plans could be harmed and the value of our stock could be significantly reduced.

Disruptions in the credit market could limit our access to capital.

We may need additional capital to fund our growth or other business activities in the future. The cost of capital under our existing or future financing arrangements could increase and affect our ability to trade with various commercial counterparties or cause our counterparties to require additional forms of credit support. If capital markets are disrupted, we may not be able to access capital at all or capital may only be available under less favorable terms.

We are required to continue to make payments to the partnership to the minimum volume commitment regardless of our production levels.

We are party to the storage and throughput agreement with our partnership, under which we are obligated to pay a minimum volume commitment regardless of whether or not we operate. We may not run our plants at volumes sufficient enough to cover the MVC resulting in payments being made to the partnership. In times of sustained negative margins, our volumes may be insufficient to recover these MVC payments in the following four quarters as outlined in the partnership agreement.

Our ability to maintain the required regulatory permits or manage changes in environmental, safety and TTB regulations is essential to successfully operating our plants.

Our plants are subject to extensive air, water, environmental and TTB regulations. Our production facilities involve the emission of various airborne pollutants, including particulate, carbon dioxide, nitrogen oxides, hazardous air pollutants and volatile organic compounds, which requires numerous environmental permits to operate our plants. Governing state agencies could impose costly conditions or restrictions that are detrimental to our profitability and have a material adverse effect on our operations, cash flows and financial position.

Environmental laws and regulations at the federal and state level are subject to change. These changes can also be made retroactively. It is possible that more stringent federal or state environmental rules or regulations could be adopted, which could increase our operating costs and expenses. Consequently, even though we currently have the proper permits, we may be required to invest or spend considerable resources in order to comply with future environmental regulations. Furthermore, ongoing plant operations, which are governed by the Occupational Safety and Health Administration, may change in a way that increases the cost of plant operations. Any of these events could have a material adverse effect on our operations, cash flows and financial position.

Part of our business is regulated by environmental laws and regulations governing the labeling, use, storage, discharge and disposal of hazardous materials. Since we handle and use hazardous substances, changes in environmental requirements or an unanticipated significant adverse environmental event could have a negative impact on our business. While we strive to comply with all environmental requirements, we cannot provide assurance that we have been in compliance at all times or will not incur material costs or liabilities in connection with these requirements. Private parties, including current and former employees, could bring personal injury or other claims against us due to the presence of hazardous substances. We are also exposed to residual risk by our land and facilities which may have environmental liabilities from prior use. Changes in environmental regulations may require us to modify existing plant and processing facilities, which could significantly increase our cost of operations.

TTB regulations apply when producing our undenatured ethanol. These regulations carry substantial penalties for non-compliance and therefore any non-compliance may adversely affect our financial operations or adversely impact our ability to produce undenatured ethanol.

Any inability to generate or obtain RINs could adversely affect our operating margins.

Nearly all of our ethanol production is sold with RINs that are used by our customers to comply with the RFS II. Should our production not meet the EPA's requirements for RIN generation in the future, we would need to purchase RINs in the open market or sell our ethanol at lower prices to compensate for the absence of RINs. The price of RINs depends on a variety of factors, including the availability of qualifying biofuels and RINs for purchase, production levels of transportation fuel and percentage mix of ethanol with other fuels, and cannot be predicted. Failure to obtain sufficient RINs or reliance on invalid RINs could subject us to fines and penalties imposed by the EPA which could adversely affect our results of operations, cash flows and financial condition.

As we trade ethanol acquired from third-parties, should it be discovered the RINs associated with the ethanol we purchased are invalid, albeit unknowingly, we could be subject to substantial penalties if we are assessed the maximum amount allowed by law. Prior to 2013, the EPA assessed only modest penalties for RIN violations. However, based on EPA penalties assessed on RINS violations in the past few years, in the event of a violation, the EPA could assess penalties, which could have an adverse impact on our profitability.

Compliance with evolving environmental, health and safety laws and regulations, particularly those related to climate change, could be costly.

Our plants emit carbon dioxide as a by-product of ethanol production. In February 2010, the EPA released its final regulations on RFS II, grandfathering our plants at their current authorized capacity. While some of our plants have received efficient producer status and no longer rely on grandfathered status, for those still reliant upon it, expansion above these levels will require a 20% reduction in greenhouse gas emissions from the 2005 baseline measurement. Separately, CARB adopted a LCFS that took effect in January 2013, which requires a 10% reduction in the average carbon intensity of gasoline and diesel transportation fuels from 2010 to 2020. An ILUC component is included in the greenhouse gas emission calculation, which may have an adverse impact on the market for corn-based ethanol in California.

To expand our production capacity, federal and state regulations may require us to obtain additional permits, achieve EPA's efficient producer status under the pathway petition program, install advanced technology or reduce drying distillers grains. Compliance with future laws or regulations to decrease carbon dioxide could be costly and may prevent us from operating our plants as profitably, which may have an adverse impact on our operations, cash flows and financial position.

We may fail to realize the anticipated benefits of mergers, acquisitions, joint ventures or partnerships.

We have increased the size and diversity of our operations through mergers and acquisitions and intend to continue exploring potential growth opportunities. Acquisitions involve numerous risks that could harm our business, including:

- difficulties integrating the operations, technologies, products, existing contracts, accounting processes and personnel and realizing anticipated synergies of the combined business;
- risks relating to environmental hazards on purchased sites;
- risks relating to developing the necessary infrastructure for facilities or acquired sites, including access to rail networks;
- difficulties supporting and transitioning customers;
- diversion of financial and management resources from existing operations;
- the purchase price exceeding the value realized;
- risks of entering new markets or areas outside of our core competencies;
- potential loss of key employees, customers and strategic alliances from our existing or acquired business;
- unanticipated problems or underlying liabilities; and
- inability to generate sufficient revenue to offset acquisition and development costs.

The anticipated benefits of these transactions may not be fully realized or take longer to realize than expected.

We may also pursue growth through joint ventures or partnerships, which typically involve restrictions on actions that the partnership or joint venture may take without the approval of the partners. These provisions could limit our ability to manage the partnership or joint venture in a manner that serves our best interests.

Future acquisitions may involve issuing equity as payment or to finance the business or assets, which could dilute your ownership interest. Furthermore, additional debt may be necessary to complete these transactions, which could have a material adverse effect on our financial condition. Failure to adequately address the risks associated with acquisitions or joint ventures could have a material adverse effect on our business, results of operations and financial condition.

We may be affected by our portfolio optimization and total transformation strategies.

In May 2018, we announced that we were evaluating the performance of our entire portfolio of assets and businesses. As part of that process, during the fourth quarter of 2018, we sold three ethanol plants, permanently closed one ethanol plant and sold Fleischmann's Vinegar. As we continue to evaluate our portfolio, we may sell additional assets or businesses or exit

particular markets that are no longer a strategic fit or no longer meet their growth or profitability targets. Depending on the nature of the assets sold, our profitability may be impacted by lost operating income or cash flows from such businesses. In addition, divestitures we complete may not yield the targeted improvements in our business and may divert management's attention from our day-to-day operations. We are also undergoing a number of project initiatives to improve margins, including the Project 24 initiative and increased investment into high protein animal feed products, as part of our total transformation strategy. Our failure to achieve the intended financial results associated with our portfolio optimization and total transformation strategies could have an adverse effect on our business, financial condition or results of operations.

Future events could result in impairment of long-lived assets, which may result in charges that adversely affect our results of operations.

Long-lived assets, including property, plant and equipment, intangible assets, goodwill and equity method investments, are evaluated for impairment annually or whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Our impairment evaluations are sensitive to changes in key assumptions used in our analysis and may require use of financial estimates of future cash flows. Application of alternative assumptions could produce significantly different results. We may be required to recognize impairments of long-lived assets based on future economic factors such as unfavorable changes in estimated future undiscounted cash flows of an asset group.

Global competition could affect our profitability.

We compete with producers in the United States and abroad. Depending on feedstock, labor and other production costs, producers in other countries, such as Brazil, may be able to produce ethanol cheaper than we can. Under RFS II, certain parties are obligated to meet an advanced biofuel standard. In recent years, sugarcane ethanol imported from Brazil has been one of the most economical means for obligated parties to meet this standard. While transportation costs, infrastructure constraints and demand may temper the impact of ethanol imports, foreign competition remains a risk to our business. Moreover, significant additional foreign ethanol production could create excess supply, which could result in lower ethanol prices throughout the world, including the United States. Any penetration of ethanol imports into the domestic market may have a material adverse effect on our operations, cash flows and financial position.

International activities such as boycotts, embargoes, product rejection, trade policies and compliance matters, may have an adverse effect on our results of operations.

Government actions abroad can have a significant impact on our business. In 2019, we exported 25% of our ethanol production. In 2013, the EU imposed a five-year tariff of $83.33 per metric ton on U.S. ethanol to discourage foreign competition. Effective January 1, 2017, China indicated its intention to raise its 5% tariff on U.S. and Brazil fuel ethanol to 30%. On April 1, 2018, China raised their tariff rate to 45%, and later raised it further to 70% in the tit for tat trade war. On December 1, 2018, following a meeting between Chinese President Xi and U.S. President Trump, the two countries announced they would be discussing a possible trade agreement over the next 90 days. Progress on, or success of these talks could lead to these ethanol tariffs being reduced or eliminated.

Although the ethanol export markets are affected by competition from other ethanol exporters, particularly Brazil, and in spite of the actions by China, we believe exports will remain active going forward. On September 1, 2017, Brazil's Chamber of Foreign Trade, or CAMEX, issued an official written resolution, imposing a 20% tariff on U.S. ethanol imports in excess of 150 million liters, or 39.6 million gallons per quarter. The ruling is valid for two years.

In January 2016, China's Ministry of Commerce initiated an anti-dumping investigation into U.S.-produced dried distillers grains exported to China. In January of 2017, the Ministry of Commerce of China announced it increased anti-dumping duties on U.S. distillers grains, ranging from 42.2% to 53.7%.

With more tariffs and reduced exports, the value of our products may be affected, which could have a negative impact on our profitability. Additionally, tariffs on U.S. ethanol may lead to further industry over-supply and reduce our profitability. Moreover, the America First trade position has caused more countries to toughen their positions on U.S. imports.

Increased ethanol industry penetration by oil and other multinational companies could impact our margins.

We operate in a very competitive environment and compete with other domestic ethanol producers in a relatively fragmented industry. The top five producers account for approximately 42% of the domestic production capacity with production capacity ranging from 800 mmgy to 1,700 mmgy. The remaining ethanol producers consist of smaller entities engaged exclusively in ethanol production and large integrated grain companies that produce ethanol in addition to their base grain businesses. We compete for capital, labor, corn and other resources with these companies.

Until recently, oil companies, petrochemical refiners and gasoline retailers were not engaged in ethanol production even though they form the primary distribution network for ethanol blended with gasoline. Over the past decade, several oil refiners have acquired ethanol production plants, and now account for almost 1/5 of domestic ethanol production. If these companies increase their ethanol plant ownership or additional companies commence production, the need to purchase ethanol from independent producers like us could diminish and adversely effect on our operations, cash flows and financial position.

Our agribusiness operations are subject to significant government regulations.

Our agribusiness operations are regulated by various government entities that can impose significant costs on our business. Failure to comply could result in additional expenditures, fines or criminal action. Our production levels, markets and grains we merchandise are affected by federal government programs, which include USDA acreage control and price support programs. Government policies such as tariffs, duties, subsidies, import and export restrictions and embargos can also impact our business. Changes in government policies and producer support could impact the type and amount of grains planted, which could affect our ability to buy grain. Export restrictions or tariffs could limit sales opportunities outside of the United States.

Commodities futures trading is subject to extensive regulations.

The futures industry is subject to extensive regulation. Since we use exchange-traded futures contracts as part of our business, we are required to comply with a wide range of requirements imposed by the CFTC, National Futures Association and the exchanges on which we trade. These regulatory bodies are responsible for safeguarding the integrity of the futures markets and protecting the interests of market participants. As a market participant, we are subject to regulation concerning trade practices, business conduct, reporting, position limits, record retention, the conduct of our officers and employees, and other matters.

Failure to comply with the laws, rules or regulations applicable to futures trading could have adverse consequences. Such claims could result in fines, settlements or suspended trading privileges, which could have a material adverse impact on our business, financial condition or operating results.

Our success depends on our ability to manage our growing and changing operations.

Since our formation in 2004, our business has grown significantly in size, products and complexity. This growth places substantial demands on our management, systems, internal controls, and financial and physical resources. If we acquire additional operations, we may need to further develop our financial and managerial controls and reporting systems, and could incur expenses related to hiring additional qualified personnel and expanding our information technology infrastructure. Our ability to manage growth effectively could impact our results of operations, financial position and cash flows.

Replacement technologies could make corn-based ethanol or our process technology obsolete.

Ethanol is used primarily as an octane additive and oxygenate blended with gasoline. Critics of ethanol blends argue that it decreases fuel economy, causes corrosion and damages fuel pumps. Prior to federal restrictions and ethanol mandates, methyl tertiary-butyl ether, or MTBE, was the leading oxygenate. Other oxygenate products could enter the market and prove to be environmentally or economically superior to ethanol. Alternative biofuel alcohols, such as methanol and butanol, could evolve and replace ethanol.

Research is currently underway to develop products and processes that have advantages over ethanol, such as: lower vapor pressure, making it easier to add to gasoline; similar energy content as gasoline, reducing any decrease in fuel economy caused by blending with gasoline; ability to blend at higher concentration levels in standard vehicles; and reduced susceptibility to separation when water is present. Products offering a competitive advantage over ethanol could reduce our ability to generate revenue and profits from ethanol production.

New ethanol process technologies could emerge that require less energy per gallon to produce and result in lower production costs. Our process technologies could become obsolete and place us at a competitive disadvantage, which could have a material adverse effect on our operations, cash flows and financial position.

We may be required to provide remedies for ethanol, distillers grains or corn oil that does not meet the specifications defined in our sales contracts.

If we produce or purchase ethanol, distillers grains or corn oil that does not meet the specifications defined in our sales contracts, we may be subject to quality claims. We could be required to refund the purchase price of any non-conforming

product or replace the non-conforming product at our expense. Ethanol, distillers grains or corn oil that we purchase or market and subsequently sell to others could result in similar claims if the product does not meet applicable contract specifications, which could have an adverse impact on our profitability.

Business disruptions due to unforeseen operational failures or factors outside of our control could impact our ability to fulfill contractual obligations.

Natural disasters, significant track damage resulting from a train derailment or strikes by our transportation providers could delay shipments of raw materials to our plants or deliveries of ethanol, distillers grains, and corn oil to our customers. If we are unable to meet customer demand or contract delivery requirements due to stalled operations caused by business disruptions, we could potentially lose customers.

Adverse weather conditions, such as inadequate or excessive amounts of rain during the growing season, overly wet conditions, an early freeze or snowy weather during harvest could impact the supply of corn that is needed to produce ethanol. Corn stored in an open pile may be damaged by rain or warm weather before the corn is dried, shipped or moved into a storage structure.

Our ethanol-related assets may be at greater risk of terrorist attacks, threats of war or actual war, than other possible targets.

Terrorist attacks in the United States, including threats of war or actual war, may adversely affect our operations. A direct attack on our ethanol production plants, or our partnership's storage facilities, fuel terminals and railcars could have a material adverse effect on our financial condition, results of operations and cash flows. Furthermore, a terrorist attack could have an adverse impact on ethanol prices. Disruption or significant increases in ethanol prices could result in government-imposed price controls.

Our network infrastructure, enterprise applications and internal technology systems could be damaged or otherwise fail and disrupt business activities.

Our network infrastructure, enterprise applications and internal technology systems are instrumental to the day-to-day operations of our business. Numerous factors outside of our control, including earthquakes, floods, lightning, tornados, fire, power loss, telecommunication failures, computer viruses, physical or electronic vandalism or similar disruptions could result in system failures, interruptions or loss of critical data and prevent us from fulfilling customer orders. We cannot provide assurance that our backup systems are sufficient to mitigate hardware or software failures, which could result in business disruptions that negatively impact our operating results and damage our reputation.

We could be adversely affected by cyber-attacks, data security breaches and significant information technology systems interruptions.

We rely on network infrastructure and enterprise applications, and internal technology systems for operational, marketing support and sales, and product development activities. The hardware and software systems related to such activities are subject to damage from earthquakes, floods, lightning, tornados, fire, power loss, telecommunication failures, cyber-attacks and other similar events. They are also subject to acts such as computer viruses, physical or electronic vandalism or other similar disruptions that could cause system interruptions and loss of critical data, and could prevent us from fulfilling customers' orders. Cybersecurity threats and incidents can range from uncoordinated individual attempts to gain unauthorized access to information technology networks and systems to more sophisticated and targeted measures, known as advanced persistent threats, directed at the company, its products, its customers and/or its third-party service providers. Despite the implementation of cybersecurity measures (including access controls, data encryption, vulnerability assessments, employee training, continuous monitoring, and maintenance of backup and protective systems), the company's information technology systems may still be vulnerable to cybersecurity threats and other electronic security breaches. While we have taken reasonable efforts to protect ourselves, and to date, we have not experienced any material breaches or material losses related to cyber-attacks, we cannot assure our shareholders that any of our security measures would be sufficient in the future. Any event that causes failures or interruption in such hardware or software systems could result in disruption of our business operations, have a negative impact on our operating results, and damage our reputation, which could negatively affect our financial condition, results of operation, cash flows.

We may not be able to hire and retain qualified personnel to operate our facilities.

Our success depends, in part, on our ability to attract and retain competent employees. Qualified managers, engineers, merchandisers and other personnel must be hired for each of our locations. If we are unable to hire and retain productive, skilled personnel, we may not be able to maximize production, optimize plant operations or execute our business strategy.

Compliance with and changes in tax laws could adversely affect our performance.

We are subject to extensive tax liabilities imposed by multiple jurisdictions, including income taxes, indirect taxes (excise/duty, sales/use, gross receipts, and value-added taxes), payroll taxes, franchise taxes, withholding taxes, and ad valorem taxes. New tax laws and regulations and changes in existing tax laws and regulations are continuously being enacted or proposed that could result in increased expenditures for tax liabilities in the future. Many of these liabilities are subject to periodic audits by the respective taxing authority. Subsequent changes to our tax liabilities as a result of these audits may subject us to interest and penalties.

Federal, state and local jurisdictions may challenge our tax return positions.

The positions taken in our federal and state tax return filings require significant judgments, use of estimates and the interpretation and application of complex tax laws. Significant judgment is also required in assessing the timing and amounts of deductible and taxable items. Despite management's belief that our tax return positions are fully supportable, certain positions may be successfully challenged by federal, state and local jurisdictions.

There have been substantial changes to the Internal Revenue Code, some of which could have an adverse effect on our shareholders.

The Tax Cuts and Jobs Act enacted on December 22, 2017 and effective January 1, 2018 made significant changes to the Internal Revenue Code. The U.S. Department of Treasury has broad authority to issue regulations and interpretative guidance that may significantly impact how we will apply the law and impact our results of operations in the period issued.

Financial performance of our equity method investments are subject to risks beyond our control and can vary substantially from period to period.

The company invests in certain limited liability companies, which are accounted for using the equity method of accounting. This means that the company's share of net income or loss in the investee increases or decreases, as applicable, the carrying value of the investment. By operating a business through this arrangement, we do not have control over operating decisions as we would if we owned the business outright. Specifically, we cannot act on major business initiatives without the consent of the other investors.

The company recognizes these investments as a separate line item in the consolidated balance sheets its proportionate share of earnings on a separate line item in the consolidated statements of operations. As a result, the amount of net investment income recognized from these investments can vary substantially from period to period. Any losses experienced by these entities could adversely impact our results of operations and the value of our investment.

We are exposed to credit risk that could result in losses or affect our ability to make payments should a counterparty fail to perform according to the terms of our agreement.

We are exposed to credit risk from a variety of customers, including major integrated oil companies, large independent refiners, petroleum wholesalers and other ethanol plants. We are also exposed to credit risk with major suppliers of petroleum products and agricultural inputs when we make payments for undelivered inventories. Our fixed-price forward contracts are subject to credit risk when prices change significantly prior to delivery. The inability by a third party to pay us for our sales, provide product that was paid for in advance or deliver on a fixed-price contract could result in a loss and adversely impact our liquidity and ability to make our own payments when due.

The interest rates under our revolving credit facility may be impacted by the phase-out of LIBOR.

LIBOR is the basic rate of interest widely used as a reference for setting the interest rates on loans globally. We use LIBOR as a reference rate for our revolving credit facilities. In 2017, the United Kingdom's Financial Conduct Authority, which regulates LIBOR, announced that it intends to phase out LIBOR by the end of 2021. It is unclear if LIBOR will cease to exist at that time or if new methods of calculating LIBOR will be established such that it continues to exist after 2021. The U.S. Federal Reserve, in conjunction with the Alternative Reference Rates Committee, a steering committee comprised of large U.S. financial institutions, is considering replacing U.S. dollar LIBOR with a new index, the Secured Overnight Financing Rate ("SOFR"), calculated using short-term repurchase agreements backed by Treasury securities. We are evaluating the potential impact of the eventual replacement of the LIBOR benchmark interest rate, however, we are not able to predict whether LIBOR will cease to be available after 2021, whether SOFR will become a widely accepted benchmark in place of LIBOR, or what the impact of such a possible transition to SOFR may be on our business, financial condition, and results of operations.

We have limitations, as a holding company, in our ability to receive distributions from a small number of our subsidiaries.

We conduct most of our operations through our subsidiaries and rely on dividends or intercompany transfers of funds to generate free cash flow. Some of our subsidiaries are currently, or are expected to be, limited in their ability to pay dividends or make distributions under the terms of their financing agreements. Consequently, we cannot fully rely on the cash flow from one subsidiary to satisfy the loan obligations of another subsidiary. As a result, if a subsidiary is unable to satisfy its loan obligations, we may not be able to prevent default by providing additional cash to that subsidiary, even if sufficient cash exists elsewhere within our organization.

Increased federal support of cellulosic ethanol could result in increased competition to corn-based ethanol producers.

Legislation, including the American Recovery and Reinvestment Act of 2009 and EISA, provides numerous funding opportunities supporting cellulosic ethanol production. In addition, RFS II mandates an increasing level of biofuel production that is not derived from corn, though this will be amended lower by the EPA in the reset rulemaking. Federal policies suggest a long-term political preference for cellulosic processing using feedstocks such as switch grass, silage, wood chips or other forms of biomass. Cellulosic ethanol is viewed more favorably since the feedstock is not diverted from food production and has a smaller carbon footprint. Several cellulosic ethanol plants are currently under development. While these have had limited success to date, as research and development programs persist, there is risk that cellulosic ethanol could displace corn ethanol.

Any changes in federal mandates from corn-based to cellulosic-based ethanol production may reduce our profitability. Our plants are designed as single-feedstock facilities and would require significant additional investments to convert production to cellulosic ethanol. Furthermore, our plants are strategically located in high-yield, low-cost corn production areas. At present, there is limited supply of alternative feedstocks near our facilities. As a result, the adoption of cellulosic ethanol and its use as the preferred form of ethanol could have a significant adverse impact on our business.

Environmental, social and corporate governance matters and uncertainty regarding regulation of such matters may increase our operating costs, impact our capital markets and potentially reduce the value of our products and assets.

The issue of global climate change continues to attract considerable public and scientific attention with widespread concern about the impacts of human activity, especially the emissions of greenhouse gases such as carbon dioxide and methane. While climate change legislation in the U.S. is unlikely in the next several years, numerous proposals have been made and are likely to continue to be made at the international, national, regional and state levels of government that are intended to limit emissions of greenhouse gases. Several states have already adopted measures requiring reduction of greenhouse gases within state boundaries. Other states have elected to participate in voluntary regional cap-and-trade programs. While we believe our products are low carbon and result in a reduction of greenhouse gas emissions compared to alternatives, any significant legislative changes at the international, national, state or local levels could significantly affect our ability to produce and sell our products, could increase the cost of the production and sale of our products and could materially reduce the value of our products.

Apart from governmental regulation, some investment banks based both domestically and internationally have announced that they have adopted environmental, social and corporate governance guidelines (ESG). There have also been efforts in recent years affecting the investment community, including investment advisers, sovereign wealth funds, public pension funds, universities and other groups, promoting the divestment of fossil fuel equities, and encouraging the consideration of ESG practices of companies in a manner that could negatively affect us. The impact of such efforts may adversely affect the demand for and price of securities issued by us, and impact our access to the capital and financial markets.

Further, it is believed by some that climate change itself may cause more extreme weather conditions such as more intense hurricanes, thunderstorms, tornadoes and snow or ice storms, as well as rising sea levels and increased volatility in seasonal temperatures. Extreme weather conditions can interfere with our operations and increase our costs, and damage resulting from extreme weather may not be fully insured. However, at this time, we are unable to determine the extent to which any potential climate change may lead to increased weather hazards affecting our operations.

We may not have adequate insurance to cover losses from certain events.

Losses related to risks that are not covered by insurance or available under acceptable terms such as war, riots or terrorism could have a material adverse effect on our operations, cash flows and financial position.

Certain of our ethanol production plants, and fuel terminals are located within recognized seismic and flood zones. We modified our facilities to comply with regional structural requirements for those regions of the country and obtained

additional insurance coverage specific to earthquake and flood risks for the applicable plants and fuel terminals. We cannot provide assurance that these facilities would remain in operation should a seismic or flood event occur, which would adversely affect our operations.

Risks Related to the Partnership

We depend on the partnership to provide fuel storage and transportation services.

The partnership's operations are subject to all of the risks and hazards inherent in the storage and transportation of fuel, including: damages to storage facilities, railcars and surrounding properties caused by floods, fires, severe weather, explosions, natural disasters or acts of terrorism; mechanical or structural failures at the partnership's facilities or at third-party facilities at which its operations are dependent; curtailments of operations relative to severe weather; and other hazards, resulting in severe damage or destruction of the partnership's assets or temporary or permanent shut-down of the partnership's facilities. If the partnership is unable to serve our storage and transportation needs, our ability to operate our business could be adversely impacted, which could adversely affect our financial condition and results of operations. The inability of the partnership to continue operations, for any reason, could also impact the value of our investment in the partnership and, because the partnership is a consolidated entity, our business, financial condition and results of operations.

The partnership's revolving credit facility includes restrictions that may limit its ability to finance future operations, meet its capital needs or expand its business. In addition, the partnership's revolving credit facility matures on July 1, 2020 and the partnership may not be able to renew, extend or replace the expiring facility with similar terms. If the partnership fails to comply with covenants in its revolving credit facility or if the facility is terminated, the partnership may be required to repay its indebtedness thereunder, which may have an adverse effect on the partnership's liquidity.

The partnership is dependent upon the earnings and cash flow generated by its operations in order to meet its debt service obligations and to allow the partnership to pay cash distributions to our unitholders. The operating and financial restrictions and covenants in the partnership's revolving credit facility or in any future financing agreements could restrict its ability to finance future operations or capital needs or to expand or pursue its business activities, which may, in turn, limit its ability to pay cash distributions to unitholders. For example, the partnership's revolving credit facility restricts its ability to, among other things:

- make certain cash distributions;
- incur certain indebtedness;
- create certain liens;
- make certain investments;
- merge or sell certain of our assets; and
- expand the nature of our business.

Furthermore, the partnership's revolving credit facility contains covenants requiring it to maintain certain financial ratios.

The provisions of the partnership's revolving credit facility may affect its ability to obtain future financing and pursue attractive business opportunities and its flexibility in planning for, and reacting to, changes in business conditions. In addition, a failure to comply with the provisions of the partnership's revolving credit facility could result in an event of default that could enable the partnership's lenders, subject to the terms and conditions of the partnership's revolving credit facility, to declare the outstanding principal of that debt, together with accrued interest, to be immediately due and payable and/or to proceed against the collateral granted to them to secure such debt. If there is a default or event of default, the payment of the partnership's debt is accelerated, defaults under its other debt instruments, if any, may be triggered, and its assets may be insufficient to repay such debt in full. Therefore, the holders of our units could experience a partial or total loss of their investment.

The revolving credit facility will mature on July 1, 2020. The partnership intends to renew and extend the revolving credit facility with similar terms prior to its maturity. Adverse changes in market conditions could make the renewal of the revolving credit facility more difficult or could result in an increase in the cost to renew.

The partnership may not have sufficient available cash to pay quarterly distributions on its units.

The amount of cash the partnership can distribute depends on how much cash is generated from operations, which can fluctuate from quarter to quarter based on ethanol and other fuel volumes, handling fees, payments associated with minimum

volume commitments, timely payments by subsidiaries and other third parties, and prevailing economic conditions. The amount of cash available for distribution also depends on the partnership's operating and general and administrative expenses, capital expenditures, acquisitions and organic growth projects, debt service requirements, working capital needs, ability to borrow funds and access capital markets, revolving credit facility restrictions, cash reserves and other risks affecting cash levels. Increasing the partnership's borrowings or other debt to finance its growth strategy could increase interest expense, which could impact the amount of cash available for distributions.

There are no limitations in the partnership agreement regarding its ability to issue additional units. Should the partnership issue additional units in connection with an acquisition or expansion, the distributions on the incremental units will increase the risk that the partnership will be unable to maintain or increase distributions on a per unit basis.

Increases in interest rates could adversely impact the partnership's unit price, ability to issue equity or incur debt, and pay cash distributions at intended levels.

The partnership's cash distributions and implied distribution yield affect its unit price. Distributions are often used by investors to compare and rank yield-oriented securities when making investment decisions. A rising interest rate environment could have an adverse impact on the partnership's unit price, ability to issue equity or incur debt or pay cash distributions at intended levels, which could adversely impact the value of our investment in the partnership.

We may be required to pay taxes on our share of the partnership's income that are greater than the cash distributions we receive from the partnership.

The unitholders of the partnership generally include, for purposes of calculating their U.S. federal, state and local income taxes, their share of the partnership's taxable income, whether they have received cash distributions from the partnership. We ultimately may not receive cash distributions from the partnership equal to our share of taxable income or the taxes that are due with respect to that income, which could negatively impact our liquidity.

A majority of the executive officers and directors of the partnership are also officers of our company, which could result in conflicts of interest.

We indirectly own and control the partnership and appoint all of its officers and directors. A majority of the executive officers and directors of the partnership are also officers or directors of our company. Although our directors and officers have a fiduciary responsibility to manage the company in a manner that is beneficial to us, as directors and officers of the partnership, they also have certain duties to the partnership and its unitholders. Conflicts of interest may arise between us and our affiliates, and the partnership and its unitholders, and in resolving these conflicts, the partnership may favor its own interests over the company's interests. In certain circumstances, the partnership may refer conflicts of interest or potential conflicts of interest to its conflicts committee, which must consist entirely of independent directors, for resolution. The conflicts committee must act in the best interests of the public unitholders of the partnership. As a result, the partnership may manage its business in a manner that differs from the best interests of the company or our stockholders, which could adversely affect our profitability.

Cash available for distributions could be reduced and likely cause a substantial reduction in unit value if the partnership became subject to entity-level taxation for federal income tax purposes.

The present federal income tax treatment of publicly traded partnerships or investments in its units could be modified, at any time, by administrative, legislative or judicial changes and interpretations. From time to time, members of Congress propose and consider substantive changes to the existing federal income tax laws that affect publicly traded partnerships. Should any legislative proposal eliminate the qualifying income exception, all publicly traded partnerships would be treated as corporations for federal income tax purposes. The partnership would be required to pay federal income tax on its taxable income at the corporate tax rate and likely state and local income taxes at varying rates as well. Distributions to unitholders would be taxed as corporate distributions. The partnership's cash available for distributions and the value of the units would be substantially reduced.

Risks Related to our Common Stock

The price of our common stock may be highly volatile and subject to factors beyond our control.

Some of the many factors that can influence the price of our common stock include:

- our results of operations and the performance of our competitors;
- public's reaction to our press releases, public announcements and filings with the SEC;

- changes in earnings estimates or recommendations by equity research analysts who follow us or other companies in our industry;
- changes in general economic conditions;
- changes in market prices for our products or raw materials and related substitutes;
- sales of common stock by our directors, executive officers and significant shareholders;
- actions by institutional investors trading in our stock;
- disruptions in our operations;
- changes in our management team;
- other developments affecting us, our industry or our competitors; and
- U.S. and international economic, legal and regulatory factors unrelated to our performance.

In recent years the stock market has experienced significant price and volume fluctuations, which are unrelated to the operating performance of any particular company. These broad market fluctuations could materially reduce the price of our common stock price based on factors that have little or nothing to do with our company or its performance.

Anti-takeover provisions could make it difficult for a third party to acquire us.

Our restated articles of incorporation, restated bylaws and Iowa's law contain anti-takeover provisions that could delay or prevent change in control of us or our management. These provisions discourage proxy contests, making it difficult for our shareholders to elect directors or take other corporate actions without the consent of our board of directors, which include:

- board members have three-year staggered terms;
- board members can only be removed for cause with an affirmative vote of no less than two-thirds of the outstanding shares;
- shareholder action can only be taken at a special or annual meeting, not by written consent except where required by Iowa law;
- shareholders are restricted from making proposals at shareholder meetings; and
- the board of directors can issue authorized or unissued shares of stock.

We are subject to the provisions of the Iowa Business Corporations Act, which prohibits combinations between an Iowa corporation whose stock is publicly traded or held by more than 2,000 shareholders and an interested shareholder for three years unless certain exemption requirements are met.

Provisions in the convertible notes could also make it more difficult or too expensive for a third party to acquire us. If a takeover constitutes a fundamental change, holders of the notes have the right to require us to repurchase their notes in cash. If a takeover constitutes a make-whole fundamental change, we may be required to increase the conversion rate for holders who convert their notes. In either case, the obligation under the notes could increase the acquisition cost and discourage a third party from acquiring us.

These items discourage transactions that could otherwise command a premium over prevailing market prices and may limit the price investors are willing to pay for our stock.

Non-U.S. shareholders may be subject to U.S. income tax on gains related to the sale of their common stock.

If we are a U.S. real property holding corporation during the shorter of the five-year period before the stock was sold or the period the stock was held by a non-U.S. shareholder, the non-U.S. shareholder could be subject to U.S federal income tax on gains related to the sale of their common stock. Whether we are a U.S. real property holding corporation depends on the fair market value of our U.S. real property interests relative to our other trade or business assets and non-U.S. real property interests. We cannot provide assurance that we are not a U.S. real property holding corporation or will not become one in the future.

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

We believe the property owned and leased at our locations is sufficient to accommodate our current needs, as well as potential expansion.

Corporate

We lease approximately 54,000 square feet of office space at 1811 Aksarben Drive in Omaha, Nebraska for our corporate headquarters, which houses our corporate administrative functions and commodity trading operations.

Ethanol Production Segment

We own approximately 2,150 acres of land and lease approximately 78 acres of land at and around our ethanol production facilities. As detailed in our discussion of the ethanol production segment in *Item 1 – Business*, our ethanol plants have the capacity to produce approximately 1.1 billion gallons of ethanol per year.

Agribusiness and Energy Services Segment

We own approximately 39 acres of land at our three grain elevators. As detailed in our discussion in *Item 1 – Business*, our agribusiness and energy services segment facilities include three grain elevators with combined grain storage capacity of approximately 7.6 million bushels, and grain storage capacity at our ethanol plants of approximately 35.9 million bushels.

Our marketing operations are conducted primarily at our corporate office, in Omaha, Nebraska.

Partnership Segment

Our partnership owns approximately five acres of land and leases approximately 18 acres of land at seven locations in six states, as disclosed in *Item 1 – Business*, where its fuel terminals are located and owns approximately 47 acres of land and leases approximately two acres of land where its storage facilities are located at our ethanol production facilities.

Item 3. Legal Proceedings.

We are currently involved in litigation that has occurred in the ordinary course of doing business. We do not believe this will have a material adverse effect on our financial position, results of operations or cash flows.

Item 4. Mine Safety Disclosures.

Not applicable.

PART II

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

Common Stock

Our common stock trades under the symbol "GPRE" on Nasdaq.

Holders of Record

We had 2,010 holders of record of our common stock, not including beneficial holders whose shares are held in names other than their own, on February 13, 2020. This figure does not include approximately 32.4 million shares held in depository trusts.

Dividend Policy

On June 18, 2019, the company announced that its board of directors decided to suspend its future quarterly cash dividend following the June 14, 2019 dividend payment, in order to retain and redirect cash flow to the company's Project 24 operating expense equalization plan, the deployment of high-protein technology and its stock repurchase program.

Issuer Purchases of Equity Securities

Employees surrender shares when restricted stock grants are vested to satisfy statutory minimum required payroll tax withholding obligations.

The following table lists the shares that were surrendered during the fourth quarter of 2019.

Month	Total Number of Shares Withheld	Average Price Paid per Share
October 1 - October 31	1,607	$ 12.14
November 1 - November 30	306	14.99
December 1 - December 31	13,187	14.75
Total	15,100	$ 14.48

On October 30, 2019, our board of directors authorized an additional $100.0 million share repurchase taking the previously authorized amount from $100.0 million to $200.0 million. Under this program, we may repurchase shares in open market transactions, privately negotiated transactions, accelerated buyback programs, tender offers or by other means. The timing and amount of the transactions are determined by management based on its evaluation of market conditions, share price, legal requirements and other factors. The program may be suspended, modified or discontinued at any time, without prior notice.

The following table lists the shares repurchased under the share repurchase program during the fourth quarter of 2019.

Month	Number of Shares Repurchased	Average Price Paid per Share	Total Number of Shares Repurchased as Part of Repurchase Program	Approximate Dollar Value of Shares that may yet be Repurchased under the Program (in thousands)
October 1 - October 31	536,724	$ 10.72	6,515,957	$ 118,643
November 1 - November 30	-	-	6,515,957	118,643
December 1 - December 31	-	-	6,515,957	118,643
Total	536,724	$ 10.72	6,515,957	$ 118,643

Since inception, the company has repurchased 6,515,957 shares of common stock for approximately $81.4 million under the program.

Recent Sales of Unregistered Securities

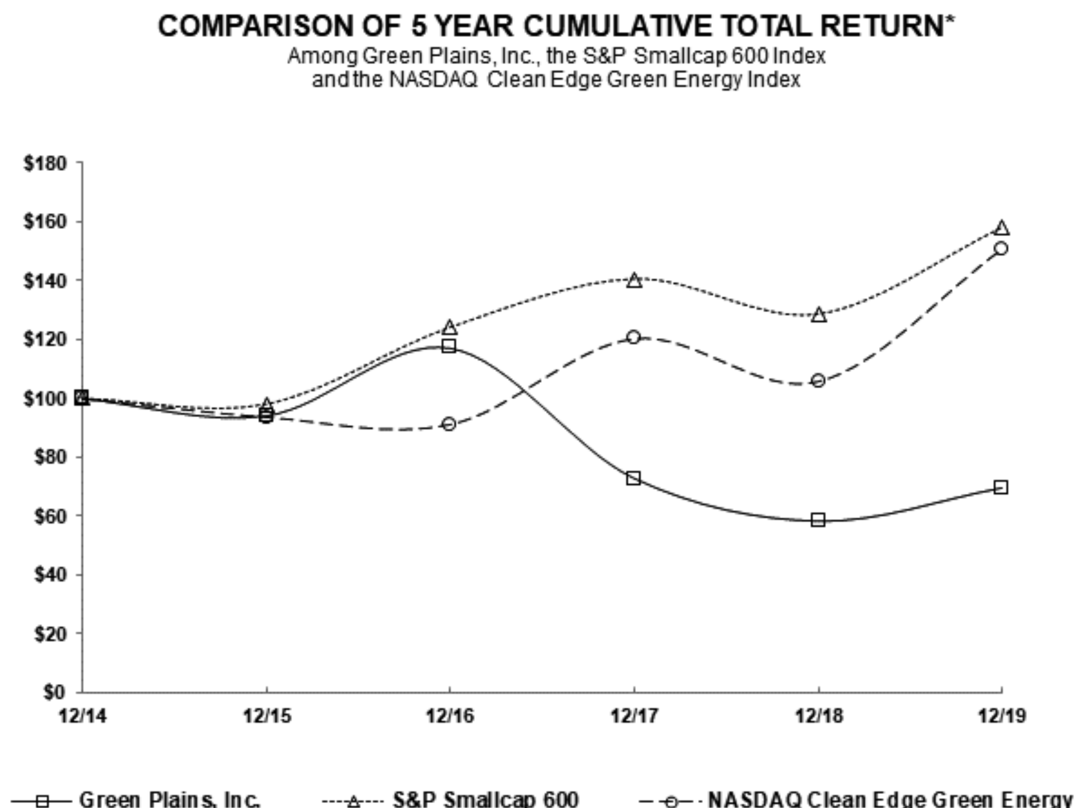
None.

Equity Compensation Plans

Refer to *Item 12 – Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters* for information regarding shares authorized for issuance under equity compensation plans.

Performance Graph

The following graph compares our cumulative total return with the S&P SmallCap 600 Index and the Nasdaq Clean Edge Green Energy Index (CELS) for each of the five years ended December 31, 2019. The graph assumes a $100 investment in our common stock and each index at December 31, 2014, and that all dividends were reinvested.



	12/14	12/15	12/16	12/17	12/18	12/19
Green Plains Inc.	$ 100.00	$ 94.08	$ 117.21	$ 72.71	$ 58.08	$ 69.46
S&P SmallCap 600	100.00	98.03	124.06	140.48	128.56	157.85
Nasdaq Clean Edge Green Energy	100.00	93.62	91.14	120.35	105.77	150.90

The information in the graph will not be considered solicitation material, nor will it be filed with the SEC or incorporated by reference into any future filing under the Securities Act or the Exchange Act, unless we specifically incorporate it by reference into our filing.

Item 6. Selected Financial Data.

The statement of operations data for the years ended December 31, 2019, 2018 and 2017 and the balance sheet data as of December 31, 2019 and 2018 are derived from our audited consolidated financial statements and should be read together with the accompanying notes included elsewhere in this report.

The statement of operations data for the years ended December 31, 2016 and 2015 and the balance sheet data as of December 31, 2017, 2016 and 2015 are derived from our audited consolidated financial statements that are not included in this report, which describe a number of matters that materially affect the comparability of the periods presented.

The following selected financial data should be read together with *Item 7 – Management's Discussion and Analysis of Financial Condition and Results of Operations* of this report. The financial information below is not necessarily indicative of results to be expected for any future period. Future results could differ materially from historical results due to numerous factors, including those discussed in *Item 1A – Risk Factors* of this report.

	Year Ended December 31,				
	2019 [(1)]	2018 [(1) (2)]	2017 [(1)]	2016 [(1)]	2015 [(1)]
Statement of Operations Data:					
(in thousands, except per share information)					
Revenues	$ 2,417,238	$ 2,983,932	$ 3,289,475	$ 3,159,313	$ 2,746,471
Costs and expenses	2,559,808	2,893,978	3,265,727	3,080,101	2,684,447
Operating income (loss) from continuing operations [(3)]	(142,570)	89,954	23,748	79,212	62,024
Total other expense	30,372	84,310	78,902	50,918	36,979
Net income (loss) from continuing operations including noncontrolling interest	(148,829)	25,195	76,633	24,669	17,097
Net income (loss) from discontinued operations, net of income taxes	829	11,539	4,998	5,822	(1,869)
Net income (loss)	(148,000)	36,734	81,631	30,491	15,228
Net income (loss) attributable to Green Plains	$ (166,860)	$ 15,923	$ 61,061	$ 10,663	$ 7,064
Basic earnings per share:					
Earnings (loss) per share from continuing operations	$ (4.40)	$ 0.11	$ 1.43	$ 0.13	$ 0.24
Earnings (loss) per share from discontinued operations	0.02	0.28	0.13	0.15	(0.05)
Earnings (loss) per share attributable to Green Plains	$ (4.38)	$ 0.39	$ 1.56	$ 0.28	$ 0.19
Diluted earnings per share:					
Earnings (loss) per share from continuing operations	$ (4.40)	$ 0.11	$ 1.37	$ 0.13	$ 0.23
Earnings (loss) per share from discontinued operations	0.02	0.28	0.10	0.15	(0.05)
Earnings (loss) per share attributable to Green Plains	$ (4.38)	$ 0.39	$ 1.47	$ 0.28	$ 0.18
Cash dividend declared per share [(4)]	$ 0.24	$ 0.48	$ 0.48	$ 0.40	$ 0.40
Other Data: (Non-GAAP)					
Adjusted EBITDA (in thousands)	$ (35,141)	$ 225,780	$ 154,451	$ 175,106	$ 128,356

	Year Ended December 31,				
	2019 [1]	2018 [1]	2017 [1]	2016 [1]	2015 [1]
Balance Sheet Data (in thousands)**:**					
Cash and cash equivalents	$ 245,977	$ 251,681	$ 266,619	$ 303,449	$ 384,866
Current assets	667,913	1,206,642	1,211,965	1,000,576	912,577
Total assets	1,698,218	2,216,432	2,790,144	2,506,492	1,917,920
Current liabilities	541,791	833,700	891,755	594,946	438,669
Long-term debt	243,990	298,110	767,278	782,610	429,139
Total liabilities	832,932	1,153,443	1,731,008	1,527,301	959,011
Stockholders' equity	865,286	1,062,989	1,059,136	979,191	958,909

(1) The assets and liabilities and results of operations of GPCC prior to its divesture on September 1, 2019 have been reclassified as discontinued operations.
(2) Fiscal year 2018 includes approximately eleven months of operations of the Bluffton, Indiana, Lakota, Iowa, Riga, Michigan and the Hopewell, Virginia ethanol plants, as well as Fleischmann's Vinegar.
(3) Fiscal year 2018 includes the $150.4 million gain on the sale of the Bluffton, Indiana, Lakota, Iowa, and Riga, Michigan ethanol plants, as well as Fleischmann's Vinegar during the fourth quarter.
(4) On June 18, 2019, the company announced that its board of directors decided to suspend its future quarterly cash dividend following the June 14, 2019 dividend payment.

We use EBITDA and adjusted EBITDA as segment measures of profitability to compare the financial performance of our reportable segments and manage those segments. EBITDA is defined as earnings before interest expense, income tax expense, depreciation and amortization excluding the amortization of right-of-use assets. Adjusted EBITDA includes adjustments related to operational results of Green Plains Cattle prior to its disposition which are recorded as discontinued operations and our proportional share of EBITDA adjustments of our equity method investees. We believe EBITDA and adjusted EBITDA are useful measures to compare our performance against other companies. EBITDA and adjusted EBITDA should not be considered alternatives to, or more meaningful than, net income, which is prepared in accordance with GAAP. EBITDA and adjusted EBITDA calculations may vary from company to company. Accordingly, our computation of EBITDA and adjusted EBITDA may not be comparable with a similarly titled measure of other companies.

The following table reconciles net income (loss) from continuing operations including noncontrolling interest to adjusted EBITDA (in thousands):

	Year Ended December 31,				
	2019	2018	2017	2016	2015
Net income (loss) from continuing operations including noncontrolling interest	$ (148,829)	$ 25,195	$ 76,633	$ 24,669	$ 17,097
Interest expense	40,200	87,449	83,700	49,935	37,638
Income tax expense (benefit)	(21,316)	(20,147)	(132,061)	3,625	7,948
Depreciation and amortization [1]	72,127	98,258	103,582	83,137	64,946
EBITDA	(57,818)	190,755	131,854	161,366	127,629
EBITDA adjustments related to discontinued operations	17,703	33,897	22,516	13,615	223
Proportional share of EBITDA adjustments to equity method investees	4,974	1,128	81	125	504
Adjusted EBITDA	$ (35,141)	$ 225,780	$ 154,451	$ 175,106	$ 128,356

(1) Excludes the amortization of operating lease right-of-use assets and amortization of debt issuance costs.

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

General

The following discussion and analysis includes information management believes is relevant to understand and assess our consolidated financial condition and results of operations. This section should be read in conjunction with our consolidated financial statements, accompanying notes and the risk factors contained in this report.

Overview

Green Plains is an Iowa corporation, founded in June 2004 as a producer of low carbon fuels. We have grown through acquisitions of ethanol production facilities and adjacent commodity processing businesses to be one of the leading corn processors in the world. We are in the process of transforming ourselves to be focused on the production of high-protein feed ingredients and export growth opportunities. Additionally, we have taken advantage of strategic opportunities to divest

certain assets in recent years. We are focused on generating stable operating margins through our business segments and risk management strategy. We own and operate assets throughout the ethanol value chain: upstream, with grain handling and storage; through our ethanol production facilities; and downstream, with marketing and distribution services to mitigate commodity price volatility, which differentiates us from companies focused only on ethanol production. Our other businesses leverage our supply chain, production platform and expertise.

Our profitability is highly dependent on commodity prices, particularly for ethanol, distillers grains, corn oil, corn, and natural gas. Since market price fluctuations of these commodities are not always correlated, our operations may be unprofitable at times. We use a variety of risk management tools and hedging strategies to monitor price risk exposure at our ethanol plants and lock in favorable margins or reduce production when margins are compressed. Our adjacent businesses integrate complementary but more predictable revenue streams that diversify our operations and profitability.

More information about our business, properties and strategy can be found *under Item 1 – Business* and a description of our risk factors can be found under *Item 1A – Risk Factors*.

Industry Factors Affecting our Results of Operations

U.S. Ethanol Supply and Demand

According to the EIA, domestic ethanol production averaged 1.03 million barrels per day in 2019, which was 1.7% lower than the 1.05 million barrels per day in 2018. Refiner and blender input volume increased 1% to 921 thousand barrels per day for 2019, compared with 914 thousand barrels per day in 2018. Gasoline demand increased 27 thousand barrels per day, or 0.3% in 2019. U.S. domestic ethanol ending stocks decreased by approximately 2.1 million barrels, or 9%, year over year to 21.0 million barrels. At the end of May 2019, the EPA finalized regulatory changes to apply the 1 pound per square inch Reid Vapor Pressure (RVP) waiver that currently applies to E10 during the summer months so that it applies to E15 as well. This removes a significant barrier to wider sales of E15 in the summer months, thus expanding the market for ethanol in transportation fuel. As of December 31, 2019, there were approximately 2,080 retail stations selling E15 in 30 states, up from 1,700 at the beginning of the year, according to Growth Energy.

Global Ethanol Supply and Demand

According to the USDA Foreign Agriculture Service, domestic ethanol exports through November 30, 2019 were approximately 1.32 bg, down 15% from 1.56 bg for the same period of 2018. Brazil remained the largest export destination for U.S. ethanol, which accounted for 23% of domestic ethanol export volume despite the 20% tariff on U.S. ethanol imports in excess of 150 million liters, or 39.6 million gallons per quarter, imposed in September 2017 by Brazil's Chamber of Foreign Trade, or CAMEX. In a resolution published August 31, 2019, Brazil raised the annual import quota to 750 million liters, or 198 million gallons per year from the expiring 600 million-liter limit. The final resolution awaits approval of the Brazilian government. In addition, Canada, India, South Korea, and the Philippines accounted for 23%, 12%, 7%, and 5%, respectively, of U.S. ethanol exports.

On April 1, 2018, China announced it would add an additional 15% tariff to the existing 30% tariff it had earlier imposed on ethanol imports from the United States and Brazil. China later raised the tariff further to 70% as the trade war escalated. In January 2020, China and the United States agreed to certain trade agreements, the impact of which on ethanol are yet to be determined.

The cost to produce the equivalent amount of starch found in sugar from $3.50-per-bushel corn is 7 cents per pound. The average price of sugar was approximately 12 cents per pound during 2019. We currently estimate that net ethanol exports will reach approximately 1.5 billion gallons in 2020, excluding any potential exports to China, based on historical demand from a variety of countries and certain countries who seek to improve their air quality and eliminate MTBE from their own fuel supplies.

Year-to-date U.S. distillers grains exports through November 30, 2019, were 10.0 million metric tons, or 9.7% lower than the same period last year, according to the USDA Foreign Agriculture Service. Mexico, South Korea, Vietnam, Indonesia, Canada, and Turkey, accounted for approximately 61% of total U.S. distillers export volumes.

While African Swine Fever (ASF) may have a positive impact on animal protein demand from the U.S., it may have a negative impact on distillers grains exports and domestic usage. ASF may depress soybean meal demand in China which could make the animal feed more price competitive to distillers grains and allow for substitution of high-protein soybean meal worldwide.

Legislation and Regulation

We are sensitive to government programs and policies that affect the supply and demand for ethanol and other fuels, which in turn may impact the volume of ethanol and other fuels we handle. Various bills have been discussed in the House and Senate which would eliminate the RFS II entirely, eliminate the corn based ethanol portion of the mandate, or make it more difficult to sell fuel blends with higher levels of ethanol. We believe it is unlikely that any of these bills will become law in the current Congress. In addition, the manner in which the EPA administers the RFS II can have a significant impact on the actual amount of ethanol blended into the domestic fuel supply.

Federal mandates supporting the use of renewable fuels are a significant driver of ethanol demand in the U.S. Ethanol policies are influenced by concerns for the environment, diversifying our fuel supply, and reducing the country's dependence on foreign oil. Consumer acceptance of flex-fuel vehicles and higher ethanol blends of ethanol in non-flex-fuel vehicles may be necessary before ethanol can achieve further growth in U.S. market share. Congress first enacted CAFE in 1975 to reduce energy consumption by increasing the fuel economy of cars and light trucks.

Flexible-fuel vehicles (FFVs), which are designed to run on a mixture of fuels, including higher blends of ethanol such as E85, receive preferential treatment in the form of CAFE credits. There are approximately 21 million FFVs on the road in the U.S. today, 16 million of which are light duty trucks. FFV credits have been decreasing since 2014 and will be completely phased out in 2020. Absent CAFE preferences, auto manufacturers may not be willing to build flexible-fuel vehicles, which has the potential to slow the growth of E85 markets.

Another important factor is a waiver in the Clean Air Act, known as the One-Pound Waiver, which allows E10 to be sold year-round, even though it exceeds the Reid Vapor Pressure limitation of nine pounds per square inch. At the end of May 2019, the EPA finalized a rule which extended the One-Pound Waiver to E15. This allows E15 to be sold year round to all vehicles model year 2001 and newer. This rule is being challenged in an action filed in Federal District Court for the DC Circuit. However, the One-Pound Waiver is in effect, and for the first time ever, E15 was legally sold to all vehicles model year 2001 and newer during the summer driving season of June 1 to September 15, 2019.

The RFS II has been a driving factor in the growth of ethanol usage in the United States. When the RFS II was established in 2010, the required volume of "conventional" corn-based ethanol to be blended with gasoline was to increase each year until it reached 15.0 billion gallons in 2015, which left the EPA to address existing limitations in both supply (ethanol production) and demand (usage of ethanol blends in older vehicles). On December 19, 2019, the EPA announced the final 2020 RVO for conventional ethanol, which met the 15.0-billion-gallon congressional target.

The EPA has the authority to waive the mandates, in whole or in part, if there is inadequate domestic renewable fuel supply or the requirement severely harms the economy or environment. According to the RFS II, if mandatory renewable fuel volumes are reduced by at least 20% for two consecutive years, the EPA is required to modify, or reset, statutory volumes through 2022 – the year through which the statutorily prescribed volumes run. While conventional ethanol maintained 15 billion gallons, 2019 was the second consecutive year that the total proposed RVO was more than 20% below statutory volumes levels. Thus, the EPA was expected to initiate a reset rulemaking, and modify statutory volumes through 2022, and do so based on the same factors they are to use in setting the RVOs post-2022. These factors include environmental impact, domestic energy security, expected production, infrastructure impact, consumer costs, job creation, price of agricultural commodities, food prices, and rural economic development. However, on December 19, 2019, the EPA announced it would not be moving forward with a reset rulemaking in 2020.

The EPA assigns individual refiners, blenders, and importers the volume of renewable fuels they are obligated to use based on their percentage of total domestic transportation fuel sales. Obligated parties use RINs to show compliance with the RFS II mandated volumes. Ethanol producers assign RINs to renewable fuels and the RINs are detached when the renewable fuel is blended with transportation fuel domestically. Market participants can trade the detached RINs in the open market. The market price of detached RINs affects the price of ethanol in certain markets and influences the purchasing decisions by obligated parties.

Under the RFS II, a small refinery is defined as one that processes fewer than 75,000 barrels of petroleum per day. Small refineries can petition the EPA for a SRE which, if approved, waives their portion of the annual RVO requirements. The EPA, through consultation with the Department of Energy and the Department of Agriculture, can grant them a full or partial waiver, or deny it outright within 90 days of submittal. The EPA granted significantly more of these waivers for 2016, 2017 and 2018 than they had in the past, totaling 790 million gallons of waived requirements for the 2016 compliance year, 1.82 billion gallons for 2017 and 1.43 billion gallons for 2018. In doing so, the EPA effectively reduced the RFS II mandated volumes for those compliance years by those amounts respectively, and as a result, RIN values have declined significantly.

Biofuels groups have filed a lawsuit in the Court of Appeals for the D.C. Circuit, challenging the 2019 RVO rule over the EPA's failure to address small refinery exemptions in the rulemaking. This was the first RFS II rulemaking since the expanded use of the exemptions came to light; however, the EPA had declined to cap the number of waivers it grants, and until late 2019, had declined to alter how it accounts for the retroactive waivers in its annual volume calculations. The EPA has a statutory mandate to ensure the volume requirements are met, which are achieved by setting the percentage standards for obligated parties. The EPA's recent approach accomplished the opposite. Even if all the obligated parties complied with their respective percentage obligations for 2019, the nation's overall supply of renewable fuel would not meet the total volume requirements set by the EPA. This undermines Congressional intent to increase the consumption of renewable fuels in the domestic transportation fuel supply. Biofuels groups have argued the EPA must therefore adjust its percentage standard calculations to make up for past retroactive waivers and adjust the standards to account for any waivers it reasonably expects to grant in the future.

In a supplemental rulemaking to the 2020 RVO rule, the EPA changed their approach, and for the first time are accounting for the gallons they anticipate they will be waiving from the blending requirements due to small refinery exemptions. To accomplish this, they are adding in the trailing three year average of gallons the Department of Energy recommended be waived, in effect raising the blending volumes across the board in anticipation of waiving the obligations in whole or in part for certain refineries that qualify for the exemptions. Though the EPA has often disregarded the recommendations of the Department of Energy in years past, they stated in the rule their intent to adhere to these recommendations going forward, including granting partial waivers rather than an all or nothing approach. The EPA will be adjudicating the 2020 compliance year small refinery exemption applications in early 2021, but have indicated they will adhere to Department of Energy recommendations for the 2019 compliance year applications as well, which should be adjudicated in early 2020. There were 21 applications pending as of this filing.

On January 24, 2020, the U.S. Court of Appeals for the 10th Circuit ruled on RFA et. al. vs. EPA in favor of biofuels interests, overturning EPA's grant of refinery exemptions to three refineries on two separate grounds. The Court agreed that, under the Clean Air Act, refineries are eligible for SREs for a given RVO year only if such exemptions are extensions of exemptions granted in previous RVO years. In this case, the three refineries at issue did not qualify for SREs in the year prior to the year that EPA granted them. They were thus ineligible for additional SRE relief because there were no immediately prior SREs to extend. In addition, the Court agreed that the disproportionate economic hardship prong of SRE eligibility should be determined solely by reference to whether compliance with the RFS II creates such hardship, not whether compliance plus other issues create disproportionate economic hardship. The Court thus vacated EPA's grant of SREs for certain years and remanded the grants back to EPA. It is expected the decision will be appealed to the U.S. Supreme Court. If the decision against the EPA is upheld by the Supreme Court, it is uncertain how the EPA will propose to remedy the situation.

The White House directed the USDA and EPA to move forward with rulemaking to expand access to higher blends of biofuels. This includes funding for infrastructure, labeling changes and allowing E15 to be sold through E10 infrastructure.

In 2017, the D.C. Circuit ruled in favor of biofuel groups against the EPA related to its decision to lower the 2016 volume requirements by 500 million gallons. As a result, the Court remanded to the EPA to make up for the 500 million gallons. Despite this, in the proposed 2020 RVO rulemaking released in July 2019, the EPA stated it does not intend to make up the 500 million gallons as the court directed, citing potential burden on obligated parties. The EPA has indicated that it plans to address this court ordered remand in early 2020.

Government actions abroad can significantly impact the demand for U.S. ethanol. In September 2017, China's National Development and Reform Commission, the National Energy Board and 15 other state departments issued a joint plan to expand the use and production of biofuels containing up to 10% ethanol by 2020. China, the number three importer of U.S. ethanol in 2016, imported negligible volumes during 2018 and 2019 due to a 30% tariff on U.S. ethanol, which increased to 70% in early 2018. There is no assurance that China's joint plan to expand blending to 10% will be carried to fruition, nor that it will lead to increased imports of U.S. ethanol in the near term. Ethanol is included as an agricultural commodity under the "Phase I" agreement with China, wherein they are to purchase upwards of $40 billion in agricultural commodities from the U.S. in both 2020 and 2021.

In Brazil, the Secretary of Foreign Trade issued an official written resolution, imposing a 20% tariff on U.S. ethanol imports in excess of 150 million liters, or 39.6 million gallons per quarter in September 2017. The initial ruling was valid for two years; however, it was extended at the end of August 2019 for an additional year. On an annual basis, Brazil will now allow into the country 750 million duty free liters distributed on a quarterly basis as follows: September to November 100 million liters, December to February 100 million liters, March to May 275 million liters and June to August 275 million liters.

Our exports also face tariffs, rate quotas, countervailing duties, and other hurdles in the European Union, India, Peru, and elsewhere, which limits the ability to compete in some markets.

In June 2017, the Energy Regulatory Commission of Mexico (CRE) approved the use of 10% ethanol blends, which was challenged by multiple lawsuits, of which several were dismissed. The remaining four cases follow one of two tracks: 1) to determine the constitutionality of the CRE regulation, or 2) to determine the benefits, or lack thereof, of introducing E10 to Mexico. An injunction was granted in October 2017, preventing the blending and selling of E10, but was overturned by a higher court in June 2018 making it legal to blend and sell E10 by PEMEX throughout Mexico except for its three largest metropolitan areas. On January 15, 2020, the Mexican Supreme Court ruled that the expedited process for the CRE regulation was unconstitutional, and that after a 180 day period the maximum ethanol blend allowed in the country would revert to 5.8%. There is an effort underway to go through the full regulatory process to allow for 10% blends countrywide, including in the three major metropolitan areas. U.S. ethanol exports to Mexico totaled 29.4 mmg in 2018 and 29.8 mmg in 2019.

On January 29, 2020, the President signed into law the updated North American Free Trade Agreement, known as the United States Mexico Canada Agreement or USMCA. The pact maintains the duty free access of U.S. agricultural commodities, including ethanol, into Canada and Mexico. As of the date of this filing, Mexico has ratified the pact and the Canadian Parliament is widely expected to do the same.

The Tax Cuts and Jobs Act (the "Act") was signed into law on December 22, 2017, effective on January 1, 2018. Among other provisions, the new law reduced the federal statutory corporate income tax rate from 35% to 21%. The tax impacts of the Act are included in our consolidated financial statements.

Environmental and Other Regulation

Our operations are subject to environmental regulations, including those that govern the handling and release of ethanol, crude oil and other liquid hydrocarbon materials. Compliance with existing and anticipated environmental laws and regulations may increase our overall cost of doing business, including capital costs to construct, maintain, operate, and upgrade equipment and facilities. Our business may also be impacted by government policies, such as tariffs, duties, subsidies, import and export restrictions and outright embargos. We employ maintenance and operations personnel at each of its facilities, which are regulated by the Occupational Safety and Health Administration.

The U.S. ethanol industry relies heavily on tank cars to deliver its product to market. On May 1, 2015, the DOT finalized the Enhanced Tank Car Standard and Operational Controls for High-Hazard and Flammable Trains, or DOT specification 117, which established a schedule to retrofit or replace older tank cars that carry crude oil and ethanol, braking standards intended to reduce the severity of accidents and new operational protocols. The deadline for compliance with DOT specification 117 is May 1, 2023. The rule may increase our lease costs for railcars over the long term. Additionally, existing railcars may be out of service for a period of time while upgrades are made, tightening supply in an industry that is highly dependent on railcars to transport product. We intend to strategically manage our leased railcar fleet to comply with the new regulations and have commenced transition of our fleet to DOT 117 compliant railcars. As of December 31, 2019, approximately 30% of our railcar fleet was DOT 117 compliant. We anticipate that an additional 20% of our railcar fleet will be DOT 117 compliant by the end of 2020, and that our entire fleet will be fully compliant by 2023.

In September 2015, the FDA issued rules for Current Good Manufacturing Practice, Hazard Analysis and Risk-Based Preventative Controls for food for animals in response to FSMA. The rules require FDA-registered food facilities to address safety concerns for sourcing, manufacturing and shipping food products and food for animals through food safety programs that include conducting hazard analyses, developing risk-based preventative controls and monitoring, and addressing intentional adulteration, recalls, sanitary transportation and supplier verification. We believe we have taken sufficient measures to comply with these regulations.

On January 1, 2017, all medically important antimicrobials intended for use in animal feed that were once available over-the-counter became veterinary feed directive drugs, requiring written orders from a licensed veterinarian to purchase and use in livestock feed under the October 2015 revised Veterinary Feed Directive rule. Our cattle feeding joint venture obtained all necessary prescriptions from a licensed veterinarian to use certain veterinary feed directive drugs, as appropriate.

Variability of Commodity Prices

Our business is highly sensitive to commodity price fluctuations, particularly for corn, ethanol, corn oil, distillers grains and natural gas, which are impacted by factors that are outside of our control, including weather conditions, corn yield, changes in domestic and global ethanol supply and demand, government programs and policies and the price of crude oil, gasoline and substitute fuels. We use various financial instruments to manage and reduce our exposure to price variability.

For more information about our commodity price risk, refer to *Item 7A. - Qualitative and Quantitative Disclosures About Market Risk, Commodity Price Risk* in this report.

During 2019, we continued to experience a weak ethanol margin environment. Our operating strategy, including the operating cost savings initiative, is to increase utilization rates and efficiency while reducing operating expenses to achieve improved margins. In 2019, our ethanol facilities ran at approximately 76% of our daily average capacity, largely due to the low margin environment during the year driven by higher domestic ethanol supplies resulting from weak refiner and blender input volume. We expect to run at higher average utilization rates to achieve the cost savings anticipated. Additionally, overall performance at our ethanol plants was negatively impacted by severe weather and associated flooding in areas where we transport products during the first half of 2019. The weather also drove corn prices up, negatively impacting margins.

Critical Accounting Policies and Estimates

The preparation of our consolidated financial statements requires that we use estimates that affect the reported assets, liabilities, revenue and expense and related disclosures for contingent assets and liabilities. We base our estimates on experience and assumptions we believe are proper and reasonable. While we regularly evaluate the appropriateness of these estimates, actual results could differ materially from our estimates. The following accounting policies, in particular, may be impacted by judgments, assumptions and estimates used in the preparation of our consolidated financial statements.

Revenue Recognition

We recognize revenue when obligations under the terms of a contract with a customer are satisfied. Generally this occurs with the transfer of control of products or services. Revenue is measured as the amount of consideration expected to be received in exchange for transferring goods or providing services. Sales, value add, and other taxes we collect concurrent with revenue-producing activities are excluded from revenue.

Sales of ethanol, distillers grains, corn oil, natural gas and other commodities by the company's marketing business are recognized when obligations under the terms of a contract with a customer are satisfied. Generally, this occurs with the transfer of control of products or services. Revenues related to marketing for third parties are presented on a gross basis as we control the product prior to the sale to the end customer, take title of the product and have inventory risk. Unearned revenue is recorded for goods in transit when we have received payment but control has not yet been transferred to the customer. Revenues for receiving, storing, transferring and transporting ethanol and other fuels are recognized when the product is delivered to the customer.

We routinely enter into physical-delivery energy commodity purchase and sale agreements. At times, we settle these transactions by transferring obligations to other counterparties rather than delivering the physical commodity. Energy trading transactions are reported net as a component of revenue. Revenues include net gains or losses from derivatives related to products sold while cost of goods sold includes net gains or losses from derivatives related to commodities purchased. Revenues also include realized gains and losses on related derivative financial instruments and reclassifications of realized gains and losses on cash flow hedges from accumulated other comprehensive income or loss.

Sales of products, including agricultural commodities are recognized when control of the product is transferred to the customer, which depends on the agreed upon shipment or delivery terms. Revenues related to grain merchandising are presented gross and include shipping and handling, which is also a component of cost of goods sold. Revenues from grain storage are recognized over time as the services are rendered.

A substantial portion of the partnership revenues are derived from fixed-fee commercial agreements for storage, terminal or transportation services. The partnership recognizes revenue upon transfer of control of product from its storage tanks and fuel terminals, when railcar volumetric capacity is provided, and as truck transportation services are performed. To the extent shortfalls associated with minimum volume commitments in the previous four quarters continue to exist, volumes in excess of the minimum volume commitment are applied to those shortfalls. Remaining excess volumes generating operating lease revenue are recognized as incurred.

Intercompany revenues are eliminated on a consolidated basis for reporting purposes.

Impairment of Long-Lived Assets and Goodwill

Our long-lived assets consist of property and equipment, operating lease right-of-use assets, intangible assets and equity method investments. We review long-lived assets for impairment whenever events or changes in circumstances indicate the carrying amount of the asset may not be recoverable. We measure recoverability by comparing the carrying amount of the asset with the estimated undiscounted future cash flows the asset is expected to generate. If the carrying amount of the asset

exceeds its estimated future cash flows, we record an impairment charge for the amount in excess of the fair value. There were no material impairment charges recorded for the periods reported.

Our goodwill is related to certain acquisitions within our ethanol production and partnership segments. We review goodwill for impairment at least annually, as of October 1, or more frequently whenever events or changes in circumstances indicate that an impairment may have occurred.

Near term industry outlook and the decline in our stock price caused a decline in our market capitalization during the three months ended September 30, 2019. As such, we determined a triggering event had occurred that required an interim impairment assessment for our ethanol production reporting unit. Due to the impairment indicators noted as a result of these triggering events, we evaluated our goodwill as of September 30, 2019. Significant assumptions inherent in the valuation methodologies for goodwill are employed and include, but are not limited to, market capitalization, prospective financial information, growth rates, discount rates, inflationary factors, and cost of capital. Based on our quantitative evaluation, we determined that the fair value of the ethanol production reporting unit exceeded its carrying value. As a result, we concluded that the goodwill assigned to the ethanol production reporting unit was not impaired, but could be at risk of future impairment. We continue to believe that our long-term financial goals will be achieved.

We performed our annual goodwill assessment as of October 1, 2019, using a qualitative assessment, which resulted in no goodwill impairment.

We estimate the amount and timing of projected cash flows that will be generated by an asset over an extended period of time when we review our long-lived assets and goodwill. Circumstances that may indicate impairment include: a decline in future projected cash flows, a decision to suspend plant operations for an extended period of time, a sustained decline in our market capitalization, a sustained decline in market prices for similar assets or businesses or a significant adverse change in legal or regulatory matters, or business climate. Significant management judgment is required to determine the fair value of our long-lived assets and goodwill and measure impairment, including projected cash flows. Fair value is determined through various valuation techniques, including discounted cash flow models utilizing assumed margins, cost of capital, inflation and other inputs, sales of comparable properties and third-party independent appraisals. Changes in estimated fair value as a result of declining ethanol margins, loss of significant customers or other factors could result in a write-down of the asset.

Leases

On January 1, 2019, we adopted the amended guidance in ASC 842, *Leases*, and all related amendments and applied it to all leases using the optional transition method which requires the amended guidance to be applied at the date of adoption. The standard does not require the guidance to be applied to the earliest comparative period presented in the financial statements. As such, comparative information has not been restated and continues to be reported under the accounting standards in effect for those periods.

We lease certain facilities, parcels of land, and equipment. Our leases are accounted for as operating leases, with lease expense recognized on a straight-line basis over the lease term. The term of the lease may include options to extend or terminate the lease when it is reasonably certain that we will exercise one of those options. For leases with initial terms greater than 12 months, we record operating lease right-of-use assets and corresponding operating lease liabilities. Leases with an initial term of 12 months or less are not recorded on our consolidated balance sheet. Operating lease right-of-use assets represent our right to control an underlying asset for the lease term and operating lease liabilities represent our obligation to make lease payments arising from the lease. These assets and liabilities are recognized at the commencement date based on the present value of lease payments over the lease term. As our leases do not provide an implicit rate, we use our incremental borrowing rate based on information available at commencement date to determine the present value of future payments.

Our partnership segment records the majority of its operating lease revenue from its storage and throughput services and rail transportation services agreements with Green Plains Trade. The lease revenue from Green Plains Trade is eliminated upon consolidation. In addition, the partnership may sublease certain of its railcars to third parties on a short-term basis. These subleases are classified as operating leases, with the associated sublease revenue recognized on a straight-line basis over the lease term.

Please refer to *Note 18 – Commitments and Contingencies* to the consolidated financial statements for further details on operating lease expense.

Derivative Financial Instruments

We use various derivative financial instruments, including exchange-traded futures and exchange-traded and over-the-counter options contracts, to attempt to minimize risk and the effect of commodity price changes including but not limited to, corn, ethanol, natural gas and crude oil. We monitor and manage this exposure as part of our overall risk management policy to reduce the adverse effect market volatility may have on our operating results. We may hedge these commodities as one way to mitigate risk; however, there may be situations when these hedging activities themselves result in losses.

By using derivatives to hedge exposures to changes in commodity prices, we are exposed to credit and market risk. Our exposure to credit risk includes the counterparty's failure to fulfill its performance obligations under the terms of the derivative contract. We minimize our credit risk by entering into transactions with high quality counterparties, limiting the amount of financial exposure it has with each counterparty and monitoring their financial condition. Market risk is the risk that the value of the financial instrument might be adversely affected by a change in commodity prices or interest rates. We manage market risk by incorporating parameters to monitor exposure within our risk management strategy, which limits the types of derivative instruments and strategies we can use and the degree of market risk we can take using derivative instruments.

We evaluate our physical delivery contracts to determine if they qualify for normal purchase or sale exemptions which are expected to be used or sold over a reasonable period in the normal course of business. Contracts that do not meet the normal purchase or sale criteria are recorded at fair value. Changes in fair value are recorded in operating income unless the contracts qualify for, and we elect, cash flow hedge accounting treatment.

Certain qualifying derivatives related to ethanol production and agribusiness and energy services segments are designated as cash flow hedges. We evaluate the derivative instrument to ascertain its effectiveness prior to entering into cash flow hedges. Unrealized gains and losses are reflected in accumulated other comprehensive income or loss until the gain or loss from the underlying hedged transaction is realized. When it becomes probable a forecasted transaction will not occur, the cash flow hedge treatment is discontinued, which affects earnings. These derivative financial instruments are recognized in current assets or current liabilities at fair value.

At times, we hedge our exposure to changes in inventory values and designate qualifying derivatives as fair value hedges. The carrying amount of the hedged inventory is adjusted in the current period for changes in fair value. Ineffectiveness of the hedges is recognized in the current period to the extent the change in fair value of the inventory is not offset by the change in fair value of the derivative.

Accounting for Income Taxes

Income taxes are accounted for under the asset and liability method in accordance with GAAP. Deferred tax assets and liabilities are recognized for future tax consequences between existing assets and liabilities and their respective tax basis, and for net operating loss and tax credit carry-forwards. Deferred tax assets and liabilities are measured using enacted tax rates expected to be applied to taxable income in years temporary differences are expected to be recovered or settled. The effect of a tax rate change is recognized in the period that includes the enactment date. The realization of deferred tax assets depends on the generation of future taxable income during the periods in which temporary differences become deductible. Management considers scheduled reversal of deferred tax liabilities, projected future taxable income and tax planning strategies to make this assessment. A valuation allowance is recorded by the company when it is more likely than not that some portion or all of a deferred tax asset will not be realized. In making such a determination, management considers the positive and negative evidence to support the need for, or reversal of, a valuation allowance. The weight given to the potential effects of positive and negative evidence is based on the extent it can be objectively verified.

To account for uncertainty in income taxes, we gauge the likelihood of a tax position based on the technical merits of the position, perform a subsequent measurement related to the maximum benefit and degree of likelihood, and determine the benefit to be recognized in the financial statements, if any.

Recently Issued Accounting Pronouncements

For information related to recent accounting pronouncements, see *Note 2 – Summary of Significant Accounting Policies* included as part of the notes to consolidated financial statements in this report.

Off-Balance Sheet Arrangements

We do not have any off-balance sheet arrangements.

Components of Revenues and Expenses

Revenues. For our ethanol production segment, our revenues are derived primarily from the sale of ethanol, distillers grains and corn oil. For our agribusiness and energy services segment, sales of ethanol, distillers grains and corn oil that we market for our ethanol plants, in which we earn a marketing fee, sales of ethanol we market for a third-party and sales of grain and other commodities purchased in the open market represent our primary sources of revenue. For our food and ingredients segment, the sale of corn oil, and vinegar prior to the sale of Fleischmann's Vinegar during the fourth quarter of 2018, are our primary sources of revenue. For our partnership segment, our revenues consist primarily of fees for receiving, storing, transferring and transporting ethanol and other fuels. Revenues include net gains or losses from derivatives related to products sold.

Cost of Goods Sold. For our ethanol production segment, cost of goods sold includes direct labor, materials and plant overhead costs. Direct labor includes compensation and related benefits of non-management personnel involved in ethanol plant operations. Plant overhead consists primarily of plant utilities and outbound freight charges. Corn is the most significant raw material cost followed by natural gas, which is used to power steam generation in the ethanol production process and dry distillers grains. Cost of goods sold also includes net gains or losses from derivatives related to commodities purchased.

For our agribusiness and energy services segment, purchases of ethanol, distillers grains, corn oil and grain are the primary component of cost of goods sold. Grain inventories held for sale and forward purchase and sale contracts are valued at market prices when available or other market quotes adjusted for differences, such as transportation, between the exchange-traded market and local markets where the terms of the contracts are based. Changes in the market value of grain inventories, forward purchase and sale contracts, and exchange-traded futures and options contracts are recognized as a component of cost of goods sold.

For our food and ingredients segment, food-grade ethanol was the most significant raw material cost. For our vinegar operation, which was sold during the fourth quarter of 2018, cost of goods sold included direct labor, materials and plant overhead costs. Direct labor included compensation and related benefits of non-management personnel involved in vinegar operations.

Operations and Maintenance Expense. For our partnership segment, transportation expense is the primary component of operations and maintenance expense. Transportation expense includes rail car leases, shipping and freight and costs incurred for storing ethanol at destination terminals.

Selling, General and Administrative Expense. Selling, general and administrative expenses are recognized at the operating segment and corporate level. These expenses consist of employee salaries, incentives and benefits; office expenses; director fees; and professional fees for accounting, legal, consulting and investor relations services. Personnel costs, which include employee salaries, incentives, and benefits, as well as severance and separation costs, are the largest expenditure. Selling, general and administrative expenses that cannot be allocated to an operating segment are referred to as corporate activities.

Gain on Sale of Assets, Net. We completed the sale of the three ethanol plants located in Bluffton, Indiana, Lakota, Iowa and Riga, Michigan, as well as Fleischmann's Vinegar during the fourth quarter of 2018. Proceeds from these sales, offset by related expenses, were recorded primarily at the corporate level, with only the gain on the assignment of operating leases of $2.7 million being recorded at the partnership level.

Other Income (Expense). Other income (expense) includes interest earned, interest expense and other non-operating items, including a gain of $4.8 million related to the sale of our 50% interest in JGP Energy Partners LLC.

Income (loss) from Equity Method Investees, Net of Income Taxes. Income (loss) from equity method investees, net of income taxes, represents our proportional share of earnings from our equity method investees.

Net Income from Discontinued Operations, Net of Income Taxes. Net income from discontinued operations, net of income taxes represents the operations of GPCC prior to its disposition during the third quarter of 2019. GPCC was previously a wholly owned subsidiary of Green Plains until the formation of the GPCC joint venture and disposition September 1, 2019.

Results of Operations

Comparability

The following summarizes various events that affect the comparability of our operating results for the past three years:

- March 2017 — Hereford, Texas cattle feeding operation was acquired.
- May 2017 — Leoti, Kansas and Eckley, Colorado cattle feeding operations were acquired.
- August 2018 — Sublette, Kansas and Tulia, Texas cattle feeding operations were acquired.
- November 2018 — Bluffton, Indiana, Lakota, Iowa and Riga, Michigan ethanol plants were sold and certain storage assets of these plants were acquired from the partnership prior to being sold.
- November 2018 — Hopewell, Virginia ethanol plant was permanently closed.
- November 2018 — Fleischmann's Vinegar was sold.
- September 2019 — An aggregate 50% membership interest of GPCC was sold, resulting in the deconsolidation of GPCC and the equity method of accounting treatment of our continued investment. Operational results of GPCC prior to its disposition, for all periods presented have been reclassified as discontinued operations in our consolidated financial statements. The assets and liabilities of GPCC have been reclassified as assets and liabilities of discontinued operations in all prior periods.
- December 2019 — Our 50% membership interest in JGP Energy Partners was sold.

The year ended December 31, 2017, includes approximately nine months of operations at our Hereford cattle feeding business and approximately six months of operations at our Leoti and Eckley cattle feeding operations. The year ended December 31, 2018, includes approximately five months of operations at our Sublette and Tulia cattle feeding businesses, eleven months of operations at our Bluffton, Lakota, Hopewell and Riga ethanol plants and eleven months of our Fleischmann's Vinegar operations. The year ended December 31, 2019, includes eight months of operations of GPCC which are included in discontinued operations with the remaining four months of the GPCC joint venture being accounted for using the equity method of accounting. Additionally, operations of GPCC have been reclassified as discontinued operations and assets and liabilities of GPCC have been reclassified as assets and liabilities of discontinued operations in all prior periods presented.

Segment Results

We report the financial and operating performance for the following four operating segments: (1) ethanol production, which includes the production of ethanol, distillers grains and corn oil, (2) agribusiness and energy services, which includes grain handling and storage, commodity marketing and merchant trading for company-produced and third-party ethanol, distillers grains, corn oil, natural gas and other commodities, (3) food and ingredients, which includes food-grade corn oil operations and included vinegar production until the sale of Fleischmann's Vinegar during the fourth quarter of 2018 and (4) partnership, which includes fuel storage and transportation services.

During the normal course of business, our operating segments do business with each other. For example, our agribusiness and energy services segment procures grain and natural gas and sells products, including ethanol, distillers grains and corn oil of our ethanol production segment. Our partnership segment provides fuel storage and transportation services for our agribusiness and energy services segment. These intersegment activities are treated like third-party transactions with origination, marketing and storage fees charged at estimated market values. Consequently, these transactions affect segment performance; however, they do not impact our consolidated results since the revenues and corresponding costs are eliminated.

Corporate activities include selling, general and administrative expenses, consisting primarily of compensation, professional fees and overhead costs not directly related to a specific operating segment and the gain on sale of assets, net recorded during the fourth quarter of 2018. When we evaluate segment performance, we review the following segment information as well as earnings before interest, income taxes, depreciation and amortization, or EBITDA, and adjusted EBITDA.

The selected operating segment financial information are as follows (in thousands):

	Year Ended December 31,		
	2019 (1)	2018 (1)	2017 (1)
Revenues:			
Ethanol production:			
Revenues from external customers	$ 1,700,615	$ 2,120,475	$ 2,507,589
Intersegment revenues	100	186	84
Total segment revenues	1,700,715	2,120,661	2,507,673
Agribusiness and energy services:			
Revenues from external customers	708,316	735,855	632,702
Intersegment revenues	27,184	33,101	36,059
Total segment revenues	735,500	768,956	668,761
Food and ingredients:			
Revenues from external customers	1,451	121,121	142,907
Intersegment revenues	-	-	-
Total segment revenues	1,451	121,121	142,907
Partnership:			
Revenues from external customers	6,856	6,481	6,277
Intersegment revenues	75,531	94,267	100,716
Total segment revenues	82,387	100,748	106,993
Revenues including intersegment activity	2,520,053	3,111,486	3,426,334
Intersegment eliminations	(102,815)	(127,554)	(136,859)
Revenues as reported	$ 2,417,238	$ 2,983,932	$ 3,289,475

(1) Revenues include certain items which were previously considered intercompany transactions prior to the disposition of GPCC and therefore eliminated upon consolidation. These revenue transactions are now presented on a gross basis in product revenues. These revenue transactions total $14.5 million, $24.6 million and $22.2 million for years ended December 31, 2019, 2018 and 2017, respectively.

	Year Ended December 31,		
	2019 (1)	2018 (1)	2017 (1)
Cost of goods sold:			
Ethanol production	$ 1,791,099	$ 2,118,787	$ 2,434,001
Agribusiness and energy services	696,226	717,772	614,582
Food and ingredients	1,526	94,679	109,343
Partnership	-	-	-
Intersegment eliminations	(103,904)	(124,270)	(136,744)
	$ 2,384,947	$ 2,806,968	$ 3,021,182

(1) Cost of goods sold include certain items which were previously considered intercompany transactions prior to the disposition of GPCC and therefore eliminated upon consolidation. These cost of goods sold transactions are now presented on a gross basis in cost of goods sold. These cost of goods sold transactions total $14.4 million, $24.5 million and $22.0 million for the years ended December 31, 2019, 2018 and 2017, respectively.

	Year Ended December 31,		
	2019	2018	2017
Operating income (loss):			
Ethanol production	$ (178,575)	$ (111,823)	$ (45,074)
Agribusiness and energy services	22,777	29,076	30,443
Food and ingredients	(76)	14,354	17,963
Partnership	50,635	64,770	65,709
Intersegment eliminations	1,188	(3,110)	(61)
Corporate activities (1)	(38,519)	96,687	(45,232)
	$ (142,570)	$ 89,954	$ 23,748

(1) Corporate activates for fiscal year 2018 include a gain on the sale of assets related to the sale of three ethanol plants and Fleischmann's Vinegar during the fourth quarter of 2018, which resulted in a net gain of $150.4 million.

We use EBITDA and adjusted EBITDA as segment measures of profitability to compare the financial performance of our reportable segments and manage those segments. EBITDA is defined as earnings before interest expense, income tax expense, depreciation and amortization excluding the amortization of right-of-use assets. Adjusted EBITDA includes adjustments related to operational results of Green Plains Cattle prior to its disposition which are recorded as discontinued

operations and our proportional share of EBITDA adjustments of our equity method investees. We believe EBITDA and adjusted EBITDA are useful measures to compare our performance against other companies. EBITDA and adjusted EBITDA should not be considered an alternative to, or more meaningful than, net income, which is prepared in accordance with GAAP. EBITDA and adjusted EBITDA calculations may vary from company to company. Accordingly, our computation of EBITDA and adjusted EBITDA may not be comparable with a similarly titled measure of other companies.

The following table reconciles net income (loss) from continuing operations including noncontrolling interest to adjusted EBITDA (in thousands):

	Year Ended December 31,		
	2019	2018	2017
Net income (loss) from continuing operations including noncontrolling interest	$ (148,829)	$ 25,195	$ 76,633
Interest expense	40,200	87,449	83,700
Income tax benefit	(21,316)	(20,147)	(132,061)
Depreciation and amortization [1]	72,127	98,258	103,582
EBITDA	(57,818)	190,755	131,854
EBITDA adjustments related to discontinued operations	17,703	33,897	22,516
Proportional share of EBITDA adjustments to equity method investees	4,974	1,128	81
Adjusted EBITDA	$ (35,141)	$ 225,780	$ 154,451

(1) Excludes the amortization of operating lease right-of-use assets and amortization of debt issuance costs.

The following table reconciles net income (loss) from continuing operations including noncontrolling interest to adjusted EBITDA by segment (in thousands):

	Year Ended December 31,		
	2019	2018	2017
Adjusted EBITDA:			
Ethanol production	$ (114,494)	$ (31,623)	$ 40,069
Agribusiness and energy services	25,050	31,583	33,906
Food and ingredients	(76)	21,908	27,287
Partnership	54,853	69,399	71,041
Intersegment eliminations	1,188	(3,110)	(61)
Corporate activities	(24,339)	102,598	(40,388)
EBITDA	(57,818)	190,755	131,854
EBITDA adjustments related to discontinued operations	17,703	33,897	22,516
Proportional share of EBITDA adjustments to equity method investees	4,974	1,128	81
Adjusted EBITDA	$ (35,141)	$ 225,780	$ 154,451

Total assets by segment are as follows (in thousands):

	Year Ended December 31,	
	2019	2018
Total assets [1]:		
Ethanol production	$ 884,293	$ 872,845
Agribusiness and energy services	410,400	399,633
Partnership	90,011	67,297
Corporate assets	324,280	334,236
Assets of discontinued operations	-	552,459
Intersegment eliminations	(10,766)	(10,038)
	$ 1,698,218	$ 2,216,432

(1) Asset balances by segment exclude intercompany payable and receivable balances.

Year Ended December 31, 2019 Compared with the Year Ended December 31, 2018

Consolidated Results

Consolidated revenues decreased $566.7 million in 2019, compared with 2018 primarily due to the disposition of three ethanol plants and the sale of Fleischmann's Vinegar during the fourth quarter of 2018.

Operating income decreased $232.5 million and adjusted EBITDA decreased $260.9 million in 2019, compared with 2018 primarily due to gain on the sale of assets related to the sale of three ethanol plants and Fleischmann's Vinegar during the fourth quarter of 2018, which resulted in a net gain of $150.4 million as well as lower volumes and decreased margins on ethanol production in 2019. Interest expense decreased $47.2 million in 2019, compared with 2018 primarily due to the repayment of the $500 million senior secured term loan during the fourth quarter of 2018 and the deconsolidation of GPCC and elimination of the related revolver in the third quarter of 2019. Income tax benefit was $21.3 million in 2019, compared to $20.1 million in 2018. The change in income tax benefit is primarily due to a loss before income taxes in 2019, partially offset by the recognition of a valuation allowance of $25.3 million against the company's net deferred tax assets, while in 2018 we recorded the impact of R&D credits, net of FIN 48 reserves, of $19.8 million.

The following discussion provides greater detail about our segment performance.

Ethanol Production Segment

Key operating data for our ethanol production segment is as follows:

	Year Ended December 31,	
	2019	**2018**
Ethanol sold (thousands of gallons)	856,623	1,086,633
Distillers grains sold (thousands of equivalent dried tons)	2,234	2,815
Corn oil sold (thousands of pounds)	212,071	276,299
Corn consumed (thousands of bushels)	298,178	377,084

Revenues in the ethanol production segment decreased $419.9 million in 2019 compared with 2018 primarily due to the disposition of three ethanol plants during the fourth quarter of 2018 as well as lower production volumes of ethanol, distillers grains and corn oil due to the depressed margin environment and lower average realized prices for ethanol and distillers grains in 2019.

Cost of goods sold in the ethanol production segment decreased $327.7 million for 2019 compared with 2018 due to the disposition of three ethanol plants during the fourth quarter of 2018 as well as lower production volumes. As a result of the factors identified above, operating income decreased $66.8 million and EBITDA decreased $82.9 million during 2019. Depreciation and amortization expense for the ethanol production segment was $63.1 million for 2019, compared with $80.2 million during 2018 due to the sale of three ethanol plants during the fourth quarter of 2018.

Agribusiness and Energy Services Segment

Revenues in the agribusiness and energy services segment decreased $33.5 million while operating income decreased $6.3 million and EBITDA decreased $6.5 million in 2019 compared with 2018. The decrease in revenues was primarily due to a decrease in ethanol, distillers grain and corn oil production and trading activity, as well as lower average realized prices for ethanol. Operating income and EBITDA decreased primarily as a result of decreased margins.

Food and Ingredients Segment

Revenues in our food and ingredients segment decreased $119.7 million while operating income decreased by $14.4 million and EBITDA decreased $22.0 million during 2019, compared with 2018. The decrease in revenues, operating income and EBITDA was primarily due to the sale of Fleischmann's Vinegar outlined above.

Partnership Segment

Revenues generated from the partnership segment decreased $18.4 million in 2019 compared with 2018. Storage and throughput revenues decreased $12.1 million primarily due to a decrease in throughput volumes as a result the disposition of three ethanol plants in the fourth quarter of 2018. Revenues generated from rail transportation services decreased $4.8 million primarily due to the reduction in volumetric capacity provided as a result of the assignment of railcar operating leases as part of the disposition discussed above. Terminal services revenue decreased $0.8 million as a result of reduced throughput volume at our terminals. Trucking and other revenues decreased $0.6 million primarily due to a reduction in volumes transported for Green Plains Trade, partially offset by an increase in volumes transported for third party customers.

Operating income for the partnership segment decreased $14.1 million while EBITDA decreased $14.5 million in 2019 compared to 2018 due to the changes in revenues discussed above, partially offset by a decrease in operations and maintenance expenses of $5.2 million as a result of the factors identified above.

Intersegment Eliminations

Intersegment eliminations of revenues decreased by $24.7 million for 2019 compared with 2018 due to a decrease in storage and throughput fees paid to the partnership segment as well as decreased intersegment marketing fees within the agribusiness and energy services segment as a result of lower production volumes.

Corporate Activities

Operating income decreased by $135.2 million for 2019 compared with 2018, primarily due to the gain on sale of assets recorded during the fourth quarter of 2018.

Income Taxes

We recorded income tax benefit of $21.3 million for 2019 compared to $20.1 million in 2018. The change in income tax benefit is primarily due to a loss before income taxes in 2019, partially offset by the recognition of a $25.3 million valuation allowance against the company's net deferred tax assets, while in 2018 we recorded the impact of R&D credits, net of FIN 48 reserves, of $19.8 million. We increased the valuation allowance for our net deferred tax assets due to uncertainty that we will realize these assets in the future. The valuation allowance on deferred tax assets was recognized as a result of negative evidence, including cumulative losses in recent years, outweighing the more subjective positive evidence.

Net Income from Discontinued Operations

As previously discussed, we sold an aggregate 50% membership interest in GPCC to TGAM and StepStone during the third quarter of 2019. After closing, GPCC is no longer consolidated in our consolidated financial statements and the GPCC investment is accounted for using the equity method of accounting. GPCC results for all reported periods prior to its disposition are classified as discontinued operations. Net income from discontinued operations decreased by $10.7 million in 2019 primarily due to severe winter weather and abnormally negative basis during the first quarter of 2019.

<u>Year Ended December 31, 2018 Compared with the Year Ended December 31, 2017</u>

Consolidated Results

Consolidated revenues decreased $305.5 million in 2018, compared with 2017, primarily as a result of decrease in volumes for ethanol and distillers grains, lower average realized prices for ethanol and corn oil and lower revenues as a result of the disposition of three ethanol plants and Fleischmann's Vinegar in November of 2018, partially offset by higher average realized prices for distillers grains and additional natural gas volumes sold.

Operating income increased $66.2 million and adjusted EBITDA increased $71.3 million in 2018, compared with 2017 primarily due to gain on the sale of assets related to the sale of three ethanol plants and Fleischmann's Vinegar during the fourth quarter, which resulted in a net gain of $150.4 million. This increase was partially offset by decreased margins in our ethanol production segment. Interest expense increased $3.7 million in 2018, compared with 2017 primarily due to the $13.2 million write-off of deferred debt issuance costs related to repayment of the $500 million senior secured term loan due 2023, as well as higher average debt borrowings and higher borrowing costs during the year, partially offset by lower expense associated with termination of previous credit facilities during the fourth quarter of 2018. Income tax benefit was $20.1 million in 2018, compared to $132.1 million in 2017. The benefit reflected in 2018 is primarily due to the company's recognition of tax benefits related to the completion of the 2017 study for R&D credits and an estimate for 2018, as well as the effect of a lower tax rate on pre-tax income. The benefit reflected in 2017 is due to the company's recognition of tax

benefits related to enactment of the Tax Cuts and Jobs Act and for the completion of a multi-year study for R&D Credits in 2017, as well as pre-tax losses at a higher tax rate.

The following discussion provides greater detail about our segment performance.

Ethanol Production Segment

Key operating data for our ethanol production segment is as follows:

	Year Ended December 31,	
	2018	2017
Ethanol sold (thousands of gallons)	1,086,633	1,256,361
Distillers grains sold (thousands of equivalent dried tons)	2,815	3,314
Corn oil sold (thousands of pounds)	276,299	301,920
Corn consumed (thousands of bushels)	377,084	437,373

Revenues in the ethanol production segment decreased $387.0 million in 2018 compared with 2017 primarily due to lower volumes of ethanol and distillers grains sold in addition to lower average ethanol and corn oil prices realized, partially offset by higher average distillers grains prices realized.

Cost of goods sold in the ethanol production segment decreased $315.2 million for 2018 compared with 2017 due to lower production volumes. As a result of the factors identified above, operating income decreased $66.7 million and EBITDA decreased $71.7 million during 2018. Depreciation and amortization expense for the ethanol production segment was $80.2 million for 2018, compared with $82.0 million during 2017 due to the sale of the three ethanol plants.

Agribusiness and Energy Services Segment

Revenues in the agribusiness and energy services segment increased $100.2 million while operating income decreased $1.4 million and EBITDA decreased $2.3 million in 2018 compared with 2017. The increase in revenues was primarily due to an increase in natural gas and ethanol trading activity, partially offset by lower average realized prices for corn oil. Operating income and EBITDA decreased primarily as a result of decreased margins.

Food and Ingredients Segment

Revenues in our food and ingredients segment decreased $21.8 million in 2018 compared with 2017. The decrease in revenues was primarily due to lower vinegar revenue due to the sale of Fleischmann's Vinegar during the fourth quarter of 2018.

Operating income decreased by $3.6 million and EBITDA decreased $5.4 million during 2018, compared with 2017 primarily due to a decrease in margins on corn oil and the sale of Fleischmann's Vinegar during the fourth quarter of 2018.

Partnership Segment

Revenues generated from the partnership segment decreased $6.2 million in 2018 compared with 2017. Revenues generated from rail transportation services decreased $3.9 million due to lower average rates charged for the railcar volumetric capacity provided, as well as the reduction in volumetric capacity associated with the assignment of railcar operating leases to Valero in the fourth quarter of 2018. Storage and throughput revenue decreased $3.2 million primarily due to a decrease in throughput volumes which was driven by lower capacity utilization, as well as the sale of the Bluffton, Indiana, Lakota, Iowa, and Riga Michigan ethanol plants. Revenues generated from terminal services decreased $0.8 million due to reduced throughput at our fuel terminals. These decreases were partially offset by an increase in trucking and other revenue of $1.6 million due to expansion of our truck fleet.

General and administrative expenses increased $1.0 million in 2018 compared with 2017 primarily due to higher transaction costs and professional fees, as well as an increase in expenses allocated to the partnership under the secondment agreement.

Operating income for the partnership segment decreased $0.9 million while EBITDA decreased $1.6 million in 2018 compared to 2017 due to the changes in revenues discussed above, partially offset by a decrease in operations and maintenance expenses of $2.6 million as a result of the factors identified above.

Intersegment Eliminations

Intersegment eliminations of revenues decreased by $9.3 million for 2018 compared with 2017, primarily due a decrease in storage and throughput fees paid to the partnership as a result of the sale of three ethanol plants in November 2018.

Corporate Activities

Operating income was impacted by a decrease in operating expenses for corporate activities of $141.9 million for 2018 compared with 2017, primarily due to the gain on sale of assets recorded during the fourth quarter of 2018.

Income Taxes

We recorded income tax benefit of $20.1 million for 2018 compared to $132.1 million in 2017. The benefit reflected in 2018 is primarily due to the company's recognition of tax benefits related to the completion of the 2017 study for R&D credits and an estimate for 2018, as well as the effect of a lower tax rate on pre-tax income. The benefit reflected in 2017 is primarily due to the company's recognition of tax benefits related to enactment of the Tax Cuts and Jobs Act and for the completion of a multi-year study for R&D Credits in 2017, as well as pre-tax losses at a higher tax rate.

Net Income from Discontinued Operations

As previously discussed, we sold an aggregate 50% membership interest in GPCC to TGAM and StepStone during the third quarter of 2019. After closing, GPCC is no longer consolidated in the company's consolidated financial statements and the GPCC investment is accounted for using the equity method of accounting. GPCC results for all prior periods are classified as discontinued operations. Net income from discontinued operations increased by $6.5 million in 2018 primarily due to an increase in volumes sold as a result of the acquisitions of cattle feeding operations during the first and second quarters of 2017 and in the third quarter of 2018. In addition, during 2018, the company recognized a gain within other income of $4.5 million related to business interruption and property insurance proceeds received in excess of the book value of certain fixed assets that were damaged at the Hereford cattle feed yard.

Liquidity and Capital Resources

Our principal sources of liquidity include cash generated from operating activities and bank credit facilities. We fund our operating expenses and service debt primarily with operating cash flows. Capital resources for maintenance and growth expenditures are funded by a variety of sources, including cash generated from operating activities, borrowings under bank credit facilities, or issuance of senior notes or equity. Our ability to access capital markets for debt under reasonable terms depends on our financial condition, credit ratings and market conditions. We believe that our ability to obtain financing at reasonable rates and history of consistent cash flow from operating activities provide a solid foundation to meet our future liquidity and capital resource requirements.

On December 31, 2019, we had $246.0 million in cash and equivalents, excluding restricted cash, consisting of $177.1 million available to our parent company and the remainder at our subsidiaries. Additionally, we had $23.9 million in restricted cash at December 31, 2019. We also had $289.7 million available under our committed revolving credit agreements, some of which were subject to restrictions or other lending conditions. Funds held by our subsidiaries are generally required for their ongoing operational needs and restricted from distribution. At December 31, 2019, our subsidiaries had approximately $67.4 million of net assets that were not available to use in the form of dividends, loans or advances due to restrictions contained in their credit facilities.

Net cash used in operating activities of continuing operations was $27.0 million in 2019 compared with net cash provided by operating activities of continuing operations of $29.5 million in 2018. Operating activities compared to the prior year were primarily affected by the decrease in operating income as well as changes to working capital. Net cash provided by investing activities of continuing operations was $34.8 million in 2019, compared to net cash provided by investing activities of continuing operations of $635.5 million in 2018 due primarily to the proceeds from the sale of the three ethanol plants and Fleischmann's Vinegar during 2018. Net cash used in financing activities of continued operations was $18.9 million in 2019, compared to $643.6 million in 2018 primarily due to the repayment of the term loan during 2018.

Additionally, Green Plains Trade and Green Plains Grain use revolving credit facilities to finance working capital requirements. We frequently draw from and repay these facilities which results in significant cash movements reflected on a gross basis within financing activities as proceeds from and payments on short-term borrowings.

We incurred capital expenditures of $76.5 million in 2019 primarily related to our high-protein and Project 24 initiatives. The current projected estimate for capital spending for 2020 is approximately $80 million to $120 million, which is subject to review prior to the initiation of any project. The budget includes additional expenditures for our high-protein and Project 24 initiatives, as well as expenditures for various other maintenance projects, and is expected to be financed with available borrowings under our credit facilities and cash provided by operating activities, as well as additional borrowings as needed.

Our business is highly sensitive to the price of commodities, particularly for corn, ethanol, distillers grains, corn oil and natural gas. We use derivative financial instruments to reduce the market risk associated with fluctuations in commodity prices. Sudden changes in commodity prices may require cash deposits with brokers for margin calls or significant liquidity with little advanced notice to meet margin calls, depending on our open derivative positions. On December 31, 2019, we had $12.2 million in margin deposits for broker margin requirements included in the balance of restricted cash. We continuously monitor our exposure to margin calls and believe we will continue to maintain adequate liquidity to cover margin calls from our operating results and borrowings.

On June 18, 2019, we announced that our board of directors decided to suspend future quarterly cash dividends following the June 14, 2019 dividend payment, in order to retain and redirect cash flow to the our Project 24 operating expense equalization plan, the deployment of high-protein technology and our stock repurchase program.

On October 30, 2019, our board of directors authorized an additional $100.0 million share repurchase taking the previously authorized amount from $100.0 million to $200.0 million. Under the program, we may repurchase shares in open market transactions, privately negotiated transactions, accelerated share buyback programs, tender offers or by other means. The timing and amount of repurchase transactions are determined by our management based on market conditions, share price, legal requirements and other factors. The program may be suspended, modified or discontinued at any time without prior notice. During 2019, we purchased a total of 5,396,608 shares of common stock for approximately $61.6 million. As of December 31, 2019, we have repurchased 6,515,957 of common stock for approximately $81.4 million under the program.

The requirements under the partnership agreement for the conversion of all of the outstanding subordinated units into common units were satisfied upon the payment of the distribution with respect to the quarter ended June 30, 2018. Accordingly, the subordination period ended on August 13, 2018, the first business day after the date of the distribution payment, and all of the 15,889,642 outstanding subordinated units were converted into common units on a one-for-one basis. The conversion of the subordinated units does not impact the amount of cash distributions paid or the total number of outstanding units.

On December 27, 2019, we filed a shelf registration statement on Form S-3 with the SEC, declared effective January 7, 2020, registering an indeterminate number of shares of common stock, warrants and debt securities up to $250,000,000.

We believe we have sufficient working capital for our existing operations. Furthermore, our liquidity position has improved as a result of the partial sale of GPCC during the third quarter of 2019 and the sale of our 50% joint venture interest in JGP Energy Partners LLC during the fourth quarter of 2019, in addition to the sale of three of our ethanol plants and Fleischmann's Vinegar during the fourth quarter of 2018. The majority of net cash proceeds from the sales of three of our ethanol plants and Fleischmann's Vinegar, net of fees and taxes, were used to pay off the outstanding term loan balance. Net cash proceeds from the partial sale of GPCC and the sale of our interest in JGP Energy Partners LLC were used towards our continued investment into our high-protein initiative, to repurchase the company's common stock as part of our share repurchase program and general corporate purposes. A continued sustained period of unprofitable operations, however, may strain our liquidity. We may sell additional assets or equity or borrow capital to improve or preserve our liquidity, expand our business or acquire businesses. We cannot provide assurance that we will be able to secure funding necessary for additional working capital or these projects at reasonable terms, if at all.

Debt

We were in compliance with our debt covenants at December 31, 2019. Based on our forecasts, we believe we will maintain compliance at each of our subsidiaries for the next twelve months or have sufficient liquidity available on a consolidated basis to resolve noncompliance. We cannot provide assurance that actual results will approximate our forecasts or that we will inject the necessary capital into a subsidiary to maintain compliance with its respective covenants. In the event a subsidiary is unable to comply with its debt covenants, the subsidiary's lenders may determine that an event of default has occurred, and following notice, the lenders may terminate the commitment and declare the unpaid balance due and payable.

As outlined in *Note 12 - Debt*, we use LIBOR as a reference rate for certain revolving credit facilities. LIBOR is currently set to be phased out at the end of 2021. At this time, it is not possible to predict the effect of this change or the alternative reference rate to be used. We will need to renegotiate certain credit facilities to determine the interest rate to replace LIBOR with the new standard that is established. As such, the potential effect of any such event on interest expense cannot yet be determined.

Corporate Activities

On June 21, 2019, we issued $105.0 million of 4.00% convertible senior notes due in 2024, or the 4.00% notes. We used approximately $57.8 million of the net proceeds to repurchase the $56.8 million outstanding principal amount of its 3.25% convertible senior notes due October 1, 2019 in cash, including accrued and unpaid interest, in privately negotiated transactions concurrently with the offering of 4.00% notes. On July 19, 2019, we closed on the issuance of an additional $10.0 million aggregate principal amount of the 4.00% notes (the "Option Notes") to the initial purchasers. The Option Notes provided us with net proceeds, after deducting commissions and our offering expenses, of approximately $9.5 million. The Option Notes have the same terms as the 4.00% notes issued on June 21, 2019, and were issued under the same Indenture dated as of June 21, 2019. After the issuance of the Option Notes, total aggregate principal of the 4.00% notes outstanding is $115.0 million.

The 4.00% notes are senior, unsecured obligations, with interest payable on January 1 and July 1 of each year, beginning January 1, 2020, at a rate of 4.00% per annum. The initial conversion rate will be 64.1540 shares of our common stock per $1,000 principal amount of the 4.00% notes, which is equivalent to an initial conversion price of approximately $15.59 per share of our common stock. The conversion rate will be subject to adjustment upon the occurrence of certain events. In addition, we may be obligated to increase the conversion rate for any conversion that occurs in connection with certain corporate events, including our calling the 4.00% notes for redemption. We may settle the 4.00% notes in cash, common stock or a combination of cash and common stock. At December 31, 2019, the outstanding principal balance was $83.5 million on the 4.00% notes.

In August 2016, we issued $170.0 million of 4.125% convertible senior notes due in 2022, or 4.125% notes, which are senior, unsecured obligations with interest payable on March 1 and September 1 of each year. Prior to March 1, 2022, the 4.125% notes are not convertible unless certain conditions are satisfied. The initial conversion rate is 35.7143 shares of common stock per $1,000 of principal which is equal to a conversion price of approximately $28.00 per share. The conversion rate is subject to adjustment upon the occurrence of certain events, including when the quarterly cash dividend exceeds $0.12 per share. We may settle the 4.125% notes in cash, common stock or a combination of cash and common stock. At December 31, 2019, the outstanding principal balance was $149.3 million on the 4.125% notes.

Ethanol Production Segment

We have small equipment financing loans, capital leases on equipment or facilities, and other forms of debt financing.

Agribusiness and Energy Services Segment

Green Plains Trade has a $300.0 million senior secured asset-based revolving credit facility to finance working capital up to the maximum commitment based on eligible collateral, which matures in July of 2022. This facility can be increased by up to $70.0 million with agent approval. Advances are subject to variable interest rates equal to a daily LIBOR rate plus 2.25% or the base rate plus 1.25%. The unused portion of the credit facility is also subject to a commitment fee of 0.375% per annum. At December 31, 2019, the outstanding principal balance was $138.2 million on the facility and the interest rate was 3.86%.

Green Plains Grain has a $100.0 million senior secured asset-based revolving credit facility to finance working capital up to the maximum commitment based on eligible collateral, which matures in June of 2022. This facility can be increased by an additional $75.0 million with agent approval and up to $50.0 million for seasonal borrowings. Total commitments outstanding under the facility cannot exceed $225.0 million. On June 28, 2019, the company amended the credit facility to extend the existing maturity date from July 26, 2019 to June 28, 2022 and lower the maximum commitment from $125.0 million to $100.0 million. Depending on utilization, the total unused portion of the $100.0 million revolving credit facility is also subject to a commitment fee ranging from 0.375% to 0.50% per annum. At December 31, 2019, the outstanding principal balance was $40.0 million and the interest rate was 6.75%. The average interest rate for fiscal 2019 was 5.62%.

Green Plains Grain has short-term inventory financing agreements with a financial institution with a maximum commitment of up to $50.0 million, which matures June 2022. Green Plains Grain has accounted for the agreements as short-term notes, rather than sales, and has elected the fair value option to offset fluctuations in market prices of the inventory. Green Plains Grain had no short-term notes payable related to these inventory financing agreements as of December 31, 2019.

Green Plains Commodity Management has an uncommitted revolving credit facility, which was amended in October 2019, to increase the maximum commitment from $20.0 million to $30.0 million. The revolving credit facility, which matures April 30, 2023, is used to finance margins related to its hedging programs. Advances are subject to variable interest rates equal to LIBOR plus 1.75%. At December 31, 2019, the outstanding principal balance was $9.6 million and the interest rate was 3.38%.

Food and Ingredients Segment

Upon the disposition of Green Plains Cattle, the food and ingredient segment no longer has any forms of debt financing. Refer to *Note 5 – Acquisitions, Dispositions and Discontinued Operations* for further discussion on the disposition and discontinued operations classification.

Partnership Segment

Green Plains Partners, through a wholly owned subsidiary, has a $200.0 million revolving credit facility to fund working capital, acquisitions, distributions, capital expenditures and other general partnership purposes. The credit facility matures on July 1, 2020, and as a result, was reclassified to current maturities of long-term debt. We intend to renew and extend the revolving credit facility with similar terms prior to its maturity. The credit facility can be increased by an additional $20.0 million without the consent of the lenders. At December 2019, the outstanding principal balance of the facility was $132.1 million and the interest rate was 4.79%.

While the partnership has not yet renegotiated the credit facility or secured additional funding necessary to repay the loan, the partnership believes it is probable that it will source appropriate funding given the partnership's consistent and stable fee-based cash flows, ongoing profitability, low debt leverage and history of obtaining financing on reasonable commercial terms. In the unlikely scenario that the partnership is unable to refinance its debt with the lenders prior to its maturity, the partnership will consider other financing sources, including but not limited to, the restructuring or issuance of new debt with a different lending group, the issuance of additional partnership units or support from Green Plains Inc.

Refer to *Note 12 – Debt* included as part of the notes to consolidated financial statements for more information about our debt.

Contractual Obligations

Contractual obligations as of December 31, 2019 were as follows (in thousands):

	Payments Due By Period				
Contractual Obligations	**Total**	**Less than 1 year**	**1-3 years**	**3-5 years**	**More than 5 years**
Long-term and short-term debt obligations (1)	$ 621,424	$ 320,367	$ 170,699	$ 115,668	$ 14,690
Interest and fees on debt obligations (2)	62,646	23,933	23,044	8,987	6,682
Operating lease obligations (3)	66,627	18,867	20,001	9,787	17,972
Other	20,683	4,154	6,231	2,431	7,867
Purchase obligations					
Forward grain purchase contracts (4)	126,950	123,994	2,039	917	-
Other commodity purchase contracts (5)	138,989	113,854	24,591	544	-
Other	41	41	-	-	-
Total contractual obligations	$ 1,037,360	$ 605,210	$ 246,605	$ 138,334	$ 47,211

(1) Includes the current portion of long-term debt and future finance lease obligations and excludes the effect of any debt discounts and issuance costs.

(2) Interest amounts are calculated over the terms of the loans using current interest rates, assuming scheduled principle and interest amounts are paid pursuant to the debt agreements. Includes administrative and/or commitment fees on debt obligations.

(3) Operating lease costs are primarily for railcars, land and office space.

(4) Purchase contracts represent index-priced and fixed-price contracts. Index purchase contracts are valued at current year-end prices.

(5) Includes fixed-price ethanol, dried distillers grains and natural gas purchase contracts.

Item 7A. Qualitative and Quantitative Disclosures About Market Risk.

We use various financial instruments to manage and reduce our exposure to various market risks, including changes in commodity prices and interest rates. We conduct the majority of our business in U.S. dollars and are not currently exposed to material foreign currency risk.

Interest Rate Risk

We are exposed to interest rate risk through our loans which bear interest at variable rates. Interest rates on our variable-rate debt are based on the market rate for the lender's prime rate or LIBOR. A 10% increase in interest rates would affect our interest cost by approximately $1.4 million per year. At December 31, 2019, we had $564.4 million in debt, $319.9 million of which had variable interest rates.

Refer to *Note 12 – Debt* included as part of the notes to consolidated financial statements for more information about our debt.

Commodity Price Risk

Our business is highly sensitive to commodity price risk, particularly for ethanol, corn, distillers grains, corn oil and natural gas. Ethanol prices are sensitive to world crude oil supply and demand, the price of crude oil, gasoline and corn, the price of substitute fuels, refining capacity and utilization, government regulation and consumer demand for alternative fuels. Corn prices are affected by weather conditions, yield, changes in domestic and global supply and demand, and government programs and policies. Distillers grains prices are impacted by livestock numbers on feed, prices for feed alternatives and supply, which is associated with ethanol plant production. Natural gas prices are influenced by severe weather in the summer and winter and hurricanes in the spring, summer and fall. Other factors include North American energy exploration and production, and the amount of natural gas in underground storage during injection and withdrawal seasons.

To reduce the risk associated with fluctuations in the price of ethanol, corn, distillers grains, corn oil and natural gas, at times we use forward fixed-price physical contracts and derivative financial instruments, such as futures and options executed on the Chicago Board of Trade, the New York Mercantile Exchange and the Chicago Mercantile Exchange. We focus on locking in favorable operating margins, when available, using a model that continually monitors market prices for corn, natural gas and other inputs relative to the price for ethanol and distillers grains at each of our production facilities. We create offsetting positions using a combination of forward fixed-price purchases, sales contracts and derivative financial instruments. As a result, we frequently have gains on derivative financial instruments that are offset by losses on forward fixed-price physical contracts or inventories and vice versa. Our results are impacted by a mismatch of gains or losses associated with the derivative instrument during a reporting period when the physical commodity purchases or sale has not yet occurred. For the year ended December 31, 2019, revenues included net losses of $10.2 million and cost of goods sold included net gains of $1.8 million associated with derivative instruments.

Ethanol Production Segment

In the ethanol production segment, net gains and losses from settled derivative instruments are offset by physical commodity purchases or sales to achieve the intended operating margins. To reduce commodity price risk caused by market fluctuations, we enter into exchange-traded futures and options contracts that serve as economic hedges. Our results are impacted when there is a mismatch of gains or losses associated with the derivative instrument during a reporting period when the physical commodity purchases or sale has not yet occurred.

Our exposure to market risk, which includes the impact of our risk management activities resulting from our fixed-price purchase and sale contracts and derivatives, is based on the estimated net income effect resulting from a hypothetical 10% change in price for the next 12 months starting on December 31, 2019, are as follows (in thousands):

Commodity	Estimated Total Volume Requirements for the Next 12 Months (1)	Unit of Measure		Net Income Effect of Approximate 10% Change in Price
Ethanol	1,123,000	Gallons	$	118,100
Corn	387,000	Bushels	$	107,075
Distillers grains	2,900	Tons (2)	$	29,848
Corn Oil	292,000	Pounds	$	3,431
Natural gas	31,200	MMBTU	$	4,492

(1) Estimated volumes reflect anticipated expansion of production capacity at our ethanol plants and assumes production at full capacity.

(2) Distillers grains quantities are stated on an equivalent dried ton basis.

Agribusiness and Energy Services Segment

In the agribusiness and energy services segment, our inventories, physical purchase and sale contracts and derivatives are marked to market. To reduce commodity price risk caused by market fluctuations for purchase and sale commitments of grain and grain held in inventory, we enter into exchange-traded futures and options contracts that serve as economic hedges.

The market value of exchange-traded futures and options used for hedging are highly correlated with the underlying market value of grain inventories and related purchase and sale contracts for grain. The less correlated portion of inventory and purchase and sale contract market values, known as basis, is much less volatile than the overall market value of exchange-traded futures and tends to follow historical patterns. We manage this less volatile risk by constantly monitoring our position relative to the price changes in the market. Inventory values are affected by the month-to-month spread in the futures markets. These spreads are also less volatile than overall market value of our inventory and tend to follow historical patterns, but cannot be mitigated directly. Our accounting policy for futures and options, as well as the underlying inventory held for sale and purchase and sale contracts, is to reflect their current market values and include gains and losses in the consolidated statement of operations.

Our daily net commodity position consists of inventories related to purchase and sale contracts and exchange-traded contracts. The fair value of our position was approximately $0.3 million for grain at December 31, 2019. Our market risk at that date, based on the estimated net income effect resulting from a hypothetical 10% change in price, was approximately $22 thousand.

Item 8. Financial Statements and Supplementary Data.

The required consolidated financial statements and accompanying notes are listed in Part IV, Item 15.

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

None.

Item 9A. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures

We maintain disclosure controls and procedures designed to ensure information that must be disclosed in the reports we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms, and that such information is accumulated and communicated to management, as appropriate, to allow timely decisions regarding required financial disclosure. In designing and evaluating the disclosure controls and procedures, management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives. Management is required to apply its judgment in evaluating the cost-benefit relationship of possible controls and procedures.

Under the supervision of and participation of our chief executive officer and chief financial officer, management carried out an evaluation of the effectiveness of the design and operation of our disclosure controls and procedures as of December 31, 2019, as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act and concluded that our disclosure controls and procedures were effective.

Management's Annual Report on Internal Control over Financial Reporting

Management is responsible for establishing and maintaining effective internal control over financial reporting, as defined in Exchange Act Rule 13a-15(f). Our internal control system is designed to provide reasonable assurance regarding the reliability of financial reporting and preparation of financial statements in accordance with GAAP.

Under the supervision and participation of our chief executive officer and chief financial officer, management assessed the design and operating effectiveness of our internal control over financial reporting as of December 31, 2019, based on the *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this assessment, management concluded that our internal control over financial reporting was effective as of December 31, 2019.

Changes in Internal Control over Financial Reporting

Management is responsible for establishing and maintaining effective internal control over financial reporting to provide reasonable assurance regarding the reliability of our financial reporting and the preparation of our consolidated financial statements for external purposes in accordance with GAAP. We have not identified any changes in our internal control over financial reporting that occurred during the period covered by this report that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
Green Plains Inc.:

Opinion on Internal Control Over Financial Reporting

We have audited Green Plains Inc. and subsidiaries' (the Company) internal control over financial reporting as of December 31, 2019, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2019, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

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 operations, comprehensive income, stockholders' equity, and cash flows for each of the years in the three-year period ended December 31, 2019, and the related notes (collectively, the consolidated financial statements), and our report dated February 20, 2020 expressed an unqualified opinion on those consolidated financial statements.

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 Annual Report on 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 of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included 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/ KPMG LLP

Omaha, Nebraska
February 20, 2020

Item 9B. Other Information.

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

Information in our Proxy Statement for the 2020 Annual Meeting of Stockholders ("Proxy Statement") under "Corporate Governance," "Proposal 1 – Election of Directors," "Our Management," and "Section 16(a) Beneficial Ownership Reporting Compliance" is incorporated by reference.

We have adopted a code of ethics that applies to our chief executive officer, chief financial officer and all other senior financial officers. Our code of ethics is available on our website at *www.gpreinc.com* in the "Investors – Corporate Governance" section. Amendments or waivers are disclosed within five business days following its adoption.

Item 11. Executive Compensation.

Information included in the Proxy Statement under "Corporate Governance" and "Executive Compensation" is incorporated by reference.

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

Information in the Proxy Statement under "Security Ownership of Certain Beneficial Owners and Management" and "Executive Compensation" is incorporated by reference.

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

Information in the Proxy Statement under "Transactions with Related Persons, Promoters and Certain Control Persons" is incorporated by reference.

Item 14. Principal Accounting Fees and Services.

Information in the Proxy Statement under "Independent Public Accountants" is incorporated by reference.

PART IV

Item 15. Exhibits, Financial Statement Schedules.

(1) Financial Statements. The following consolidated financial statements and notes are filed as part of this annual report on Form 10-K.

	Page
Report of Independent Registered Public Accounting Firm	F-1
Consolidated Balance Sheets as of December 31, 2019 and 2018	F-2
Consolidated Statements of Operations for the years-ended December 31, 2019, 2018 and 2017	F-3
Consolidated Statements of Comprehensive Income for the years-ended December 31, 2019, 2018 and 2017	F-4
Consolidated Statements of Stockholders' Equity for the years-ended December 31, 2019, 2018 and 2017	F-5
Consolidated Statements of Cash Flows for the years-ended December 31, 2019, 2018 and 2017	F-6
Notes to Consolidated Financial Statements	F-8

(2) Financial Statement Schedules. All schedules have been omitted because they are not applicable or the required information is included in the consolidated financial statements or notes thereto.

(3) Exhibits. The following exhibits are incorporated by reference, filed or furnished as part of this annual report on Form 10-K.

Exhibit Index

Exhibit No.	Description of Exhibit
2.1	Membership Interest Purchase Agreement between Murphy Oil USA, Inc. and Green Plains Inc. dated October 28, 2015 (certain exhibits and disclosure schedules to this agreement have been omitted; Green Plains will furnish such exhibits and disclosure schedules to the SEC upon request) (incorporated herein by reference to Exhibit 2.1 to the company's Current Report on Form 8-K dated November 12, 2015)
2.2	Asset Purchase Agreement, dated as of July 27, 2018, by and among Green Plains Cattle Company LLC, and Bartlett Cattle Company, L.P. (incorporated herein by reference to Exhibit 2.1 of the company's Current Report on Form 8-K filed on August 1, 2018)
2.3(a)	Asset Purchase Agreement among Green Plains Bluffton LLC, Green Plains Holdings II LLC, Green Plains Inc. and Valero Renewable Fuels Company, LLC, dated October 8, 2018. (incorporated by reference to Exhibit 2.1 of our Current Report on Form 8-K filed on October 10, 2018). (The schedules to the Asset Purchase Agreement have been omitted. The company will furnish such schedules to the SEC upon request.)
2.3(b)	Asset Purchase Agreement among Green Plains Partners LP, Green Plains Holdings LLC, Green Plains Operating Company LLC, Green Plains Ethanol Storage LLC, Green Plains Logistics LLC, Green Plains Inc., Green Plains Trade Group LLC, Green Plains Bluffton LLC and Green Plains Holdings II LLC (incorporated by reference to Exhibit 2.2 of our Current Report on Form 8-K filed on October 10, 2018). (The schedules to the Asset Purchase Agreement have been omitted. The Partnership will furnish such schedules to the SEC upon request).
2.4	Asset Purchase Agreement, dated as of April 25, 2017, by and among Green Plains Cattle Company LLC, and Cargill Cattle Feeders, LLC. (incorporated herein by reference to Exhibit 2.1 to the company's Current Report on Form 8-K dated April 26, 2017)
2.5	Stock Purchase Agreement among Green Plains Inc., Green Plains II LLC and Kerry Holding Co. dated October 23, 2018. (The schedules to the Stock Purchase Agreement have been omitted. The Company will furnish such schedules to the SEC upon request.) (incorporated herein by reference to Exhibit 2.1 of the company's Current Report on Form 8-K filed October 25, 2018)
2.6	Securities Purchase Agreement, dated as of September 6, 2019, by and among Green Plains Inc., Green Plains Cattle Company LLC, TGAM Agribusiness Fund Holdings-B LP, and StepStone Atlantic Fund, L.P. (Certain schedules to the Securities Purchase Agreement have been omitted. The company will furnish such schedules to the SEC upon request.) (incorporated herein by reference to Exhibit 2.1 of the company's Current Report on Form 8-K filed September 9, 2019)

2.7	Second Amended and Restated Limited Liability Company Agreement of Green Plains Cattle Company LLC, dated September 6, 2019 (Certain schedules to the Second Amended and Restated Limited Liability Company Agreement have been omitted. The company will furnish such schedules to the SEC upon request.) (incorporated herein by reference to Exhibit 10.1 of the company's Current Report on Form 8-K filed September 9, 2019)
3.1(a)	Second Amended and Restated Articles of Incorporation of the company (incorporated herein by reference to Exhibit 3.1 of the company's Current Report on Form 8-K filed October 15, 2008)
3.1(b)	Articles of Amendment to Second Amended and Restated Articles of Incorporation of Green Plains Renewable Energy, Inc. (incorporated herein by reference to Exhibit 3.1 of the company's Current Report on Form 8-K filed May 9, 2011)
3.1(c)	Second Articles of Amendment to Second Amended and Restated Articles of Incorporation of Green Plains Renewable Energy, Inc. (incorporated herein by reference to Exhibit 3.1 of the company's Current Report on Form 8-K filed May 16, 2014)
3.2	Second Amended and Restated Bylaws of Green Plains Renewable Energy, Inc., dated August 14, 2012 (incorporated herein by reference to Exhibit 3.1 of the company's Current Report on Form 8-K filed August 15, 2012)
4.1	Shareholders' Agreement by and among Green Plains Renewable Energy, Inc., each of the investors listed on Schedule A, and each of the existing shareholders and affiliates identified on Schedule B, dated May 7, 2008 (incorporated herein by reference to Appendix F of the company's Registration Statement on Form S-4/A filed September 4, 2008)
4.2	Form of Senior Indenture (incorporated herein by reference to Exhibit 4.5 of the company's Registration Statement on Form S-3/A filed December 30, 2009)
4.3	Form of Subordinated Indenture (incorporated herein by reference to Exhibit 4.6 of the company's Registration Statement on Form S-3/A filed December 30, 2009)
4.4	Indenture relating to the 4.125% Convertible Senior Notes due 2022, dated as of August 15, 2016, between Green Plains Inc. and Wilmington Trust, National Association, including the form of Global Note attached as Exhibit A thereto (incorporated herein by reference to Exhibit 4.1 to the company's Current Report on Form 8-K filed August 15, 2016)
4.5	Indenture relating to the 3.25% Convertible Senior Notes due 2019, dated as of August 14, 2018, between Green Plains Inc. and Wilmington Trust, National Association, as trustee (including therein Form of 3.25% Convertible Senior Notes Due 2019) (incorporated herein by reference to Exhibit 4.1 to the company's Current Report on Form 8-K filed August 14, 2018)
4.6	Indenture relating to the 4.00% Convertible Senior Notes due 2024, dated as of June 21, 2019, between Green Plains Inc. and Wilmington Trust, National Association, including the form of Global Note attached as Exhibit A thereto (incorporated herein by reference to Exhibit 4.1 of the company's Current Report on Form 8-K filed on June 21, 2019)
4.7	Description of Securities Registered Under Section 12 of the Exchange Act
*10.1	2007 Equity Incentive Plan (incorporated herein by reference to Appendix A of the company's Definitive Proxy Statement filed March 27, 2007)
10.2	Form of Indemnification Agreement (incorporated herein by reference to Exhibit 10.53 of the company's Registration Statement on Form S-4/A filed August 1, 2008)
*10.3(a)	Employment Agreement with Todd Becker (incorporated herein by reference to Exhibit 10.54 of the company's Registration Statement on Form S-4/A filed August 1, 2008)
*10.3(b)	Amendment No. 1 to Employment Agreement with Todd Becker, dated December 18, 2009. (incorporated herein by reference to Exhibit 10.7(b) of the company's Annual Report on Form 10-K filed February 24, 2010)
*10.3(c)	Amendment No. 2 to Employment Agreement with Todd Becker, dated March 27, 2018 (incorporated herein by reference to Exhibit 10.52 of the company's Quarterly Report on Form 10-Q filed on May 7, 2018)
*10.4(a)	2009 Equity Incentive Plan (incorporated herein by reference to Exhibit 10.1 of the company's Current Report on Form 8-K dated May 11, 2009)
*10.4(b)	Amendment No. 1 to the 2009 Equity Incentive Plan (incorporated herein by reference to Appendix A of the company's Definitive Proxy Statement filed March 25, 2011)

*10.4(c)	Amendment No. 2 to the 2009 Equity Incentive Plan (incorporated herein by reference to Appendix A of the company's Definitive Proxy Statement filed March 29, 2013)
*10.4(d)	Amended and Restated 2009 Equity Incentive Plan (incorporated herein by reference to Exhibit 99.1 of the company's Registration Statement on Form S-8 filed June 23, 2017)
*10.4(e)	Form of Stock Option Award Agreement for 2009 Equity Incentive Plan (incorporated herein by reference to Exhibit 10.19(b) of the company's Annual Report on Form 10-K filed February 24, 2010)
*10.4(f)	Form of Restricted Stock Award Agreement for 2009 Equity Incentive Plan (incorporated herein by reference to Exhibit 10.19(c) of the company's Annual Report on Form 10-K/A (Amendment No. 1) filed February 25, 2010)
*10.4(g)	Amended Form of Restricted Stock Award agreement for 2009 Equity Incentive Plan (incorporated herein by reference to Exhibit 10.53 of the company's Quarterly Report on Form 10-Q filed on May 7, 2018)
*10.4(h)	Form of Deferred Stock Unit Award Agreement for 2009 Equity Incentive Plan (incorporated herein by reference to Exhibit 10.19(d) of the company's Annual Report on Form 10-K filed February 24, 2010)
*10.4(i)	Form of Performance Share Unit Award agreement for 2009 Equity Incentive Plan (incorporated herein by reference to Exhibit 10.54 of the company's Quarterly Report on Form 10-Q filed on May 7, 2018)
10.5(a)	Second Amended and Restated Revolving Credit and Security Agreement dated April 26, 2013 by and among Green Plains Trade Group LLC and PNC Bank, National Association (as Lender and Agent) (incorporated herein by reference to Exhibit 10.2 of the company's Quarterly Report on Form 10-Q filed May 2, 2013)
10.5(b)	Third Amended and Restated Revolving Credit and Security Agreement dated November 26, 2014 by and among Green Plains Trade Group LLC, the Lenders and PNC Bank, National Association (as Lender and Agent) (incorporated herein by reference to Exhibit 10.1 of the company's Current Report on Form 8-K filed December 2, 2014)
10.5(c)	Fourth Amended and Restated Revolving Credit and Security Agreement dated July 28, 2017, among Green Plains Trade Group LLC, the Lenders and PNC Bank, National Association as Lender and Agent (incorporated herein by reference to Exhibit 10.1 to the company's Current Report on Form 8-K dated July 31, 2017)
10.5(d)	First Amendment to Fourth Amended and Restated Revolving Credit and Security Agreement, dated as of August 29, 2017, among Green Plains Trade Group LLC and PNC Bank, National Association, as agent, and the lenders party to the Credit and Security Agreement (incorporated herein by reference to Exhibit 10.4(a) to the company's Current Report on Form 8-K dated August 29, 2017)
10.5(e)	Second Amendment to Fourth Amended and Restated Revolving Credit and Security Agreement, dated as of March 15, 2018, by and among Green Plains Trade Group LLC and PNC Bank, National Association (incorporated herein by reference to Exhibit 10.1 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.5(f)	Third Amendment to Fourth Amended and Restated Revolving Credit and Security Agreement, dated as of November 27, 2019, by and among Green Plains Trade Group LLC and PNC Bank, National Association
10.5(g)	Revolving Credit Note dated April 26, 2013 by and among Green Plains Trade Group LLC and Citibank, N.A. (incorporated herein by reference to Exhibit 10.2(b) of the company's Quarterly Report on Form 10-Q filed May 2, 2013)
10.5(h)	Revolving Credit Note dated April 26, 2013 by and among Green Plains Trade Group LLC and BMO Harris Bank N.A. (incorporated herein by reference to Exhibit 10.2(c) of the company's Quarterly Report on Form 10-Q filed May 2, 2013)
10.5(i)	Revolving Credit Note dated April 26, 2013 by and among Green Plains Trade Group LLC and Alostar Bank of Commerce (incorporated herein by reference to Exhibit 10.2(d) of the company's Quarterly Report on Form 10-Q filed May 2, 2013)
10.5(j)	Second Amended and Restated Credit Note dated April 26, 2013 by and among Green Plains Trade Group LLC and PNC Bank, National Association (Incorporated by reference to Exhibit 10.2(a) of the company's Quarterly Report on Form 10-Q filed May 2, 2013)

10.5(k)	Revolving Credit Note dated April 26, 2013 by and among Green Plains Trade Group LLC and Bank of America (incorporated here by reference to Exhibit 10.2(e) of the company's Quarterly Report on Form 10-Q filed May 2, 2013)
10.5(l)	ABL Intercreditor Agreement, dated as of August 29, 2017, among PNC Bank, National Association, as ABL Collateral Agent, and BNP Paribas, as Term Loan Collateral Agent, and acknowledged by Green Plains Trade Group LLC and the other ABL Grantors (incorporated herein by reference to Exhibit 10.4(b) to the company's Current Report on Form 8-K dated August 29, 2017)
10.5(m)	Guaranty, dated as of August 29, 2017, in favor of PNC Bank, National Association, as agent (incorporated herein by reference to Exhibit 10.4(c) to the company's Current Report on Form 8-K dated August 29, 2017)
*10.6	Umbrella Short-Term Incentive Plan (incorporated herein by reference to Appendix A of the company's Proxy Statement filed April 3, 2014)
*10.7	Director Compensation effective May 11, 2016 (incorporated herein by reference to Exhibit 10.4 of the company's Quarterly Report on Form 10-Q filed August 3, 2016)
*10.8	Director Compensation effective November 14, 2017 (incorporated herein by reference to Exhibit 10.9 of the company's Annual Report on Form 10-K filed February 15, 2018)
10.9(a)	Credit Agreement dated October 28, 2011 by and among Green Plains Grain Company LLC, Green Plains Grain Company TN LLC, Green Plains Essex Inc., BNP Paribas Securities Corp. as Lead Arranger, Rabo Agrifinance, Inc. as Syndication Agent, ABN AMRO Capital USA LLC as Documentation Agent and BNP Paribas as Administrative Agent (incorporated herein by reference to Exhibit 10.1 of the company's Current Report on Form 8-K filed November 3, 2011)
10.9(b)	Security Agreement dated October 28, 2011 by and among Green Plains Grain Company LLC, Green Plains Grain Company TN LLC, Green Plains Essex Inc. and BNP Paribas (incorporated herein by reference to Exhibit 10.2 of the company's Current Report on Form 8-K filed November 3, 2011)
10.9(c)	Promissory Note dated October 28, 2011 by and among Green Plains Grain Company LLC, Green Plains Grain Company TN LLC, Green Plains Essex Inc. and Bank of Oklahoma (incorporated herein by reference to Exhibit 10.3 of the company's Current Report on Form 8-K filed November 3, 2011)
10.9(d)	Promissory Note dated October 28, 2011 by and among Green Plains Grain Company LLC, Green Plains Grain Company TN LLC, Green Plains Essex Inc. and U.S. Bank National Association (incorporated herein by reference to Exhibit 10.4 of the company's Current Report on Form 8-K filed November 3, 2011)
10.9(e)	Promissory Note dated October 28, 2011 by and among Green Plains Grain Company LLC, Green Plains Grain Company TN LLC, Green Plains Essex Inc. and Farm Credit Bank of Texas (incorporated herein by reference to Exhibit 10.5 of the company's Current Report on Form 8-K filed November 3, 2011)
10.9(f)	First Amendment to Credit Agreement dated January 6, 2012 by and among Green Plains Grain Company LLC, Green Plains Grain Company TN LLC, Green Plains Essex Inc., BNP Paribas and the Required Lenders (incorporated herein by reference to Exhibit 10.26(k) of the company's Annual Report on Form 10-K filed February 17, 2012)
10.9(g)	Second Amendment to Credit Agreement, dated October 26, 2012, by and among Green Plains Grain Company LLC, Green Plains Grain Company TN LLC, Green Plains Essex, Inc., BNP Paribas, as the administrative agent under the Credit Agreement, and the lenders party to the Credit Agreement (incorporated herein by reference to Exhibit 10.5 of the company's Quarterly Report on Form 10-Q filed November 1, 2012)
10.9(h)	Third Amendment to Credit Agreement, dated August 27, 2013, by and among Green Plains Grain Company LLC, Green Plains Grain Company TN LLC, Green Plains Essex, Inc., BNP Paribas, as the administrative agent under the Credit Agreement, and the lenders party to the Credit Agreement (incorporated herein by reference to Exhibit 10.3 of the company's Quarterly Report on Form 10-Q filed October 31, 2013)
10.9(i)	Fourth Amendment to Credit Agreement, dated August 8, 2014, by and among Green Plains Grain Company LLC (including in its capacity as successor by merger to Green Plains Essex Inc.), Green Plains Grain Company TN LLC, BNP Paribas, as the administrative agent under the Credit Agreement, and the lenders party to the Credit Agreement (incorporated herein by reference to Exhibit 10.3 of the company's Quarterly Report on Form 10-Q filed October 30, 2014)

10.9(j)	Fifth Amendment to Credit Agreement, dated June 1, 2015, by and among Green Plains Grain Company LLC (including in its capacity as successor by merger to Green Plains Essex Inc.), Green Plains Grain Company TN LLC, BNP Paribas, as the administrative agent under the Credit Agreement, and the lenders party to the Credit Agreement (incorporated herein by reference to Exhibit 10.5 of the company's Quarterly Report on Form 10-Q filed August 3, 2016)
10.9(k)	Sixth Amendment to Credit Agreement, dated January 5, 2016, by and among Green Plains Grain Company LLC (including in its capacity as successor by merger to Green Plains Essex Inc.), Green Plains Grain Company TN LLC, BNP Paribas, as the administrative agent under the Credit Agreement, and the lenders party to the Credit Agreement (incorporated herein by reference to Exhibit 10.6 of the company's Quarterly Report on Form 10-Q filed August 3, 2016)
10.9(l)	Seventh Amendment to Credit Agreement, dated July 27, 2016, by and among Green Plains Grain Company LLC (including in its capacity as successor by merger to Green Plains Essex Inc.), Green Plains Grain Company TN LLC, BNP Paribas, as the administrative agent under the Credit Agreement, and the lenders party to the Credit Agreement (incorporated herein by reference to Exhibit 10.7 of the company's Quarterly Report on Form 10-Q filed August 3, 2016)
10.9(m)	Eighth Amendment to Credit Agreement, dated as of August 29, 2017, among Green Plains Grain Company and BNP Paribas, as Administrative Agent, and the lenders party to the Credit Agreement (incorporated herein by reference to Exhibit 10.3(a) to the company's Current Report on Form 8-K dated August 29, 2017)
10.9(n)	Ninth Amendment to Credit Agreement, dated as of June 28, 2019, among Green Plains Grain Company LLC and BNP Paribas, as Administrative Agent, and the lenders party to the Credit Agreement (incorporated herein by reference to Exhibit 10.1 of the company's Current Report on Form 8-K filed on July 1, 2019)
10.9(o)	ABL Intercreditor Agreement, dated as of August 29, 2017, among BNP Paribas, as ABL Collateral Agent, and BNP Paribas, as Term Loan Collateral Agent, and acknowledged by Green Plains Grain Company LLC and the other ABL Grantors (incorporated herein by reference to Exhibit 10.3(b) to the company's Current Report on Form 8-K dated August 29, 2017)
10.9(p)	Guaranty, dated as of August 29, 2017, in favor of BNP Paribas, as administrative agent (incorporated herein by reference to Exhibit 10.3(c) to the company's Current Report on Form 8-K dated August 29, 2017)
*10.10	Employment Agreement by and between Green Plains Renewable Energy, Inc. and Patrich Simpkins dated April 1, 2012 (incorporated herein by reference to Exhibit 10.2 of the company's Quarterly Report on Form 10-Q filed May 1, 2014)
*10.11	Employment Agreement with John Neppl (incorporated herein by reference to Exhibit 10.1 to the company's Current Report on Form 8-K dated September 5, 2017)
*10.12	Employment Agreement with Michelle S. Mapes
10.13(a)	First Lien Deed of Trust, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Green Plains Atkinson LLC, as grantor, to the trustee named therein for the benefit of BNP Paribas (State of Nebraska) (incorporated herein by reference to Exhibit 10.37 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(b)	Second Lien Deed of Trust, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Green Plains Atkinson LLC, as grantor, to the trustee named therein for the benefit of BNP Paribas (State of Nebraska) (incorporated herein by reference to Exhibit 10.38 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(c)	First Lien Deed of Trust, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by and from Green Plains Central City LLC, as grantor, to the trustee named therein for the benefit of BNP Paribas (State of Nebraska) (incorporated herein by reference to Exhibit 10.39 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(d)	Second Lien Deed of Trust, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by and from Green Plains Central City LLC, as grantor, to the trustee named therein for the benefit of BNP Paribas (State of Nebraska) (incorporated herein by reference to Exhibit 10.40 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)

10.13(e)	First Lien Deed of Trust, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by and from Green Plains Ord LLC, as grantor, to the trustee named therein for the benefit of BNP Paribas (State of Nebraska) (incorporated herein by reference to Exhibit 10.21 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(f)	Second Lien Deed of Trust, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by and from Green Plains Ord LLC, as grantor, to the trustee named therein for the benefit of BNP Paribas (State of Nebraska) (incorporated herein by reference to Exhibit 10.22 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(g)	First Lien Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Green Plains Bluffton LLC, as mortgagor, to and for the benefit of BNP Paribas (State of Indiana) (incorporated herein by reference to Exhibit 10.27 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(h)	Second Lien Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Green Plains Bluffton LLC, as mortgagor, to and for the benefit of BNP Paribas (State of Indiana) (incorporated herein by reference to Exhibit 10.28 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(i)	First Lien Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Green Plains Otter Tail LLC, as mortgagor, to and for the benefit of BNP Paribas (State of Minnesota) (incorporated herein by reference to Exhibit 10.13 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(j)	Second Lien Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Green Plains Otter Tail LLC, as mortgagor, to and for the benefit of BNP Paribas (State of Minnesota) (incorporated herein by reference to Exhibit 10.14 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(k)	First Lien Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Green Plains Shenandoah LLC, as mortgagor, to and for the benefit of BNP Paribas (State of Iowa) (incorporated herein by reference to Exhibit 10.11 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(l)	Second Lien Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Green Plains Shenandoah LLC, as mortgagor, to and for the benefit of BNP Paribas (State of Iowa) (incorporated herein by reference to Exhibit 10.12 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(m)	First Lien Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Green Plains Fairmont LLC, as mortgagor, to and for the benefit of BNP Paribas (State of Minnesota) (incorporated herein by reference to Exhibit 10.25 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(n)	Second Lien Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Green Plains Fairmont LLC, as mortgagor, to and for the benefit of BNP Paribas (State of Minnesota) (incorporated herein by reference to Exhibit 10.26 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(o)	First Lien Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by and from Green Plains Holdings II LLC, as mortgagor, to and for the benefit of BNP Paribas (State of Iowa) (incorporated herein by reference to Exhibit 10.5 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(p)	Second Lien Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by and from Green Plains Holdings II LLC, as mortgagor, to and for the benefit of BNP Paribas (State of Iowa) (incorporated herein by reference to Exhibit 10.6 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(q)	First Lien Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Green Plains Holdings II LLC, as mortgagor, to and for the benefit of BNP Paribas (State of Michigan) (incorporated herein by reference to Exhibit 10.43 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)

10.13(r)	Second Lien Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Green Plains Holdings II LLC, as mortgagor, to and for the benefit of BNP Paribas (State of Michigan) (incorporated herein by reference to Exhibit 10.44 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(s)	First Lien Deed of Trust, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by and from Green Plains Obion LLC, as grantor, to the trustee named therein for the benefit of BNP Paribas (State of Tennessee) (incorporated herein by reference to Exhibit 10.35 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(t)	Second Lien Deed of Trust, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by and from Green Plains Obion LLC, as grantor, to the trustee named therein for the benefit of BNP Paribas (State of Tennessee) (incorporated herein by reference to Exhibit 10.36 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(u)	First Lien Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Green Plains Superior LLC, as mortgagor, to and for the benefit of BNP Paribas (State of Iowa) (incorporated herein by reference to Exhibit 10.17 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(v)	Second Lien Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Green Plains Superior LLC, as mortgagor, to and for the benefit of BNP Paribas (State of Iowa) (incorporated herein by reference to Exhibit 10.18 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(w)	First Lien Fee and Leasehold Deed of Trust, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by and from Green Plains Wood River LLC, as grantor, to the trustee named therein for the benefit of BNP Paribas (State of Nebraska) (incorporated herein by reference to Exhibit 10.19 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(x)	Second Lien Deed of Trust, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by and from Green Plains Wood River LLC, as grantor, to the trustee named therein for the benefit of BNP Paribas (State of Nebraska) (incorporated herein by reference to Exhibit 10.20 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(y)	Second Amendment to Second Amended and Restated Security Agreement, dated as of April 13, 2018, by and among Green Plains Commodity Management LLC and PNC Bank, National Association (incorporated herein by reference to Exhibit 10.2 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(z)	First Lien Deed of Trust Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Fleischmann's Vinegar Company, Inc., as grantor, to the trustee names therein for the benefit of BNP Paribas (Montebello, California) (incorporated herein by reference to Exhibit 10.9 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(aa)	Second Lien Deed of Trust Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Fleischmann's Vinegar Company, Inc., as grantor, to the trustee names therein for the benefit of BNP Paribas (Montebello California) (incorporated herein by reference to Exhibit 10.10 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(ab)	First Lien Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by and from Green Plains Mount Vernon LLC, as mortgagor, to and for the benefit of BNP Paribas (State of Indiana) (incorporated herein by reference to Exhibit 10.15 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(ac)	Second Lien Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by and from Green Plains Mount Vernon LLC, as mortgagor, to and for the benefit of BNP Paribas (State of Indiana) (incorporated herein by reference to Exhibit 10.16 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(ad)	First Lien Deed of Trust, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by and from Green Plains York LLC, as grantor, to the trustee named therein for the benefit of BNP Paribas (State of Nebraska) (incorporated herein by reference to Exhibit 10.23 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)

10.13(ae)	Second Lien Deed of Trust, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by and from Green Plains York LLC, as grantor, to the trustee named therein for the benefit of BNP Paribas (State of Nebraska) (incorporated herein by reference to Exhibit 10.24 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(af)	First Lien Deed of Trust, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by and from Green Plains Hopewell LLC, as grantor, to the trustee named therein for the benefit of BNP Paribas (State of Virginia) (incorporated herein by reference to Exhibit 10.29 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(ag)	Second Lien Deed of Trust, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by and from Green Plains Hopewell LLC, as grantor, to the trustee named therein for the benefit of BNP Paribas (State of Virginia) (incorporated herein by reference to Exhibit 10.30 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(ah)	First Lien Leasehold Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by and from Green Plains Madison LLC, as mortgagor, to and for the benefit of BNP Paribas (State of Illinois) (incorporated herein by reference to Exhibit 10.31 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(ai)	Second Lien Leasehold Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by and from Green Plains Madison LLC, as mortgagor, to and for the benefit of BNP Paribas (State of Illinois) (incorporated herein by reference to Exhibit 10.32 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(aj)	First Lien Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Fleischmann's Vinegar Company, Inc., as mortgagor, to and for the benefit of BNP Paribas (State of Illinois) (incorporated herein by reference to Exhibit 10.41 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(ak)	Second Lien Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Fleischmann's Vinegar Company, Inc., as mortgagor, to and for the benefit of BNP Paribas (State of Illinois) (incorporated herein by reference to Exhibit 10.42 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(al)	First Lien Fee and Leasehold Deed of Trust, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by and from Green Plains Hereford LLC, as grantor, to the trustee named therein for the benefit of BNP Paribas (State of Texas) (incorporated herein by reference to Exhibit 10.49 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.13(am)	Second Lien Deed of Trust, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by and from Green Plains Hereford LLC, as grantor, to the trustee named therein for the benefit of BNP Paribas (State of Texas) (incorporated herein by reference to Exhibit 10.50 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.14(a)	Credit Agreement dated December 3, 2014 among Green Plains Cattle Company, LLC, Bank of the West and ING Capital LLC, as Joint Administrative Agents, and the lenders party to the Credit Agreement (incorporated herein by reference to Exhibit 10.1 to the company's Current Report on Form 8-K dated December 5, 2014)
10.14(b)	Security and Pledge Agreement dated December 3, 2014 among Green Plains Cattle Company, LLC, and Bank of the West and ING Capital LLC in their capacity as Joint Administrative Agents (incorporated herein by reference to Exhibit 10.2 to the company's Current Report on Form 8-K dated December 5, 2014)
10.14(c)	Second Amendment to the Credit Agreement, dated as of April 28, 2017, by and among Green Plains Cattle Company LLC and Bank of the West and ING Capital LLC. (joint administrative agents for lenders). (incorporated herein by reference to Exhibit 10.1 to the company's Current Report on Form 8-K dated May 1, 2017)
10.14(d)	Third Amendment to the Credit Agreement, dated June 29, 2017, among Green Plains Cattle Company LLC, Bank of the West and ING Capital LLC, as Joint Administrative Agents, and the lenders party to the Credit Agreement (incorporated herein by reference to Exhibit 10.2 of the company's Quarterly Report on Form 10-Q filed August 3, 2017)

10.14(e)	Fourth Amendment to the Credit Agreement, dated as of August 29, 2017, among Green Plains Cattle Company LLC, Bank of the West and ING Capital LLC, as Joint Administrative Agents, and the lenders party to the Credit Agreement (incorporated herein by reference to Exhibit 10.2(a) to the company's Current Report on Form 8-K dated August 29, 2017)
10.14(f)	Fifth Amendment to the Credit Agreement, dated as of November 16, 2017, among Green Plains Cattle Company LLC, Bank of the West and ING Capital LLC, as Joint Administrative Agents, and the lenders party to the Credit Agreement (incorporated herein by reference to Exhibit 10.1 to the company's Current Report on Form 8-K dated November 17, 2017)
10.14(g)	Replacement Page for Fifth Amendment to the Credit Agreement, dated as of November 16, 2017, among Green Plains Cattle Company LLC, Bank of the West and ING Capital LLC, as Joint Administrative Agents, and the lenders party to the Credit Agreement, originally filed as Exhibit 10.1 to the company's Current Report on Form 8-K dated November 17, 2017 (incorporated herein by reference to Exhibit 10.1 to the company's Quarterly Report on Form 10-Q dated August 2, 2018)
10.14(h)	Sixth Amendment to the Credit Agreement, dated as of July 31, 2018, by and among Green Plains Cattle Company LLC and Bank of the West and ING Capital LLC, as Joint Administrative Agents, and the lenders party to the Credit Agreement (incorporated herein by reference to Exhibit 10.4 to the company's Quarterly Report on Form 10-Q dated August 2, 2018)
10.14(i)	ABL Intercreditor Agreement, dated as of August 29, 2017, among Bank of the West and ING Capital LLC, as Joint ABL Collateral Agent, and BNP Paribas, as Term Loan Collateral Agent, and acknowledged by Green Plains Cattle Company LLC and the other ABL Grantors (incorporated herein by reference to Exhibit 10.2(b) to the company's Current Report on Form 8-K dated August 29, 2017)
10.14(j)	Guaranty, dated as of August 29, 2017, in favor of Bank of the West and ING Capital LLC, as joint administrative agents (incorporated herein by reference to Exhibit 10.2(c) to the company's Current Report on Form 8-K dated August 29, 2017)
10.14(k)	Amended and Restated Credit Agreement, dated as of August 28, 2019, by and among Green Plains Cattle Company LLC, Bank of the West and ING Capital LLC, as Joint Administrative Agents, and the lenders party to the Credit Agreement (Certain schedules to the Amended and Restated Credit Agreement have been omitted. The company will furnish such schedules to the SEC upon request.) (incorporated herein by reference to Exhibit 10.3 of the company's Current Report on Form 8-K filed September 9, 2019)
10.15	Contribution, Conveyance and Assumption Agreement, dated July 1, 2015, by and among Green Plains Inc., Green Plains Obion LLC, Green Plains Trucking LLC, Green Plains Holdings LLC, Green Plains Partners LP and Green Plains Operating Company LLC (incorporated herein by reference to Exhibit 10.1 to the company's Current Report on Form 8-K dated July 6, 2015)
10.16(a)	Omnibus Agreement, dated July 1, 2015, by and among Green Plains Inc., Green Plains Holdings LLC, Green Plains Partners LP and Green Plains Operating Company LLC (incorporated herein by reference to Exhibit 10.2 to the company's Current Report on Form 8-K dated July 6, 2015)
10.16(b)	First Amendment to the Omnibus Agreement, dated January 1, 2016, by and among Green Plains Inc., Green Plains Holdings LLC, Green Plains Partners LP and Green Plains Operating Company LLC (incorporated herein by reference to Exhibit 10.22(b) to the company's Annual Report on Form 10-K for the year ended December 31, 2015)
10.16(c)	Second Amendment to the Omnibus Agreement, dated September 23, 2016, by and among Green Plains Inc., Green Plains Partners LP, Green Plains Holdings LLC and Green Plains Operating Company LLC (incorporated herein by reference to Exhibit 10.1 to the company's Current Report on Form 8-K dated September 26, 2016)
10.16(d)	Third Amendment to the Omnibus Agreement, dated November 15, 2018, by and among Green Plains Inc., Green Plains Partners LP, Green Plains Holdings LLC and Green Plains Operating Company LLC (incorporated herein by reference to Exhibit 10.18(d) to the company's Annual Report on Form 10-K for the year ended December 31, 2018)
10.17(a)	Operational Services and Secondment Agreement, dated July 1, 2015, by and between Green Plains Inc. and Green Plains Holdings LLC (incorporated herein by reference to Exhibit 10.3 to the company's Current Report on Form 8-K dated July 6, 2015)
10.17(b)	Amendment No. 1 to the Operational Services and Secondment Agreement, dated January 1, 2016, by and between Green Plains Inc. and Green Plains Holdings LLC (incorporated herein by reference to Exhibit 10.23(b) to the company's Annual Report on Form 10-K for the year ended December 31, 2015)

10.17(c)	Amendment No. 2 to Operational Services and Secondment Agreement, dated September 23, 2016, between Green Plains Inc. and Green Plains Holdings LLC (incorporated herein by reference to Exhibit 10.2 to the company's Current Report on Form 8-K dated September 26, 2016)
10.17(d)	Amendment No. 3 to Operational Services and Secondment Agreement, dated November 15, 2018, between Green Plains Inc. and Green Plains Holdings LLC (incorporated herein by reference to Exhibit 10.19(d) to the company's Annual Report on Form 10-K for the year ended December 31, 2018)
10.18(a)	Rail Transportation Services Agreement, dated July 1, 2015, by and between Green Plains Logistics LLC and Green Plains Trade Group LLC (incorporated herein by reference to Exhibit 10.4 to the company's Current Report on Form 8-K dated July 6, 2015)
10.18(b)	Amendment No. 1 to Rail Transportation Services Agreement, dated September 1, 2015, by and between Green Plains Logistics LLC and Green Plains Trade Group LLC (incorporated herein by reference to Exhibit 10.1 of the company's Quarterly Report on Form 10-Q filed August 3, 2016)
10.18(c)	Correction to Rail Transportation Services Agreement, dated May 12, 2016, by and between Green Plains Logistics LLC and Green Plains Trade Group LLC (incorporated herein by reference to Exhibit 10.3 of the company's Quarterly Report on Form 10-Q filed August 3, 2016)
10.18(d)	Amendment No. 2 to Rail Transportation Services Agreement, dated November 30, 2016 (incorporated herein by reference to Exhibit 10.1 to the company's Current Report on Form 8-K dated December 1, 2016)
10.18(e)	Amendment No. 2 to Rail Transportation Services Agreement, dated November 15, 2018 (incorporated herein by reference to Exhibit 10.1 to the company's Current Report on Form 8-K dated November 15, 2018)
10.18(f)	Corrective Amendment to Rail Transportation Services Agreement, dated November 15, 2018, by and between Green Plains Logistics LLC and Green Plains Trade Group LLC (incorporated herein by reference to Exhibit 10.20(f) to the company's Annual Report on Form 10-K for the year ended December 31, 2018)
10.19(a)	Ethanol Storage and Throughput Agreement, dated July 1, 2015, by and between Green Plains Ethanol Storage LLC and Green Plains Trade Group LLC (incorporated herein by reference to Exhibit 10.5 to the company's Current Report on Form 8-K dated July 6, 2015)
10.19(b)	Amendment No. 1 to the Ethanol Storage and Throughput Agreement, dated January 1, 2016, by and between Green Plains Ethanol Storage LLC and Green Plains Trade Group LLC (incorporated herein by reference to Exhibit 10.25(b) to the company's Annual Report on Form 10-K for the year ended December 31, 2015)
10.19(c)	Clarifying Amendment to Ethanol Storage and Throughput Agreement, dated January 4, 2016, by and between Green Plains Ethanol Storage LLC and Green Plains Trade Group LLC (incorporated herein by reference to Exhibit 10.2 of the company's Quarterly Report on Form 10-Q filed August 3, 2016)
10.19(d)	Amendment No. 2 to Ethanol Storage and Throughput Agreement, dated September 23, 2016, by and between Green Plains Ethanol Storage LLC and Green Plains Trade Group LLC (incorporated herein by reference to Exhibit 10.3 to the company's Current Report on Form 8-K dated September 26, 2016)
10.19(e)	Amendment No. 3 to Ethanol Storage and Throughput Agreement, dated November 15, 2018, by and between Green Plains Ethanol Storage LLC and Green Plains Trade Group LLC (incorporated herein by reference to Exhibit 10.2 to the company's Current Report on Form 8-K dated November 15, 2018) (The exhibits to Amendment No. 3 have been omitted. The company will furnish such schedules to the SEC upon request).
10.20(a)	Credit Agreement, dated July 1, 2015, by and among Green Plains Operating Company LLC, as the Borrower, the subsidiaries of the Borrower identified therein, Bank of America, N.A., and the other lenders party thereto (incorporated herein by reference to Exhibit 10.6 to the company's Current Report on Form 8-K dated July 6, 2015)
10.20(b)	First Amendment to Credit Agreement, dated September 16, 2016 by and among Green Plains Operating Company LLC, as the Borrower, the subsidiaries of the Borrower identified therein, Bank of America, N.A., and the other lenders party thereto (incorporated herein by reference to Exhibit 10.22(b) to the company's Annual Report on Form 10-K for the year ended December 31, 2018)
10.20(c)	Incremental Joinder Agreement, dated October 27, 2017, among Green Plains Operating Company LLC and Bank of America, as Administrative (incorporated herein by reference to Exhibit 10.8 to the company's Quarterly Report on Form 10-Q dated November 2, 2017)

10.20(d)	Second Amendment to Credit Agreement, dated February 16, 2018 by and among Green Plains Operating Company LLC, as the Borrower, the subsidiaries of the Borrower identified therein, Bank of America, N.A., and the other lenders party thereto (incorporated herein by reference to Exhibit 10.22(d) to the company's Annual Report on Form 10-K for the year ended December 31, 2018)
10.20(e)	Incremental Joinder Agreement, dated February 20, 2018, among Green Plains Operating Company LLC and Bank of America, as Administrative (incorporated herein by reference to Exhibit 10.22(e) to the company's Annual Report on Form 10-K for the year ended December 31, 2018)
10.20(f)	Third Amendment to Credit Agreement, dated October 12, 2018 by and among Green Plains Operating Company LLC, as the Borrower, the subsidiaries of the Borrower identified therein, Bank of America, N.A., and the other lenders party thereto (incorporated herein by reference to Exhibit 10.22(f) to the company's Annual Report on Form 10-K for the year ended December 31, 2018)
10.20(g)	Consent to Credit Agreement, dated July 15, 2019, by and among Green Plains Operating Company LLC and Bank of America, as Administrative Agent (incorporated herein by reference to Exhibit 10.1 to the company's Quarterly Report on Form 10-Q dated August 6, 2019)
10.21(a)	First Lien Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Fleischmann's Vinegar Company, Inc., as mortgagor, to and for the benefit of BNP Paribas (State of Alabama) (incorporated herein by reference to Exhibit 10.7 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.21(b)	Second Lien Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Fleischmann's Vinegar Company, Inc., as mortgagor, to and for the benefit of BNP Paribas (State of Alabama) (incorporated herein by reference to Exhibit 10.8 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.21(c)	First Lien Deed of Trust Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Fleischmann's Vinegar Company, Inc., as grantor, to the trustee names therein for the benefit of BNP Paribas (Cerritos, California) (incorporated herein by reference to Exhibit 10.45 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.21(d)	Second Lien Deed of Trust Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Fleischmann's Vinegar Company, Inc., as grantor, to the trustee names therein for the benefit of BNP Paribas (Cerritos, California) (incorporated herein by reference to Exhibit 10.46 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.21(e)	First Lien Indemnity Deed of Trust, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Fleischmann's Vinegar Company, Inc., as grantor, to the trustee named therein for the benefit of BNP Paribas (State of Maryland) (incorporated herein by reference to Exhibit 10.33 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.21(f)	Second Lien Indemnity Deed of Trust, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Fleischmann's Vinegar Company, Inc., as grantor, to the trustee named therein for the benefit of BNP Paribas (State of Maryland) (incorporated herein by reference to Exhibit 10.34 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.21(g)	Deed of Trust, Security Agreement, Assignment of Leases and Rents and Fixture Filing by Fleischmann's Vinegar Company, Inc., as mortgagor, to and for the benefit of Maranon Capital, L.P. (State of Missouri) (incorporated herein by reference to Exhibit 10.22(n) to the company's Annual Report on Form 10-K for the year ended December 31, 2016)
10.21(h)	First Lien Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Fleischmann's Vinegar Company, Inc., as mortgagor, to and for the benefit of BNP Paribas (State of New York) (incorporated herein by reference to Exhibit 10.47 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.21(i)	Second Lien Mortgage, Assignment of Leases and Rents, Security Agreement and Fixture Filing Statement by Fleischmann's Vinegar Company, Inc., as mortgagor, to and for the benefit of BNP Paribas (State of New York) (incorporated herein by reference to Exhibit 10.48 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.22	Second Amendment to Term Loan Agreement, dated July 13, 2018, among Green Plains Inc. and BNP Paribas, as administrative agent and collateral agent (incorporated herein by reference to Exhibit 10.3 to the company's Quarterly Report on Form 10-Q dated August 2, 2018)

10.23	Partial Release of Security Interest, dated as of April 30, 2018, by and among Green Plains Inc., its subsidiaries and BNP Paribas, as collateral agent (incorporated herein by reference to Exhibit 10.3 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.24(a)	Revolving Credit Facility, dated as of April 30, 2018, by and among Green Plains Commodity Management LLC and Macquarie Bank Limited (incorporated herein by reference to Exhibit 10.4 to the company's Quarterly Report on Form 10-Q dated May 7, 2018)
10.24(b)	Amendment to Revolving Credit Facility, dated as of June 18, 2019, by and among Green Plains Commodity Management LLC and Macquarie Bank Limited
10.25	Promissory Note between Green Plains Inc. and StepStone Atlantic Fund, L.P., dated September 6, 2019 (incorporated herein by reference to Exhibit 10.2 of the company's Current Report on Form 8-K filed September 9, 2019)
21.1	Schedule of Subsidiaries
23.1	Consent of KPMG LLP
31.1	Certification of Chief Executive Officer pursuant to Rule 13a-14(a) and Section 302 of the Sarbanes-Oxley Act of 2002
31.2	Certification of Chief Financial Officer pursuant to Rule 13a-14(a) and Section 302 of the Sarbanes-Oxley Act of 2002
32.1	Certification of Chief Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
32.2	Certification of Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
101	The following information from Green Plains Inc.'s Annual Report on Form 10-K for the annual period ended December 31, 2019, formatted in Inline Extensible Business Reporting Language (iXBRL): (i) the Consolidated Balance Sheets, (ii) the Consolidated Statements of Operations, (iii) the Consolidated Statements of Comprehensive Income (iv) the Consolidated Statements of Stockholders' Equity (v) the Consolidated Statements of Cash Flows and (vi) the Notes to Consolidated Financial Statements and Financial Statement Schedule.
104	The cover page from Green Plains Inc. Annual Report on Form 10-K for the year ended December 31, 2019, formatted in iXBRL

* Represents management compensatory contracts

Item 16. Form 10-K Summary.

None.

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.

GREEN PLAINS INC
(Registrant)

Date: February 20, 2020

By: */s/ Todd A. Becker*
Todd A. Becker
President and Chief Executive Officer
(Principal Executive Officer)

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 on the dates indicated.

Signature	Title	Date
/s/ Todd A. Becker Todd A. Becker	President and Chief Executive Officer (Principal Executive Officer) and Director	February 20, 2020
/s/ G. Patrich Simpkins Jr. G. Patrich Simpkins Jr.	Chief Financial Officer (Principal Financial Officer and Principal Accounting Officer)	February 20, 2020
/s/ Wayne B. Hoovestol Wayne B. Hoovestol	Chairman of the Board	February 20, 2020
/s/ Jim Anderson Jim Anderson	Director	February 20, 2020
/s/ James F. Crowley James F. Crowley	Director	February 20, 2020
/s/ S. Eugene Edwards S. Eugene Edwards	Director	February 20, 2020
/s/ Gordon F. Glade Gordon F. Glade	Director	February 20, 2020
/s/ Ejnar A. Knudsen III Ejnar A. Knudsen III	Director	February 20, 2020
/s/ Thomas L. Manuel Thomas L. Manuel	Director	February 20, 2020
/s/ Brian D. Peterson Brian D. Peterson	Director	February 20, 2020
/s/ Alain Treuer Alain Treuer	Director	February 20, 2020

Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
Green Plains Inc.:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Green Plains Inc. and subsidiaries (the Company) as of December 31, 2019 and 2018, the related consolidated statements of operations, comprehensive income, stockholders' equity, and cash flows for each of the years in the three-year period ended December 31, 2019, and the related notes (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2019 and 2018, and the results of its operations and its cash flows for each of the years in the three-year 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 (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission, and our report dated February 20, 2020 expressed an unqualified opinion on the effectiveness of the Company's internal control over financial reporting.

Changes in Accounting Principle

As discussed in Note 18 to the consolidated financial statements, the Company has changed its method of accounting for leases in 2019 due to the adoption of ASC Topic 842, *Leases.*

As discussed in Note 4 to the consolidated financial statements, the Company changed its method of accounting for revenues in 2018 due to the adoption of ASC Topic 606, *Revenue from Contracts with Customers*.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated 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 consolidated 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 consolidated 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 consolidated 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 consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ KPMG LLP

We have served as the Company's auditor since 2009.

Omaha, Nebraska
February 20, 2020

GREEN PLAINS INC. AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS
(in thousands, except share amounts)

	December 31, 2019	December 31, 2018
ASSETS		
Current assets		
Cash and cash equivalents	$ 245,977	$ 251,681
Restricted cash	23,919	31,603
Accounts receivable, net of allowances of $166 and $147, respectively	107,183	88,501
Income taxes receivable	6,216	12,418
Inventories	252,992	302,600
Prepaid expenses and other	13,685	14,125
Derivative financial instruments	17,941	26,315
Current assets of discontinued operations	-	479,399
Total current assets	667,913	1,206,642
Property and equipment, net	827,271	815,235
Operating lease right-of-use assets	52,476	-
Investment in equity method investees	68,998	29,714
Other assets	81,560	91,781
Noncurrent assets of discontinued operations	-	73,060
Total assets	$ 1,698,218	$ 2,216,432
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities		
Accounts payable	$ 156,693	$ 135,829
Accrued and other liabilities	39,384	52,563
Derivative financial instruments	8,721	7,852
Operating lease current liabilities	16,626	-
Short-term notes payable and other borrowings	187,812	163,751
Current maturities of long-term debt	132,555	54,769
Current liabilities of discontinued operations	-	418,936
Total current liabilities	541,791	833,700
Long-term debt	243,990	298,110
Deferred income taxes	-	10,123
Operating lease long-term liabilities	38,314	-
Other liabilities	8,837	11,428
Noncurrent liabilities of discontinued operations	-	82
Total liabilities	832,932	1,153,443
Commitments and contingencies (Note 18)		
Stockholders' equity		
Common stock, $0.001 par value; 75,000,000 shares authorized; 46,964,115 and 46,637,549 shares issued, and 36,031,933 and 41,101,975 shares outstanding, respectively	47	47
Additional paid-in capital	734,580	696,222
Retained earnings	148,150	324,728
Accumulated other comprehensive loss	(11,064)	(16,016)
Treasury stock, 10,932,182 and 5,535,574 shares, respectively	(119,808)	(58,162)
Total Green Plains stockholders' equity	751,905	946,819
Noncontrolling interests	113,381	116,170
Total stockholders' equity	865,286	1,062,989
Total liabilities and stockholders' equity	$ 1,698,218	$ 2,216,432

See accompanying notes to the consolidated financial statements.

GREEN PLAINS INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF OPERATIONS
(in thousands, except per share amounts)

	Year Ended December 31,		
	2019	2018	2017
Revenues			
Product revenues	$ 2,410,382	$ 2,977,451	$ 3,283,290
Service revenues	6,856	6,481	6,185
Total revenues	2,417,238	2,983,932	3,289,475
Costs and expenses			
Cost of goods sold (excluding depreciation and amortization expenses reflected below)	2,384,947	2,806,968	3,021,182
Operations and maintenance expenses	25,657	30,844	33,448
Selling, general and administrative expenses	77,077	108,259	107,515
Gain on sale of assets, net	-	(150,351)	-
Depreciation and amortization expenses	72,127	98,258	103,582
Total costs and expenses	2,559,808	2,893,978	3,265,727
Operating income (loss) from continuing operations	(142,570)	89,954	23,748
Other income (expense)			
Interest income	4,333	2,961	1,587
Interest expense	(40,200)	(87,449)	(83,700)
Other, net	5,495	178	3,211
Total other expense	(30,372)	(84,310)	(78,902)
Income (loss) from continuing operations before income taxes and income (loss) from equity method investees	(172,942)	5,644	(55,154)
Income tax benefit	21,316	20,147	132,061
Income (loss) from equity method investees, net of income taxes	2,797	(596)	(274)
Net income (loss) from continuing operations including noncontrolling interest	(148,829)	25,195	76,633
Net income from discontinued operations, net of income taxes	829	11,539	4,998
Net income (loss)	(148,000)	36,734	81,631
Net income attributable to noncontrolling interests	18,860	20,811	20,570
Net income (loss) attributable to Green Plains	$ (166,860)	$ 15,923	$ 61,061
Earnings (loss) per share - basic			
Net income (loss) from continuing operations	$ (4.40)	$ 0.11	$ 1.43
Net income from discontinued operations	0.02	0.28	0.13
Net income (loss) attributable to Green Plains	$ (4.38)	$ 0.39	$ 1.56
Earnings (loss) per share - diluted:			
Net income (loss) from continuing operations	$ (4.40)	$ 0.11	$ 1.37
Net income from discontinued operations	0.02	0.28	0.10
Net income (loss) attributable to Green Plains	$ (4.38)	$ 0.39	$ 1.47
Weighted average shares outstanding:			
Basic	38,111	40,320	39,247
Diluted	38,111	41,254	50,240

See accompanying notes to the consolidated financial statements.

GREEN PLAINS INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(in thousands)

	Year Ended December 31,		
	2019	**2018**	**2017**
Net income (loss)	$ (148,000)	$ 36,734	$ 81,631
Other comprehensive income (loss), net of tax:			
Unrealized gains (losses) on derivatives arising during the period, net of tax benefit (expense) of ($14,431), $2,854 and $2,967, respectively	55,973	(6,788)	(5,048)
Reclassification of realized losses (gains) on derivatives, net of tax expense (benefit) of $10,002, ($2,887) and $2,306, respectively	(38,795)	6,669	(3,925)
Other comprehensive income (loss), net of tax	17,178	(119)	(8,973)
Share of equity method investees other comprehensive loss arising during the period, net of tax benefit of $3,929, $0 and $0, respectively	(12,226)	-	-
Total other comprehensive income (loss), net of tax	4,952	(119)	(8,973)
Comprehensive income (loss)	(143,048)	36,615	72,658
Comprehensive income attributable to noncontrolling interests	18,860	20,811	20,570
Comprehensive income (loss) attributable to Green Plains	$ (161,908)	$ 15,804	$ 52,088

See accompanying notes to the consolidated financial statements.

GREEN PLAINS INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(in thousands)

	Common Stock		Additional Paid-in	Retained	Accum. Other Comp. Income	Treasury Stock		Total Green Plains Stockholders'	Non-Control.	Total Stockholders'
	Shares	Amount	Capital	Earnings	(Loss)	Shares	Amount	Equity	Interests	Equity
Balance, December 31, 2016	46,079	$ 46	$ 659,200	$ 283,214	$ (4,137)	7,715	$ (75,816)	$ 862,507	$ 116,684	$ 979,191
Net income	-	-	-	61,061	-	-	-	61,061	20,570	81,631
Cash dividends and distributions declared	-	-	-	(18,864)	-	-	-	(18,864)	(20,519)	(39,383)
Other comp. loss before reclassification	-	-	-	-	(5,048)	-	-	-	-	-
Amounts reclassified from accum. other comp. loss	-	-	-	-	(3,925)	-	-	-	-	-
Other comp. loss, net of tax	-	-	-	-	(8,973)	-	-	(8,973)	-	(8,973)
Repurchase of common stock	-	-	-	-	-	395	(6,724)	(6,724)	-	(6,724)
Exchange of 3.25% convertible notes due 2018	-	-	18,326	-	-	(2,784)	27,356	45,682	-	45,682
Stock-based compensation	326	-	7,443	-	-	-	-	7,443	219	7,662
Stock options exercised	5	-	50	-	-	-	-	50	-	50
Balance, December 31, 2017	46,410	46	685,019	325,411	(13,110)	5,326	(55,184)	942,182	116,954	1,059,136
Reclassification of certain tax effects from other comprehensive loss (Note 1)	-	-	-	2,787	(2,787)	-	-	-	-	-
Balance, January 1, 2018	46,410	46	685,019	328,198	(15,897)	5,326	(55,184)	942,182	116,954	1,059,136
Net income	-	-	-	15,923	-	-	-	15,923	20,811	36,734
Cash dividends and distributions declared	-	-	-	(19,393)	-	-	-	(19,393)	(21,872)	(41,265)
Other comp. loss before reclassification	-	-	-	-	(6,788)	-	-	-	-	-
Amounts reclassified from accum. other comp. loss	-	-	-	-	6,669	-	-	-	-	-
Other comp. loss, net of tax	-	-	-	-	(119)	-	-	(119)	-	(119)
Repurchase of common stock	-	-	-	-	-	210	(2,979)	(2,979)	-	(2,979)
Modification of 3.25% convertible notes due 2019	-	-	3,480	-	-	-	-	3,480	-	3,480
Exchange of 3.25% convertible notes due 2018	-	-	-	-	-	-	1	1	-	1
Stock-based compensation	213	1	7,573	-	-	-	-	7,574	277	7,851
Stock options exercised	15	-	150	-	-	-	-	150	-	150
Balance, December 31, 2018	46,638	$ 47	$ 696,222	$ 324,728	$ (16,016)	5,536	$ (58,162)	$ 946,819	$ 116,170	$ 1,062,989
Net income (loss)	-	-	-	(166,860)	-	-	-	(166,860)	18,860	(148,000)
Cash dividends and distributions declared	-	-	-	(9,718)	-	-	-	(9,718)	(21,968)	(31,686)
Other comprehensive loss before reclassification	-	-	-	-	55,973	-	-	-	-	-
Amounts reclassified from accumulated other comprehensive loss	-	-	-	-	(38,795)	-	-	-	-	-
Other comprehensive income, net of tax	-	-	-	-	17,178	-	-	17,178	-	17,178
Share of equity method investees other comprehensive loss arising during the period, net of tax	-	-	-	-	(12,226)	-	-	(12,226)	-	(12,226)
Proceeds from disgorgement of shareholders short-swing profits, net of tax	-	-	5,054	-	-	-	-	5,054	-	5,054
Issuance of 4.00% convertible notes due 2024, net of tax	-	-	24,928	-	-	-	-	24,928	-	24,928
Settlements of 3.25% convertible notes due 2019, net of tax	-	-	(271)	-	-	-	-	(271)	-	(271)
Repurchase of common stock	-	-	-	-	-	5,396	(61,646)	(61,646)	-	(61,646)
Stock-based compensation	207	-	7,052	-	-	-	-	7,052	319	7,371
Stock options exercised	119	-	1,595	-	-	-	-	1,595	-	1,595
Balance, December 31, 2019	46,964	$ 47	$ 734,580	$ 148,150	$ (11,064)	10,932	$ (119,808)	$ 751,905	$ 113,381	$ 865,286

See accompanying notes to the consolidated financial statements.

GREEN PLAINS INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS
(in thousands)

	Year Ended December 31,		
	2019	2018	2017
Cash flows from operating activities:			
Net income (loss) from continuing operations including noncontrolling interest	$ (148,829)	$ 25,195	$ 76,633
Net income from discontinued operations, net of income taxes	829	11,539	4,998
Net income (loss)	(148,000)	36,734	81,631
Adjustments to reconcile net income (loss) to net cash provided by operating activities:			
Depreciation and amortization	72,127	98,258	103,582
Amortization of debt issuance costs and debt discount	20,364	13,277	14,238
Loss on exchange of 3.25% convertible notes due 2018	-	-	1,291
Gain on the disposal of assets, net	(3,680)	(150,351)	(2,535)
Write-off of deferred financing fees related to extinguishment of debt	-	13,178	9,460
Deferred income taxes	(17,252)	(24,484)	(81,077)
Stock-based compensation	9,692	11,420	12,161
Loss (income) from equity method investees, net of income taxes	(2,797)	596	274
Other	-	(11,604)	(7,842)
Changes in operating assets and liabilities before effects of business combinations and dispositions:			
Accounts receivable	(21,762)	43,443	7,338
Inventories	50,022	26,972	(35,980)
Derivative financial instruments	12,420	(12,294)	(4,119)
Prepaid expenses and other assets	793	1,907	(644)
Accounts payable and accrued liabilities	(1,778)	(53,565)	(12,835)
Current income taxes	3,138	31,517	(41,087)
Other	(288)	4,526	2,772
Net cash provided by (used in) operating activities - continuing operations	(27,001)	29,530	46,628
Net cash provided by (used in) operating activities - discontinued operations	17,469	9,437	(228,791)
Net cash provided by (used in) operating activities	(9,532)	38,967	(182,163)
Cash flows from investing activities:			
Purchases of property and equipment, net	(75,481)	(40,529)	(44,594)
Proceeds from sale of discontinued operations, net of cash divested	76,884	-	-
Proceeds from the sale of assets, net	3,469	671,650	-
Disposition of equity method investee	29,721	-	-
Distributions from (contribution to) equity method investees	220	(3,091)	(20,286)
Other investing activities	-	7,500	-
Net cash provided by (used in) investing activities - continuing operations	34,813	635,530	(64,880)
Net cash used in investing activities - discontinued operations	(4,169)	(128,065)	(63,600)
Net cash provided by (used in) investing activities	30,644	507,465	(128,480)
Cash flows from financing activities:			
Proceeds from the issuance of long-term debt	157,710	83,100	570,600
Payments of principal on long-term debt	(45,702)	(576,389)	(510,209)
Proceeds from short-term borrowings	2,802,199	3,479,784	4,028,298
Payments on short-term borrowings	(2,840,505)	(3,578,629)	(4,001,359)
Cash payment for exchange of 3.25% convertible notes due 2018	-	-	(8,523)
Payments for repurchase of common stock	(61,646)	(2,978)	(6,724)
Payments of cash dividends and distributions	(31,686)	(41,265)	(39,383)
Proceeds from disgorgement of shareholder short-swing profits	6,699	-	-
Payment penalty on early extinguishment of debt	-	-	(2,881)
Payments of loan fees	(5,291)	(3,808)	(14,271)
Payments related to tax withholdings for stock-based compensation	(2,320)	(3,569)	(4,499)
Proceeds from exercises of stock options	1,595	150	50
Net cash provided by (used in) financing activities - continuing operations	(18,947)	(643,604)	11,099
Net cash provided by (used in) financing activities - discontinued operations	(50,464)	103,007	205,113
Net cash provided by (used in) financing activities	(69,411)	(540,597)	216,212
Net change in cash, cash equivalents and restricted cash	(48,299)	5,835	(94,431)
Cash, cash equivalents and restricted cash, beginning of period	283,284	289,667	406,029
Discontinued operations cash activity included above:			
Add: Cash balance included in current assets of discontinued operations at beginning of period	34,911	22,693	762
Less: Cash balance included in current assets of discontinued operations at end of period	-	(34,911)	(22,693)
Cash, cash equivalents and restricted cash, end of period	$ 269,896	$ 283,284	$ 289,667

Continued on the following page

GREEN PLAINS INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS
(in thousands)

Continued from the previous page

	Year Ended December 31,		
	2019	**2018**	**2017**
Reconciliation of total cash, cash equivalents and restricted cash:			
Cash and cash equivalents	$ 245,977	$ 251,683	$ 266,651
Restricted cash	23,919	66,512	45,709
Discontinued operations cash activity included above:			
Less: Cash, cash equivalents and restricted cash balance included in current assets of discontinued operations at end of period	-	(34,911)	(22,693)
Total cash, cash equivalents and restricted cash	$ 269,896	$ 283,284	$ 289,667
Non-cash financing activity:			
Settlement of NMTC transaction	$ 8,100	$ -	$ -
Modification of 3.25% convertible notes due 2019, net	$ -	$ 3,480	$ -
Exchange of 3.25% convertible notes due 2018 for shares of common stock	$ -	$ -	$ 47,743
Exchange of common stock held in treasury stock for 3.25% convertible notes due 2018	$ -	$ 1	$ 27,356
Supplemental investing and financing activities:			
Assets acquired in acquisitions and mergers, net of cash	$ -	$ 124,525	$ 63,670
Less: liabilities assumed	-	(118)	(1,943)
Net assets acquired	$ -	$ 124,407	$ 61,727
Assets disposed of in sale	$ 527,614	$ 550,648	$ -
Less: liabilities disposed	(373,846)	(41,276)	-
Net assets disposed	$ 153,768	$ 509,372	$ -
Supplemental disclosures of cash flow:			
Cash paid (refunded) for income taxes	$ 563	$ (22,478)	$ (3,768)
Cash paid for interest of continuing operations	$ 24,287	$ 60,664	$ 48,298
Cash paid for interest of discontinued operations	$ 11,557	$ 12,481	$ 5,915

See accompanying notes to the consolidated financial statements.

1. BASIS OF PRESENTATION AND DESCRIPTION OF BUSINESS

References to the Company

References to "Green Plains" or the "company" in the consolidated financial statements and in these notes to the consolidated financial statements refer to Green Plains Inc., an Iowa corporation, and its subsidiaries.

Consolidated Financial Statements

The consolidated financial statements include the company's accounts and all significant intercompany balances and transactions are eliminated. As of December 31, 2019, the company owns a 49.0% limited partner interest and a 2.0% general partner interest in Green Plains Partners LP. Public investors own the remaining 49.0% limited partner interest in the partnership. The company determined that the limited partners in the partnership with equity at risk lack the power, through voting rights or similar rights, to direct the activities that most significantly impact partnership's economic performance; therefore, the partnership is considered a variable interest entity. The company, through its ownership of the general partner interest in the partnership, has the power to direct the activities that most significantly affect economic performance and is obligated to absorb losses and has the right to receive benefits that could be significant to the partnership. Therefore, the company is considered the primary beneficiary and consolidates the partnership in the company's financial statements. The assets of the partnership cannot be used by the company for general corporate purposes. The partnership's consolidated total assets as of December 31, 2019 and 2018, excluding intercompany balances, are $90.0 million and $67.3 million, respectively, and primarily consist of property and equipment, operating lease right-of-use assets and goodwill. The partnership's consolidated total liabilities as of December 31, 2019 and 2018, excluding intercompany balances, are $180.9 million and $152.9 million, respectively, which primarily consist of long-term debt as discussed in *Note 12 – Debt* and operating lease liabilities. The liabilities recognized as a result of consolidating the partnership do not represent additional claims on our general assets.

On September 1, 2019, the company, TGAM Agribusiness Fund Holdings-B LP ("TGAM") and StepStone Atlantic Fund, L.P. ("StepStone") formed a joint venture and entered into the Second Amended and Restated Limited Liability Company Agreement (the "LLC Agreement") of Green Plains Cattle. GPCC was previously a wholly owned subsidiary of Green Plains. Green Plains also entered into a Securities Purchase Agreement with TGAM and StepStone, whereby TGAM and StepStone purchased an aggregate of 50% of the membership interests of GPCC from Green Plains. After closing, GPCC is no longer consolidated in the company's consolidated financial statements and the GPCC investment is accounted for using the equity method of accounting. Under this method, the investment is recorded at the acquisition cost plus the company's share of equity in undistributed earnings or losses since acquisition and the company's share of equity method investees other comprehensive income arising during the period, reduced by distributions received and the amortization of excess net investment. The company recognizes this investment on a separate line item in the consolidated balance sheet and recognizes its proportionate share of earnings on a separate line item in the consolidated statement of operations. The company does not consolidate any part of the assets or liabilities or operating results of its equity method investees. Additionally, the company concluded that the disposition of GPCC met the requirements under ASC 205-20 *Presentation of Financial Statements – Discontinued Operations* ("ASC 205-20") to be presented as discontinued operations. As such, GPCC results prior to its disposition are classified as discontinued operations in current and prior period consolidated financial statements. See *Note 5 - Acquisitions, Dispositions and Discontinued Operations* for further details.

The company also owns a 90.0% interest in BioProcess Algae, a joint venture formed in 2008, and consolidates their results in its consolidated financial statements.

Reclassifications

Certain prior year amounts were reclassified to conform to the current year presentation, including the discontinued operations of GPCC. These reclassifications affected certain balance sheet line items, total revenues, costs and expenses.

Use of Estimates in the Preparation of Consolidated Financial Statements

The preparation of consolidated financial statements in conformity with GAAP requires management to make certain estimates and assumptions that affect the reported amounts of assets and liabilities, disclosure of contingent assets and liabilities at the date of the consolidated financial statements, and the reported amounts of revenues and expenses during the reporting period. The company bases its estimates on historical experience and assumptions it believes are proper and

reasonable under the circumstances and regularly evaluates the appropriateness of its estimates and assumptions. Actual results could differ from those estimates. Key accounting policies, including but not limited to those relating to revenue recognition, depreciation of property and equipment, carrying value of intangible assets, operating leases, impairment of long-lived assets and goodwill, derivative financial instruments, accounting for income taxes and assets acquired and liabilities assumed in acquisitions, are impacted significantly by judgments, assumptions and estimates used in the preparation of the consolidated financial statements.

Description of Business

The company operates within four business segments: (1) ethanol production, which includes the production of ethanol, distillers grains and corn oil, (2) agribusiness and energy services, which includes grain handling and storage, commodity marketing and merchant trading for company-produced and third-party ethanol, distillers grains, corn oil, natural gas and other commodities, (3) food and ingredients, which includes food-grade corn oil and included vinegar production until the sale of Fleischmann's Vinegar during the fourth quarter of 2018 and (4) partnership, which includes fuel storage and transportation services.

Ethanol Production Segment

Green Plains is one of the largest ethanol producers in North America. The company operates 13 ethanol plants in seven states through separate wholly owned operating subsidiaries. The company's ethanol plants use a dry mill process to produce ethanol and co-products such as wet, modified wet or dried distillers grains, as well as corn oil. The corn oil systems are designed to extract non-edible corn oil from the whole stillage immediately prior to production of distillers grains. At capacity, the company expects to process approximately 387 million bushels of corn and produce approximately 1.1 billion gallons of ethanol, 2.9 million tons of distillers grains and 292 million pounds of industrial grade corn oil annually.

Agribusiness and Energy Services Segment

The company owns and operates grain handling and storage assets through its agribusiness and energy services segment, which has grain storage capacity of approximately 43.5 million bushels, with 35.9 million bushels of storage capacity at the company's ethanol plants and 7.6 million bushels of total storage capacity at its three grain elevators. The company's agribusiness operations provide synergies with the ethanol production segment as it supplies a portion of the feedstock needed to produce ethanol. The company has an in-house marketing business that is responsible for the sale, marketing and distribution of all ethanol, distillers grains and corn oil produced at its ethanol plants. The company also purchases and sells ethanol, distillers grains, corn oil, grain, natural gas and other commodities and participates in other merchant trading activities in various markets.

Food and Ingredients Segment

The company has food-grade corn oil operations which focus on shipping corn oil from facilities across the Midwest by rail or barge to terminal facilities located in the southern United States. Until its sale on November 27, 2018, the company also owned Fleischmann's Vinegar, which is one of the world's largest producers of food-grade industrial vinegar.

Partnership Segment

The company's partnership segment provides fuel storage and transportation services by owning, operating, developing and acquiring ethanol and fuel storage tanks, terminals, transportation assets and other related assets and businesses. As of December 31, 2019, the partnership owns (i) 32 ethanol storage facilities located at or near the company's 13 operational ethanol production plants and one non-operational ethanol production plant, which have the ability to efficiently and effectively store and load railcars and tanker trucks with all of the ethanol produced at the company's ethanol production plants, (ii) seven fuel terminal facilities, located near major rail lines, which enable the partnership to receive, store and deliver fuels from and to markets that seek access to renewable fuels, and (iii) transportation assets, including a leased railcar fleet of approximately 2,630 railcars which is utilized to transport ethanol from the company's ethanol production plants to refineries throughout the United States and international export terminals.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Cash and Cash Equivalents

Cash and cash equivalents includes bank deposits as well as short-term, highly liquid investments with original maturities of three months or less.

Restricted Cash

The company has restricted cash, which can only be used for funding letters of credit or for payment towards a revolving credit agreement. Restricted cash also includes cash margins and securities pledged to commodity exchange clearinghouses and at times, funds in escrow related to acquisition and disposition activities. To the degree these segregated balances are cash and cash equivalents, they are considered restricted cash on the consolidated statements of cash flows.

Revenue Recognition

The company recognizes revenue when obligations under the terms of a contract with a customer are satisfied. Generally this occurs with the transfer of control of products or services. Revenue is measured as the amount of consideration expected to be received in exchange for transferring goods or providing services. Sales, value add, and other taxes the company collects concurrent with revenue-producing activities are excluded from revenue.

Sales of ethanol, distillers grains, corn oil, natural gas and other commodities by the company's marketing business are recognized when obligations under the terms of a contract with a customer are satisfied. Generally, this occurs with the transfer of control of products or services. Revenues related to marketing for third parties are presented on a gross basis as the company controls the product prior to the sale to the end customer, takes title of the product and has inventory risk. Unearned revenue is recorded for goods in transit when the company has received payment but control has not yet been transferred to the customer. Revenues for receiving, storing, transferring and transporting ethanol and other fuels are recognized when the product is delivered to the customer.

The company routinely enters into physical-delivery energy commodity purchase and sale agreements. At times, the company settles these transactions by transferring its obligations to other counterparties rather than delivering the physical commodity. Energy trading transactions are reported net as a component of revenue. Revenues include net gains or losses from derivatives related to products sold while cost of goods sold includes net gains or losses from derivatives related to commodities purchased. Revenues also include realized gains and losses on related derivative financial instruments and reclassifications of realized gains and losses on cash flow hedges from accumulated other comprehensive income or loss.

Sales of products, including agricultural commodities, are recognized when control of the product is transferred to the customer, which depends on the agreed upon shipment or delivery terms. Revenues related to grain merchandising are presented gross and include shipping and handling, which is also a component of cost of goods sold. Revenues from grain storage are recognized over time as the services are rendered.

A substantial portion of the partnership revenues are derived from fixed-fee commercial agreements for storage, terminal or transportation services. The partnership recognizes revenue upon transfer of control of product from its storage tanks and fuel terminals, when railcar volumetric capacity is provided, and as truck transportation services are performed. To the extent shortfalls associated with minimum volume commitments in the previous four quarters continue to exist, volumes in excess of the minimum volume commitment are applied to those shortfalls. Remaining excess volumes generating operating lease revenue are recognized as incurred.

Shipping and Handling Costs

The company accounts for shipping and handling activities related to contracts with customers as costs to fulfill its promise to transfer the associated products. Accordingly, the company records customer payments associated with shipping and handling costs as a component of revenue, and classifies such costs as a component of cost of goods sold.

Cost of Goods Sold

Cost of goods sold includes direct labor, materials, shipping and plant overhead costs. Direct labor includes all compensation and related benefits of non-management personnel involved in ethanol production and vinegar production until the sale of Fleischmann's Vinegar during the fourth quarter of 2018. Grain purchasing and receiving costs, excluding labor costs for grain buyers and scale operators, are also included in cost of goods sold. Materials include the cost of corn feedstock, denaturant, and process chemicals. Corn feedstock costs include gains and losses on related derivative financial

instruments not designated as cash flow hedges, inbound freight charges, inspection costs and transfer costs, as well as reclassifications of gains and losses on cash flow hedges from accumulated other comprehensive income or loss. Plant overhead consists primarily of plant utilities, repairs and maintenance and outbound freight charges. Shipping costs incurred by the company, including railcar costs, are also reflected in cost of goods sold.

The company uses exchange-traded futures and options contracts and forward purchase and sale contracts to attempt to minimize the effect of price changes on ethanol, grain and natural gas. Exchange-traded futures and options contracts are valued at quoted market prices and settled predominantly in cash. The company is exposed to loss when counterparties default on forward purchase and sale contracts. Grain inventories held for sale and forward purchase and sale contracts are valued at market prices when available or other market quotes adjusted for differences, primarily in transportation, between the exchange-traded market and local market where the terms of the contract is based. Changes in forward purchase contracts and exchange-traded futures and options contracts are recognized as a component of cost of goods sold.

Operations and Maintenance Expenses

In the partnership segment, transportation expenses represent the primary component of operations and maintenance expenses. Transportation expenses include railcar leases, freight and shipping of the company's ethanol and co-products, as well as costs incurred storing ethanol at destination terminals.

Derivative Financial Instruments

The company uses various derivative financial instruments, including exchange-traded futures and exchange-traded and over-the-counter options contracts, to attempt to minimize risk and the effect of commodity price changes including but not limited to, corn, ethanol, natural gas and crude oil. The company monitors and manages this exposure as part of its overall risk management policy to reduce the adverse effect market volatility may have on its operating results. The company may hedge these commodities as one way to mitigate risk; however, there may be situations when these hedging activities themselves result in losses.

By using derivatives to hedge exposures to changes in commodity prices, the company is exposed to credit and market risk. The company's exposure to credit risk includes the counterparty's failure to fulfill its performance obligations under the terms of the derivative contract. The company minimizes its credit risk by entering into transactions with high quality counterparties, limiting the amount of financial exposure it has with each counterparty and monitoring their financial condition. Market risk is the risk that the value of the financial instrument might be adversely affected by a change in commodity prices or interest rates. The company manages market risk by incorporating parameters to monitor exposure within its risk management strategy, which limits the types of derivative instruments and strategies the company can use and the degree of market risk it can take using derivative instruments.

The company evaluates its physical delivery contracts to determine if they qualify for normal purchase or sale exemptions which are expected to be used or sold over a reasonable period in the normal course of business. Contracts that do not meet the normal purchase or sale criteria are recorded at fair value. Changes in fair value are recorded in operating income unless the contracts qualify for, and the company elects, cash flow hedge accounting treatment.

Certain qualifying derivatives related to ethanol production and agribusiness and energy services are designated as cash flow hedges. The company evaluates the derivative instrument to ascertain its effectiveness prior to entering into cash flow hedges. Unrealized gains and losses are reflected in accumulated other comprehensive income or loss until the gain or loss from the underlying hedged transaction is realized. When it becomes probable a forecasted transaction will not occur, the cash flow hedge treatment is discontinued, which affects earnings. These derivative financial instruments are recognized in current assets or other current liabilities at fair value.

At times, the company hedges its exposure to changes in inventory values and designates qualifying derivatives as fair value hedges. The carrying amount of the hedged inventory is adjusted in the current period for changes in fair value. Ineffectiveness of the hedges is recognized in the current period to the extent the change in fair value of the inventory is not offset by the change in fair value of the derivative.

Concentrations of Credit Risk

The company is exposed to credit risk resulting from the possibility that another party may fail to perform according to the terms of the company's contract. The company sells ethanol, corn oil and distillers grains and markets products for third parties, which can result in concentrations of credit risk from a variety of customers, including major integrated oil companies, large independent refiners, petroleum wholesalers and other marketers. The company also sells grain to large commercial buyers, including other ethanol plants. Although payments are typically received within fifteen days of the sale,

the company continually monitors its exposure. The company is also exposed to credit risk on prepayments of undelivered inventories with a few major suppliers of petroleum products and agricultural inputs.

The company has master netting arrangements with various counterparties. On the consolidated balance sheets, the associated net amount for each counterparty is reflected as either an accounts receivable or accounts payable. If the amount for each counterparty were reflected on a gross basis, the company's accounts receivable and accounts payable would increase by $1.2 million and $13.7 million at December 31, 2019 and 2018, respectively.

Inventories

Corn held for ethanol production, ethanol, corn oil and distillers grains inventories are recorded at lower of average cost or market.

Other grain inventories include readily marketable grain, forward contracts to buy and sell grain, and exchange traded futures and option contracts, which are all stated at market value. All grain inventories held for sale are marked to market. Changes are reflected in cost of goods sold. The forward contracts require performance in future periods. Contracts to purchase grain generally relate to current or future crop years for delivery periods quoted by regulated commodity exchanges. Contracts for the sale of grain to processors or other consumers generally do not extend beyond one year. The terms of the purchase and sale agreements for grain are consistent with industry standards. Raw materials and finished goods inventories are valued at the lower of average cost or market.

Property and Equipment

Property and equipment are stated at cost less accumulated depreciation. Depreciation is generally calculated using the straight-line method over the following estimated useful life of the assets:

	Years
Plant, buildings and improvements	10-40
Production equipment	15-40
Other machinery and equipment	5-7
Land improvements	20
Railroad track and equipment	20
Computer hardware and software	3-5
Office furniture and equipment	5-7

Property and equipment is capitalized at cost. Land improvements and other property improvements are capitalized and depreciated. Costs of repairs and maintenance are charged to expense when incurred. The company periodically evaluates whether events and circumstances have occurred that warrant a revision of the estimated useful life of its fixed assets.

Intangible Assets

Our intangible assets consist of research and development technology and licenses that were capitalized at fair value at the time of consolidation of BioProcess Algae, and are being amortized over their estimated useful lives. Prior to the sale of Fleischmann's Vinegar during the fourth quarter of 2018, our intangible assets also included the vinegar trade name and customer relationships.

Impairment of Long-Lived Assets

The company reviews its long-lived assets, currently consisting of property and equipment, operating lease right-of-use assets, intangible assets and equity method investments, for impairment whenever events or changes in circumstances indicate the carrying amount of the asset may not be recoverable. Recoverability of assets to be held and used is measured by comparison of the carrying amount of an asset to estimated undiscounted future cash flows expected to be generated by the asset. If the carrying amount of an asset exceeds its estimated future cash flows, an impairment charge is recognized in the amount by which the carrying amount of the asset exceeds the fair value of the asset. Significant management judgment is required to determine the fair value of long-lived assets, which includes undiscounted cash flows projections. There were no material impairment charges recorded for the periods reported.

Goodwill

Goodwill is an asset representing the future economic benefits arising from other assets acquired in a business combination that are not individually identified and separately recognized. The determination of goodwill takes into consideration the fair value of net tangible and intangible assets. The company's goodwill currently consists of amounts related to the acquisition of certain ethanol plants and its fuel terminal and distribution business.

Effective January 1, 2018, the company early adopted the amended guidance in ASC 350, *Intangibles – Goodwill and Other: Simplifying the Test for Goodwill Impairment*, which simplifies the measurement of goodwill by eliminating Step 2 from the goodwill impairment test. Under the amended guidance, an entity may first assess qualitative factors to determine whether it is necessary to perform a quantitative goodwill impairment test. If determined to be necessary, the quantitative impairment test shall be used to identify goodwill impairment and measure the amount of a goodwill impairment loss to be recognized (if any).

The company is required to perform impairment tests related to goodwill annually, which it performs as of October 1, or sooner if an indicator of impairment occurs. Significant assumptions inherent in the valuation methodologies for goodwill were employed and include, but are not limited to, market capitalization, prospective financial information, growth rates, discount rates, inflationary factors, and cost of capital.

Circumstances that may indicate impairment include a decline in the company's future projected cash flows, a decision to suspend plant operations for an extended period of time, sustained decline in the company's market capitalization or market prices for similar assets or businesses, or a significant adverse change in legal or regulatory matters or business climate. Significant management judgment is required to determine the fair value of goodwill and measure impairment, which includes the company's market capitalization and projected cash flows. Fair value is determined by using various valuation techniques, including discounted cash flow models, sales of comparable properties and third-party independent appraisals. Changes in estimated fair value could result in a write-down of the asset. For additional information, please refer to *Note 10 – Goodwill and Intangible Assets.*

Leases

On January 1, 2019, the company adopted the amended guidance in ASC 842, *Leases*, and all related amendments and applied it to all leases using the optional transition method which requires the amended guidance to be applied at the date of adoption. The standard does not require the guidance to be applied to the earliest comparative period presented in the financial statements. As such, comparative information has not been restated and continues to be reported under the accounting standards in effect for those periods.

The company leases certain facilities, parcels of land, and equipment. These leases are accounted for as operating leases, with lease expense recognized on a straight-line basis over the lease term. The term of the lease may include options to extend or terminate the lease when it is reasonably certain that such options will be exercised. For leases with initial terms greater than 12 months, the partnership records operating lease right-of-use assets and corresponding operating lease liabilities. Leases with an initial term of 12 months or less are not recorded on the consolidated balance sheet. Operating lease right-of-use assets represent the right to control an underlying asset for the lease term and operating lease liabilities represent the obligation to make lease payments arising from the lease. These assets and liabilities are recognized at the commencement date based on the present value of lease payments over the lease term. As the company's leases do not provide an implicit rate, the incremental borrowing rate is used based on information available at commencement date to determine the present value of future payments.

The partnership segment records the majority of it operating lease revenue from its storage and throughput services, rail transportation services and certain terminal services agreements with Green Plains Trade. In addition, the partnership may sublease certain of its railcars to third parties on a short-term basis. These subleases are classified as operating leases, with the associated sublease revenue recognized on a straight-line basis over the lease term.

Please refer to *Note 18 – Commitments and Contingencies* to the consolidated financial statements for further details on operating lease expense and revenue.

Investments in Equity Method Investees

The company accounts for investments in which the company exercises significant influence using the equity method so long as the company (i) does not control the investee and (ii) is not the primary beneficiary of the entity. The company recognizes these investments as a separate line item in the consolidated balance sheets and its proportionate share of earnings on a separate line item in the consolidated statements of operations. The company's share of equity method investees other

comprehensive income arising during the period is included in accumulated other comprehensive loss in the consolidated balance sheet.

The company recognizes losses in the value of equity method investments when there is evidence of an other-than-temporary decrease in value. Evidence of a loss might include, but would not necessarily be limited to, the inability to recover the carrying amount of the investment or the inability of the equity method investee to sustain an earnings capacity that justifies the carrying amount of the investment. The current fair value of an investment that is less than its carrying amount may indicate a loss in value of the investment. The company evaluates equity method investments for impairment if there is evidence an investment may be impaired.

Distributions paid to the company from unconsolidated affiliates are classified as operating activities in the consolidated statements of cash flows until the cumulative distributions exceed the company's proportionate share of income from the unconsolidated affiliate since the date of initial investment. The amount of cumulative distributions paid to the company that exceeds the cumulative proportionate share of income in each period represents a return of investment, which is classified as an investing activity in the consolidated statements of cash flows.

Discontinued Operations

In determining whether a disposal group should be presented as discontinued operations, the company makes a determination of whether such a group being disposed of comprises a component of the entity, or a group of components of the entity, that represents a strategic shift that has, or will have, a major effect on the company's operations and financial results. If these determinations are made affirmatively, the results of operations of the group being disposed of are aggregated for separate presentation apart from the continuing operations of the company for all periods presented in the consolidated financial statements. General corporate overhead is not allocated to discontinued operations.

Net income from discontinued operations, net of income taxes, relates to the operations of GPCC, which was previously a wholly owned subsidiary of Green Plains until the formation of the GPCC joint venture and partial sale during the third quarter of 2019. The assets and liabilities of GPCC have been reclassified as assets and liabilities of discontinued operations in the prior year. See *Note 5 - Acquisitions, Dispositions and Discontinued Operations* for further details.

The company entered into a shared service agreement whereby they will continue to provide certain administrative services to GPCC and will receive $400 thousand on a quarterly basis through September 1, 2024, with the option for automatic renewal for successive one year periods thereafter and the quarterly fee subject to adjustments annually based on services rendered or market rates. The company will continue to sell distillers grains and corn to GPCC, and will recognize these sales and related cost of goods in continuing operations within their consolidated results, whereas previously these were eliminated as intercompany transactions.

Financing Costs

Fees and costs related to securing debt are recorded as financing costs. Debt issuance costs are stated at cost and are amortized using the effective interest method for term loans and the straight-line basis over the life of the agreements for revolving credit arrangements and convertible notes. During periods of construction, amortization is capitalized in construction-in-progress.

Selling, General and Administrative Expenses

Selling, general and administrative expenses consists of various expenses including employee salaries, incentives and benefits; office expenses; director compensation; professional fees for accounting, legal, consulting, and investor relations activities.

Stock-Based Compensation

The company recognizes compensation cost using a fair value based method whereby compensation cost is measured at the grant date based on the value of the award and is recognized over the service period, which is usually the vesting period. The company uses the Black-Scholes pricing model to calculate the fair value of options and warrants issued to both employees and non-employees. The company used the Monte Carlo valuation model to estimate the fair value of performance shares issued to employees. Stock issued for compensation is valued using the market price of the stock on the date of the related agreement.

Income Taxes

The provision for income taxes is computed using the asset and liability method, under which deferred tax assets and liabilities are recognized for the expected future tax consequences attributable to temporary differences between the financial reporting carrying amount of existing assets and liabilities and their respective tax bases. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in operating results in the period of enactment. Deferred tax assets are reduced by a valuation allowance when it is more likely than not that some portion or all of the deferred tax assets will not be realized.

The company recognizes uncertainties in income taxes within the financial statements under a process by which the likelihood of a tax position is gauged based upon the technical merits of the position, and then a subsequent measurement relates the maximum benefit and the degree of likelihood to determine the amount of benefit recognized in the financial statements.

Recent Accounting Pronouncements

Effective January 1, 2019, the company adopted the amended guidance in ASC 842, *Leases.* Please refer to *Note 18 – Commitments and Contingencies* for further details.

Effective January 1, 2020, the company will adopt the amended guidance in ASC 326, *Financial Instruments - Credit Losses*, which replaces the current incurred loss impairment method with a method that reflects expected credit losses on financial instruments. The new standard is effective for fiscal years and interim periods within those years, beginning after December 15, 2019, and allows for early adoption. The adoption of the new guidance will not have a material impact on the company's consolidated financial statements.

3. GREEN PLAINS PARTNERS LP

The partnership is a fee-based master limited partnership formed by Green Plains to provide fuel storage and transportation services by owning, operating, developing and acquiring ethanol and fuel storage tanks, terminals, transportation assets and other related assets and businesses. The partnership's assets currently include (i) 32 ethanol storage facilities, located at or near the company's 13 operational ethanol production plants and one non-operational ethanol plant, which have the ability to efficiently and effectively store and load railcars and tanker trucks with all of the ethanol produced at the company's ethanol production plants, (ii) seven fuel terminal facilities, located near major rail lines, which enable the partnership to receive, store and deliver fuels from and to markets that seek access to renewable fuels, and (iii) transportation assets, including a leased railcar fleet of approximately 2,630 railcars, which are contracted to transport ethanol from the company's ethanol production plants to refineries throughout the United States and international export terminals. The partnership is the company's primary downstream logistics provider to support its approximately 1.1 bgy ethanol marketing and distribution business since the partnership's assets are the principal method of storing and delivering the ethanol the company produces.

As of December 31, 2019, the company owns a 49.0% limited partner interest, consisting of 11,586,548 common units, and a 2.0% general partner interest in the partnership. The public owns the remaining 49.0% limited partner interest in the partnership. The partnership is consolidated in the company's financial statements.

A substantial portion of the partnership's revenues are derived from long-term, fee-based commercial agreements with Green Plains Trade, a subsidiary of the company. The partnership's agreements with Green Plains Trade include the following:

- 10-year storage and throughput agreement, expiring on June 30, 2028;
- 10-year rail transportation services agreement, expiring on June 30, 2025;
- 1-year trucking transportation agreement, expiring on May 31, 2020;
- Terminal services agreement for the Birmingham, Alabama unit train terminal, expiring December 31, 2022; and
- Various other terminal services agreements for other fuel terminal facilities, each with Green Plains Trade.

The partnership's storage and throughput agreement, and certain terminal services agreements, including the terminal services agreement for the Birmingham facility, are supported by minimum volume commitments. The partnership's rail transportation services agreement is supported by minimum take-or-pay capacity commitments. The company also has

agreements which establish fees for general and administrative, and operational and maintenance services it provides. These transactions are eliminated when the company consolidates its financial results.

The company consolidates the financial results of the partnership and records a noncontrolling interest in the partnership held by public common unitholders. Noncontrolling interest on the consolidated statements of operations includes the portion of net income attributable to the economic interest held by the partnership's public common unitholders. Noncontrolling interest on the consolidated balance sheets includes the portion of net assets attributable to the partnership's public common unitholders.

4. REVENUE

Adoption of ASC 606

On January 1, 2018, the company adopted the amended guidance in ASC 606, *Revenue from Contracts with Customers*, and all related amendments and applied it to all contracts using the modified retrospective transition method. As such, comparative information has not been restated and continues to be reported under the accounting standards in effect for those periods. There was no adjustments to the consolidated January 1, 2018 balance sheet for the adoption of the new revenue standard, and there was no impact of adoption on the consolidated statements of operations for the year ended December 31, 2018.

Revenue Recognition

Revenue is recognized when obligations under the terms of a contract with a customer are satisfied. Generally this occurs with the transfer of control of products or services. Revenue is measured as the amount of consideration expected to be received in exchange for transferring goods or providing services. Sales, value add, and other taxes the company collects concurrent with revenue-producing activities are excluded from revenue.

Revenue by Source

The following tables disaggregate revenue by major source for the years ended December 31, 2019 and 2018 (in thousands):

	Twelve Months Ended December 31, 2019 [1]					
	Ethanol Production	Agribusiness & Energy Services	Food & Ingredients	Partnership	Eliminations	Total
Revenues:						
Revenues from contracts with customers under ASC 606:						
Ethanol	$ 620	$ -	$ -	$ -	$ -	$ 620
Distillers grains	70,729	-	-	-	-	70,729
Service revenues	-	-	-	6,422	-	6,422
Other	2,589	3,684	-	-	-	6,273
Intersegment revenues	100	-	-	7,126	(7,226)	-
Total revenues from contracts with customers	74,038	3,684	-	13,548	(7,226)	84,044
Revenues from contracts accounted for as derivatives under ASC 815 [2]:						
Ethanol	1,338,093	522,572	-	-	-	1,860,665
Distillers grains	228,849	42,445	-	-	-	271,294
Corn oil	50,290	28,034	1,451	-	-	79,775
Grain	175	63,233	-	-	-	63,408
Other	9,270	48,348	-	-	-	57,618
Intersegment revenues	-	27,184	-	-	(27,184)	-
Total revenues from contracts accounted for as derivatives	1,626,677	731,816	1,451	-	(27,184)	2,332,760
Leasing revenues under ASC 842 [3]	-	-	-	68,839	(68,405)	434
Total Revenues	$ 1,700,715	$ 735,500	$ 1,451	$ 82,387	$ (102,815)	$ 2,417,238

	Twelve Months Ended December 31, 2018 [1]					
	Ethanol Production	**Agribusiness & Energy Services**	**Food & Ingredients**	**Partnership**	**Eliminations**	**Total**
Revenues:						
Revenues from contracts with customers under ASC 606:						
Ethanol	$ 3,803	$ -	$ -	$ -	$ -	$ 3,803
Distillers grains	206,905	-	-	-	-	206,905
Vinegar	-	-	108,011	-	-	108,011
Service revenues	-	-	-	5,180	-	5,180
Other	5,369	3,014	-	-	-	8,383
Intersegment revenues	186	24	-	9,030	(9,240)	-
Total revenues from contracts with customers	216,263	3,038	108,011	14,210	(9,240)	332,282
Revenues from contracts accounted for as derivatives under ASC 815 [2]:						
Ethanol	1,618,319	418,956	-	-	-	2,037,275
Distillers grains	198,738	141,140	-	-	-	339,878
Corn oil	66,567	22,623	13,110	-	-	102,300
Grain	520	81,742	-	-	-	82,262
Other	20,254	68,380	-	-	-	88,634
Intersegment revenues	-	33,077	-	-	(33,077)	-
Total revenues from contracts accounted for as derivatives	1,904,398	765,918	13,110	-	(33,077)	2,650,349
Leasing revenues under ASC 840 [3]	-	-	-	86,538	(85,237)	1,301
Total Revenues	$ 2,120,661	$ 768,956	$ 121,121	$ 100,748	$ (127,554)	$ 2,983,932

(1) Revenues include certain items which were previously considered intercompany transactions prior to the disposition of GPCC and therefore eliminated upon consolidation. These revenue transactions are now presented on a gross basis in product revenues. These revenue transactions total $14.5 million and $24.6 million for the years ended December 31, 2019 and 2018, respectively.

(2) Revenues from contracts accounted for as derivatives represent physically settled derivative sales that are outside the scope of ASC 606, where the company recognizes revenue when control of the inventory is transferred within the meaning of ASC 606 as required by ASC 610-20, *Gains and Losses from Derecognition of Nonfinancial Assets*.

(3) Leasing revenues do not represent revenues recognized from contracts with customers under ASC 606, and are accounted for under ASC 842, *Leases* for 2019 and ASC 840, *Leases* for 2018.

Major Customer

For the year ended December 31, 2019, revenues from one customer represented 11% of total revenues. Revenues from this customer are reported in the ethanol production segment. There were no third party customers that accounted for more than 10% of total revenues for the years ended December 31, 2018 or 2017.

Payment Terms

The company has standard payment terms, which vary depending upon the nature of the services provided, with the majority falling within 10 to 30 days after transfer of control or completion of services. In instances where the timing of revenue recognition differs from the timing of invoicing, the company has determined that contracts generally do not include a significant financing component.

Contract Liabilities

The company records unearned revenue when consideration is received, or such consideration is unconditionally due, from a customer prior to transferring goods or services to the customer under the terms of service and lease agreements. Unearned revenue from service agreements, which represents a contract liability, is recorded for fees that have been charged to the customer prior to the completion of performance obligations. Unearned revenue is generally recognized in the subsequent quarter and is not material to the company. The company expects to recognize all of the unearned revenue associated with service agreements as of December 31, 2019, in the subsequent quarter when the inventory is withdrawn from the partnership's tank storage.

5. ACQUISITIONS, DISPOSITIONS AND DISCONTINUED OPERATIONS

ACQUISITIONS

Acquisition of Cattle Feeding Operations – Bartlett Cattle Company, L.P.

On August 1, 2018, the company acquired two cattle-feeding operations from Bartlett Cattle Company, L.P. for $16.2 million, plus working capital of approximately $106.6 million primarily consisting of work-in-process inventory. The transaction included the feed yards located in Sublette, Kansas and Tulia, Texas, which added combined feedlot capacity of 97,000 head of cattle to the company's operations. The transaction was financed using cash on hand and proceeds from the Green Plains Cattle senior secured asset-based revolving credit facility. There were no material acquisition costs recorded for the acquisition.

The following is a summary of the assets acquired and liabilities assumed (in thousands):

Amounts of Identifiable Assets Acquired and Liabilities Assumed		
Accounts receivable	$	1,897
Inventory		104,809
Property and equipment, net		16,190
Current liabilities		(118)
Total identifiable net assets	$	122,778

The amounts above reflect the final purchase price allocation, which included working capital true-up payments by the company of $0.9 million made during 2018. After the disposition of GPCC, the assets and liabilities of the acquired feedlots were reclassified as discontinued operations. See *Disposition of Green Plains Cattle Company LLC* described below.

Acquisition of Cattle Feeding Operations – Cargill Cattle Feeders, LLC

On May 16, 2017, the company acquired two cattle-feeding operations from Cargill Cattle Feeders, LLC for $59.3 million, including certain working capital adjustments. The transaction included the feed yards located in Leoti, Kansas and Eckley, Colorado, which added combined feedlot capacity of 155,000 head of cattle to the company's operations. The transaction was financed using cash on hand. There were no material acquisition costs recorded for the acquisition.

As part of the transaction, the company also entered into a long-term cattle supply agreement with Cargill Meat Solutions Corporation. Under the cattle supply agreement, all cattle placed in the Leoti and Eckley feedlots are sold exclusively to Cargill Meat Solutions under an agreed upon pricing arrangement.

The following is a summary of the assets acquired and liabilities assumed (in thousands):

Amounts of Identifiable Assets Acquired and Liabilities Assumed		
Inventory	$	22,450
Prepaid expenses and other		52
Property and equipment, net		36,960
Current liabilities		(180)
Total identifiable net assets	$	59,282

The amounts above reflect the final purchase price allocation, which included working capital true-up payments by the company of $1.6 million made during 2018. After the disposition of GPCC, the assets and liabilities of the acquired feedlots were reclassified as discontinued operations. See *Disposition of Green Plains Cattle Company LLC* described below.

DISPOSITIONS

Disposition of Fleischmann's Vinegar

On November 27, 2018, the company and Green Plains II LLC, an indirect wholly-owned subsidiary of the company, completed the sale of Fleischmann's Vinegar Company, Inc. to Kerry Holding Co. ("Kerry"). The company received as net consideration from Kerry $354.0 million in cash and restricted cash, excluding net working capital adjustments. The divested

assets were reported within the company's food and ingredients segment. The company recorded a pre-tax gain on the sale of Fleischmann's Vinegar of $58.2 million, including offsetting related transaction costs of $7.4 million within the corporate segment.

The assets and liabilities of Fleischmann's Vinegar at closing on November 27, 2018 were as follows (in thousands):

Amounts of Identifiable Assets Disposed and Liabilities Relinquished		
Cash	$	2,107
Accounts receivable, net		16,142
Inventory		15,167
Prepaid expenses and other		853
Property and equipment		64,552
Other assets		79,389
Current liabilities		(8,837)
Deferred tax liabilities		(26,617)
Total identifiable net assets		142,756
Goodwill		142,002
Net assets disposed	$	284,758

The amounts above reflect the final purchase price allocation, including a working capital payment made to and received from Kerry of $0.3 million and $0.3 million during the first and third quarters of 2019, respectively.

Disposition of Bluffton, Lakota and Riga Ethanol Plants

On November 15, 2018, the company completed the sale of three ethanol plants located in Bluffton, Indiana, Lakota, Iowa, and Riga, Michigan, and certain related assets from subsidiaries, to Valero Renewable Fuels Company, LLC ("Valero") for the sale price of $323.2 million, including net working capital and other adjustments. Correspondingly, the partnership's storage assets located adjacent to such plants were sold to Green Plains Inc. for $120.9 million. The company received as consideration from Valero approximately $323.2 million, while the partnership received as consideration from the company 8.7 million partnership units and a portion of the general partner interest equating to 0.2 million equivalent limited partner units to maintain the general partner's 2% interest. In addition, the partnership also received additional consideration of approximately $2.7 million from Valero for the assignment of certain railcar operating leases. The divested assets were reported within the company's ethanol production, agribusiness and energy services and partnership segments. The company recorded a pre-tax gain on the sale of the three ethanol plants of $92.2 million, of which $89.5 million was recorded within the corporate segment and $2.7 million was recorded within the partnership segment, including offsetting transaction costs of $4.2 million, of which $3.7 million were recorded within the corporate segment and $0.5 million were recorded within the partnership segment.

The assets and liabilities of the Bluffton, Lakota and Riga ethanol plants at closing on November 15, 2018 were as follows (in thousands):

Amounts of Identifiable Assets Disposed and Liabilities Relinquished		
Inventory	$	36,812
Prepaid expenses and other		189
Property and equipment		184,970
Other assets		1,717
Current liabilities		(746)
Other liabilities		(4,706)
Total identifiable net assets		218,236
Goodwill		6,188
Net assets disposed	$	224,424

The amounts above reflect the final working capital true-up payments by Valero of $3.4 million received during the first quarter of 2019.

The company determined that the dispositions noted above did not meet the criteria for discontinued operations presentation as the disposition of these businesses did not represent a strategic shift that will have a major effect on its operations and financial results.

Disposition of Green Plains Cattle Company LLC

On September 1, 2019, the company, TGAM and StepStone formed a joint venture and entered into the LLC Agreement. GPCC was previously a wholly owned subsidiary of Green Plains. Green Plains also entered into a Securities Purchase Agreement with TGAM and StepStone, whereby TGAM and StepStone purchased an aggregate of 50% of the membership interests of GPCC from Green Plains for approximately $76.9 million in cash. There was no gain or loss recorded as part of this transaction. The LLC Agreement contains certain earn-out or bonus provisions to be paid by or received from GPCC if certain EBITDA thresholds are met. The company does not believe these are reasonably estimable and therefore has not recorded these amounts in the consolidated financial statements.

Under the LLC Agreement, Green Plains has certain rights and obligations, including but not limited to, the right or obligation: (i) to designate two Managers to the Board of Managers of GPCC (the "Board"), or in the event the size of the Board is increased, the number of Managers equal to two-fifths of the Board, rounded up, and (ii) to fund additional capital contributions in accordance with their percentage interest upon mutual agreement by Green Plains, TGAM and StepStone. Additionally, TGAM and StepStone both have the right or obligation to designate one Manager, or in the event the size of the Board is increased, the number of Managers equal to one-fifths of the Board, rounded up. Each Manager serving on the Board shall have one vote and a majority of the Managers serving on the Board shall constitute a quorum for the transaction of business of the Board. Green Plains' allocation under the LLC Agreement will be subject to certain adjustments.

The assets and liabilities of the GPCC at closing on September 1, 2019 were as follows (in thousands):

Amounts of Identifiable Assets Disposed and Liabilities Relinquished		
Cash	$	2
Accounts receivable, net		17,920
Inventory		387,534
Derivative financial instruments		48,189
Property and equipment		71,678
Other assets		2,291
Current liabilities		(49,297)
Short-term notes payable and other borrowings		(38)
Current maturities of long-term debt		(324,028)
Long-term debt		(80)
Other liabilities		(403)
Total identifiable net assets disposed	$	153,768

DISCONTINUED OPERATIONS

After closing, GPCC is no longer consolidated in the company's consolidated financial statements and the GPCC investment is accounted for using the equity method of accounting. Additionally, the company concluded that the disposition of GPCC met the requirements under ASC 205-20. As such, GPCC results prior to its disposition are classified as discontinued operations for all periods provided. Furthermore, the related assets and liabilities of GPCC have been presented as discontinued operations on the December 31, 2018 consolidated balance sheet. Financial results of GPCC were previously recorded within the food and ingredients segment.

Assets and Liabilities in the Consolidated Balance Sheet Attributable to Discontinued Operations

The following table presents assets and liabilities associated with our discontinued operations.

		December 31, 2018
Assets		
Cash and cash equivalents	$	2
Restricted cash		34,909
Accounts receivable, net of allowances		11,860
Inventories		432,283
Prepaid expenses and other		345
Current assets of discontinued operations	$	479,399
Property and equipment, net of accumulated depreciation and amortization	$	71,341
Other assets		1,719
Noncurrent assets of discontinued operations	$	73,060
Liabilities		
Accounts payable	$	21,072
Accrued and other liabilities		6,410
Derivative financial instruments		16,924
Short-term notes payable and other borrowings		374,492
Current maturities of long-term debt		38
Current liabilities of discontinued operations	$	418,936
Long-term debt	$	80
Other liabilities		2
Noncurrent liabilities of discontinued operations	$	82

Summarized Results of Discontinued Operations

The following table presents the results of our discontinued operations for the periods presented. GPCC was disposed of on September 1, 2019, as such operational results through August 31, 2019 are included in the fiscal year 2019 amounts presented below.

	Year Ended December 31,		
	2019 (1)	**2018** (1)	**2017** (1)
Product revenues	$ 638,122	$ 884,072	$ 328,874
Costs and expenses			
Cost of goods sold (excluding depreciation and amortization expenses reflected below)	614,671	845,160	302,438
Selling, general and administrative expenses	5,931	7,775	4,659
Depreciation and amortization expenses	4,198	5,361	3,779
Total costs and expenses	624,800	858,296	310,876
Operating income	13,322	25,776	17,998
Other income (expense)			
Interest income	182	147	10
Interest expense	(12,417)	(13,576)	(6,460)
Other, net	-	2,613	729
Total other expense	(12,235)	(10,816)	(5,721)
Income before income taxes	1,087	14,960	12,277
Income tax expense	(258)	(3,421)	(7,279)
Net income	$ 829	$ 11,539	$ 4,998

(1) Product revenues, costs of goods sold and selling, general and administrative expenses include certain revenue and expense items which were previously considered intercompany transactions prior to the disposition of GPCC and therefore eliminated upon consolidation. These revenue and costs of goods sold transactions total $14.5 million, $24.6 million and $22.2 million for the years ended December 31, 2019, 2018 and 2017, respectively.

6. FAIR VALUE DISCLOSURES

The following methods, assumptions and valuation techniques were used in estimating the fair value of the company’s financial instruments:

Level 1 – unadjusted quoted prices in active markets for identical assets or liabilities the company can access at the measurement date.

Level 2 – directly or indirectly observable inputs such as quoted prices for similar assets or liabilities in active markets other than quoted prices included within Level 1, quoted prices for identical or similar assets in markets that are not active, and other inputs that are observable or can be substantially corroborated by observable market data through correlation or other means. Grain inventories held for sale in the agribusiness and energy services segment are valued at nearby futures values, plus or minus nearby basis.

Level 3 – unobservable inputs that are supported by little or no market activity and comprise a significant component of the fair value of the assets or liabilities. The company currently does not have any recurring Level 3 financial instruments.

Derivative contracts include exchange-traded commodity futures and options contracts and forward commodity purchase and sale contracts. Exchange-traded futures and options contracts are valued based on unadjusted quoted prices in active markets and are classified in Level 1. The majority of the company’s exchange-traded futures and options contracts are cash-settled on a daily basis.

There have been no changes in valuation techniques and inputs used in measuring fair value. The company's assets and liabilities by level are as follows (in thousands):

	Fair Value Measurements at December 31, 2019		
	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Total
Assets:			
Cash and cash equivalents	$ 245,977	$ -	$ 245,977
Restricted cash	23,919	-	23,919
Inventories carried at market	-	73,318	73,318
Unrealized gains on derivatives	-	14,515	14,515
Other assets	113	-	113
Total assets measured at fair value	$ 270,009	$ 87,833	$ 357,842
Liabilities:			
Accounts payable [(1)]	$ -	$ 37,294	$ 37,294
Unrealized losses on derivatives	-	7,771	7,771
Total liabilities measured at fair value	$ -	$ 45,065	$ 45,065

	Fair Value Measurements at December 31, 2018		
	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Total
Assets:			
Cash and cash equivalents	$ 251,681	$ -	$ 251,681
Restricted cash	31,603	-	31,603
Inventories carried at market	-	111,960	111,960
Unrealized gains on derivatives	-	9,976	9,976
Other assets	114	1	115
Cash, cash equivalents and restricted cash of discontinued operations [(2)]	34,911	-	34,911
Total assets measured at fair value	$ 318,309	$ 121,937	$ 440,246
Liabilities:			
Accounts payable [(1)]	$ -	$ 16,573	$ 16,573
Unrealized losses on derivatives	-	7,852	7,852
Other liabilities	-	2	2
Total liabilities measured at fair value	$ -	$ 24,427	$ 24,427

(1) Accounts payable is generally stated at historical amounts with the exception of $37.3 million and $16.6 million at December 31, 2019 and 2018, respectively, related to certain delivered inventory for which the payable fluctuates based on changes in commodity prices. These payables are hybrid financial instruments for which the company has elected the fair value option.

(2) Includes $2 thousand of cash and cash equivalents and $34.9 million of restricted cash which is classified as current assets of discontinued operations in the December 31, 2018 consolidated balance sheet.

The company believes the fair value of its debt approximated book value, which was approximately $564.4 million at December 31, 2019, and $516.6 million at December 31, 2018. The company estimated the fair value of its outstanding debt using Level 2 inputs. The company believes the fair values of its accounts receivable approximated book value, which was $107.2 million and $88.5 million, respectively, at December 31, 2019 and 2018.

Although the company currently does not have any recurring Level 3 financial measurements, the fair values of tangible assets and goodwill acquired and the equity component of convertible debt represent Level 3 measurements which were derived using a combination of the income approach, market approach and cost approach for the specific assets or liabilities being valued.

7. SEGMENT INFORMATION

The company reports the financial and operating performance for the following four operating segments: (1) ethanol production, which includes the production of ethanol, distillers grains and corn oil, (2) agribusiness and energy services, which includes grain handling and storage, commodity marketing and merchant trading for company-produced and third-party ethanol, distillers grains, corn oil, natural gas and other commodities, (3) food and ingredients, which includes food-grade corn oil and included vinegar production until the sale of Fleischmann's Vinegar during the fourth quarter of 2018 and (4) partnership, which includes fuel storage and transportation services.

Corporate activities include selling, general and administrative expenses, consisting primarily of compensation, professional fees and overhead costs not directly related to a specific operating segment.

During the normal course of business, the operating segments conduct business with each other. For example, the agribusiness and energy services segment procures grain and natural gas and sells products, including ethanol, distillers grains and corn oil for the ethanol production segment. The partnership segment provides fuel storage and transportation services for the ethanol production segment. These intersegment activities are treated like third-party transactions with origination, marketing and storage fees charged at estimated market values. Consequently, these transactions affect segment performance; however, they do not impact the company's consolidated results since the revenues and corresponding costs are eliminated.

The following tables set forth certain financial data for the company's operating segments, excluding amounts related to discontinued operations (in thousands):

	Year Ended December 31,		
	2019 (1)	2018 (1)	2017 (1)
Revenues:			
Ethanol production:			
Revenues from external customers	$ 1,700,615	$ 2,120,475	$ 2,507,589
Intersegment revenues	100	186	84
Total segment revenues	1,700,715	2,120,661	2,507,673
Agribusiness and energy services:			
Revenues from external customers	708,316	735,855	632,702
Intersegment revenues	27,184	33,101	36,059
Total segment revenues	735,500	768,956	668,761
Food and ingredients:			
Revenues from external customers	1,451	121,121	142,907
Intersegment revenues	-	-	-
Total segment revenues	1,451	121,121	142,907
Partnership:			
Revenues from external customers	6,856	6,481	6,277
Intersegment revenues	75,531	94,267	100,716
Total segment revenues	82,387	100,748	106,993
Revenues including intersegment activity	2,520,053	3,111,486	3,426,334
Intersegment eliminations	(102,815)	(127,554)	(136,859)
Revenues as reported	$ 2,417,238	$ 2,983,932	$ 3,289,475

(1) Revenues include certain items which were previously considered intercompany transactions prior to the disposition of GPCC and therefore eliminated upon consolidation. These revenue transactions are now presented on a gross basis in product revenues. These revenue transactions total $14.5 million, $24.6 million and $22.2 million for years ended December 31, 2019, 2018 and 2017, respectively.

Refer to *Note 4 – Revenue*, for further disaggregation of revenue by operating segment.

	Year Ended December 31,		
	2019 [1]	2018 [1]	2017 [1]
Cost of goods sold:			
Ethanol production	$ 1,791,099	$ 2,118,787	$ 2,434,001
Agribusiness and energy services	696,226	717,772	614,582
Food and ingredients	1,526	94,679	109,343
Partnership	-	-	-
Intersegment eliminations	(103,904)	(124,270)	(136,744)
	$ 2,384,947	$ 2,806,968	$ 3,021,182

(1) Cost of goods sold include certain items which were previously considered intercompany transactions prior to the disposition of GPCC and therefore eliminated upon consolidation. These cost of goods sold transactions are now presented on a gross basis in cost of goods sold. These cost of goods sold transactions total $14.4 million, $24.5 million and $22.0 million for the years ended December 31, 2019, 2018 and 2017, respectively.

	Year Ended December 31,		
	2019	2018	2017
Operating income (loss):			
Ethanol production	$ (178,575)	$ (111,823)	$ (45,074)
Agribusiness and energy services	22,777	29,076	30,443
Food and ingredients	(76)	14,354	17,963
Partnership	50,635	64,770	65,709
Intersegment eliminations	1,188	(3,110)	(61)
Corporate activities [1]	(38,519)	96,687	(45,232)
	$ (142,570)	$ 89,954	$ 23,748

(1) Corporate activates for fiscal year 2018 include a gain on the sale of assets related to the sale of three ethanol plants and Fleischmann's Vinegar during the fourth quarter of 2018, which resulted in a net gain of $150.4 million.

	Year Ended December 31,		
	2019	2018	2017
Depreciation and amortization:			
Ethanol production	$ 63,073	$ 80,227	$ 81,987
Agribusiness and energy services	2,222	2,470	3,462
Food and ingredients	-	7,553	9,324
Partnership	3,441	4,442	5,111
Corporate activities	3,391	3,566	3,698
	$ 72,127	$ 98,258	$ 103,582

	Year Ended December 31,		
	2019	2018	2017
Capital expenditures:			
Ethanol production	$ 72,374	$ 27,322	$ 28,996
Agribusiness and energy services	2,251	277	397
Food and ingredients	-	9,025	13,467
Partnership	305	1,268	2,024
Corporate activities	1,542	451	3,115
	$ 76,472	$ 38,343	$ 47,999

The following table sets forth total assets by operating segment (in thousands):

	Year Ended December 31,	
	2019	2018
Total assets [1]:		
Ethanol production	$ 884,293	$ 872,845
Agribusiness and energy services	410,400	399,633
Partnership	90,011	67,297
Corporate assets	324,280	334,236
Assets of discontinued operations	-	552,459
Intersegment eliminations	(10,766)	(10,038)
	$ 1,698,218	$ 2,216,432

(1) Asset balances by segment exclude intercompany payable and receivable balances.

8. INVENTORIES

Inventories are carried at the lower of cost or net realizable value, except grain held for sale and fair-value hedged inventories. Commodities held for sale are reported at market value. The company recorded a $6.6 million and $6.0 million lower of cost or market inventory adjustment reflected in cost of goods sold within the ethanol production segment as of December 31, 2019 and 2018, respectively.

The components of inventories are as follows (in thousands):

	December 31,	
	2019	2018
Finished goods	$ 85,975	$ 99,566
Commodities held for sale	42,836	62,896
Raw materials	77,900	98,174
Work-in-process	13,523	12,680
Supplies and parts	32,758	29,284
	$ 252,992	$ 302,600

9. PROPERTY AND EQUIPMENT

The components of property and equipment are as follows (in thousands):

	December 31,	
	2019	2018
Plant equipment	$ 911,097	$ 884,738
Buildings and improvements	168,309	167,842
Land and improvements	92,321	92,154
Railroad track and equipment	34,404	34,163
Construction-in-progress	60,262	8,491
Computer hardware and software	19,368	18,444
Office furniture and equipment	3,716	3,639
Leasehold improvements and other	24,471	24,416
Total property and equipment	1,313,948	1,233,887
Less: accumulated depreciation and amortization	(486,677)	(418,652)
Property and equipment, net	$ 827,271	$ 815,235

10. GOODWILL AND INTANGIBLE ASSETS

Goodwill

Effective January 1, 2018, the company early adopted the amended guidance in ASC 350, *Intangibles – Goodwill and Other: Simplifying the Test for Goodwill Impairment*, which simplifies the measurement of goodwill by eliminating Step 2 from the goodwill impairment test. Under the amended guidance, an entity may first assess qualitative factors to determine whether it is necessary to perform a quantitative goodwill impairment test. If determined to be necessary, the quantitative

impairment test shall be used to identify goodwill impairment and measure the amount of a goodwill impairment loss to be recognized (if any).

The company is required to perform impairment tests related to goodwill annually, which it performs as of October 1, or sooner if an indicator of impairment occurs. Near term industry outlook and the decline in the company's stock price caused a decline in the company's market capitalization during the three months ended September 30, 2019. As such, the company determined a triggering event had occurred that required an interim impairment assessment for its ethanol production reporting unit. Due to the impairment indicators noted as a result of these triggering events, the company evaluated goodwill as of September 30, 2019. Significant assumptions inherent in the valuation methodologies for goodwill were employed and include, but are not limited to, market capitalization, prospective financial information, growth rates, discount rates, inflationary factors, and cost of capital. Based on the company's quantitative evaluation, it was determined that the fair value of the ethanol production reporting unit exceeded its carrying value. As a result, the company concluded that the goodwill assigned to the ethanol production reporting unit was not impaired, but could be at risk of future impairment. The company continues to believe that its long-term financial goals will be achieved. As a result of the analysis, the company did not take a goodwill impairment charge.

The company performed an annual goodwill assessment as of October 1, 2019, and given the quantitative work performed during the third quarter as described above, the company used a qualitative assessment, which resulted in no goodwill impairment. There were no qualitative factors from our interim quantitative goodwill impairment assessment on September 30, 2019 through December 31, 2019 that would suggest that its more likely than not that our goodwill is impaired.

Changes in the carrying amount of goodwill attributable to each business segment during the years ended December 31, 2019 and 2018 were as follows (in thousands):

	Ethanol Production	Food and Ingredients	Partnership	Total
Balance, December 31, 2017	$ 30,279	$ 142,002	$ 10,598	$ 182,879
Dispositions [(1)]	(6,188)	(142,002)	-	(148,190)
Balance, December 31, 2018	$ 24,091	$ -	$ 10,598	$ 34,689
Balance, December 31, 2019	$ 24,091	$ -	$ 10,598	$ 34,689

(1) As of December 31, 2018, in connection with the sale of the Bluffton, Lakota and Riga ethanol plants and Fleischmann's Vinegar, the fair value of goodwill was reduced by $6.2 million and $142.0 million, respectively.

Intangible Assets

As of November 27, 2018, the company's customer relationship intangible asset recognized in connection with the Fleischmann's Vinegar acquisition of $68.9 million, net of $11.1 million of amortization, was disposed of in connection with the Fleischmann's Vinegar sale. As of November 27, 2018, the company's indefinite-lived trade name intangible asset of $10.5 million was disposed of as part of the Fleischmann's Vinegar sale. Prior to its disposition, the company recognized $4.4 million and $5.3 million, respectively, of amortization expense associated with amortizing the customer relationship intangible asset during the years ended December 31, 2018 and 2017.

11. DERIVATIVE FINANCIAL INSTRUMENTS

At December 31, 2019, the company's consolidated balance sheet reflected unrealized losses of $11.1 million, net of tax, in accumulated other comprehensive loss, which included its share of equity method investee's other comprehensive income arising during the period. The company expects these losses will be reclassified as operating income over the next 12 months as a result of hedged transactions that are forecasted to occur. The amount realized in operating income will differ as commodity prices change.

Fair Values of Derivative Instruments

The fair values of the company's derivative financial instruments and the line items on the consolidated balance sheets where they are reported are as follows (in thousands):

	Asset Derivatives' Fair Value at December 31,		Liability Derivatives' Fair Value at December 31,	
	2019	2018	2019	2018
Derivative financial instruments	$ 14,515 [(1)]	$ 9,976 [(2)]	$ 7,771	$ 7,852
Other assets	-	1	-	-
Other liabilities	-	-	-	2
Total	$ 14,515	$ 9,977	$ 7,771	$ 7,854

(1) At December 31, 2019, derivative financial instruments, as reflected on the balance sheet, includes net unrealized gains on exchange traded futures and options contracts of $3.4 million, which include $0.1 million of net unrealized gains on derivative financial instruments designated as cash flow hedging instruments.

(2) At December 31, 2018, derivative financial instruments, as reflected on the balance sheet, includes net unrealized gains on exchange traded futures and options contracts of $16.3 million.

Refer to *Note 6 - Fair Value Disclosures*, which contains fair value information related to derivative financial instruments.

Effect of Derivative Instruments on Consolidated Balance Sheets, Consolidated Statements of Operations and Consolidated Statements of Comprehensive Income

The gains or losses recognized in income and other comprehensive income related to the company's derivative financial instruments and the line items on the consolidated financial statements where they are reported are as follows (in thousands):

Location of Gain or (Loss) Reclassified from Accumulated Other Comprehensive Income into Income	Amount of Gain or (Loss) Reclassified from Accumulated Other Comprehensive Income into Income — Year Ended December 31, 2019	2018	2017
Revenues	$ -	$ 3,648	$ 42,710
Cost of goods sold	-	1,258	(11,765)
Net income (loss) from discontinued operations, net of income taxes	48,797	(14,462)	(24,714)
Net gain (loss) recognized in loss before tax	$ 48,797	$ (9,556)	$ 6,231

Gain or (Loss) Recognized in Other Comprehensive Income on Derivatives	Amount of Gain or (Loss) Recognized in Other Comprehensive Income on Derivatives — Year Ended December 31, 2019	2018	2017
Commodity Contracts	$ 70,404	$ (9,642)	$ (8,015)

Derivatives Not Designated as Hedging Instruments	Location of Gain or (Loss) Recognized in Income on Derivatives	Amount of Gain or (Loss) Recognized in Income on Derivatives — Year Ended December 31, 2019	2018	2017
Commodity contracts	Revenues	$ (10,202)	$ 11,565	$ (12,588)
Commodity contracts	Costs of goods sold	(2,442)	21,101	25,825
Commodity contracts	Net income (loss) from discontinued operations, net of income taxes	(2,470)	(3,607)	1,258
		$ (15,114)	$ 29,059	$ 14,495

The following amounts were recorded on the consolidated balance sheets related to cumulative basis adjustments for the fair value hedged items (in thousands):

Line Item in the Consolidated Balance Sheet in Which the Hedged Item is Included	December 31, 2019		December 31, 2018	
	Carrying Amount of the Hedged Assets	Cumulative Amount of Fair Value Hedging Adjustment Included in the Carrying Amount of the Hedged Assets	Carrying Amount of the Hedged Assets	Cumulative Amount of Fair Value Hedging Adjustment Included in the Carrying Amount of the Hedged Assets
Inventories	$ 55,021	$ (2,808)	$ 89,188	$ 2,430

Effect of Cash Flow and Fair Value Hedge Accounting on the Statements of Operations

	Location and Amount of Gain Recognized in Income on Cash Flow and Fair Value Hedging Relationships for the Year Ended December 31, 2019		
	Revenue	Cost of Goods Sold	Net Income (Loss) from Discontinued Operations, Net of Income Taxes
Gain on cash flow hedging relationships:			
Commodity contracts:			
Amount of gain (loss) reclassified from accumulated other comprehensive income into income	$ -	$ -	$ 48,797
Gain (loss) on fair value hedging relationships:			
Commodity contracts:			
Hedged item	-	(844)	-
Derivatives designated as hedging instruments	-	4,254	-
Total amounts of income and expense line items presented in the consolidated statement of operations in which the effects of cash flow or fair value hedges are recorded	$ -	$ 3,410	$ 48,797

	Location and Amount of Gain or (Loss) Recognized in Income on Cash Flow and Fair Value Hedging Relationships for the Year Ended December 31, 2018		
	Revenue	**Cost of Goods Sold**	**Net Income (Loss) from Discontinued Operations, Net of Income Taxes**
Gain (loss) on cash flow hedging relationships:			
Commodity contracts:			
Amount of gain (loss) reclassified from accumulated other comprehensive income into income	$ 3,648	$ 1,258	$ (14,462)
Gain (loss) on fair value hedging relationships:			
Commodity contracts:			
Hedged item	-	13,681	-
Derivatives designated as hedging instruments	-	(12,304)	-
Total amounts of income and expense line items presented in the consolidated statement of operations in which the effects of cash flow or fair value hedges are recorded	$ 3,648	$ 2,635	$ (14,462)

	Location and Amount of Gain or (Loss) Recognized in Income on Cash Flow and Fair Value Hedging Relationships for the Year Ended December 31, 2017		
	Revenue	**Cost of Goods Sold**	**Net Income (Loss) from Discontinued Operations, Net of Income Taxes**
Gain (loss) on cash flow hedging relationships:			
Commodity contracts:			
Amount of gain (loss) reclassified from accumulated other comprehensive income into income	$ 42,710	$ (11,765)	$ (24,714)
Gain (loss) on fair value hedging relationships:			
Commodity contracts:			
Hedged item	1,451	(6,229)	-
Derivatives designated as hedging instruments	(1,734)	8,530	-
Total amounts of income and expense line items presented in the consolidated statement of operations in which the effects of cash flow or fair value hedges are recorded	$ 42,427	$ (9,464)	$ (24,714)

There were no gains or losses from discontinuing cash flow or fair value hedge treatment during the years ended December 31, 2019, 2018 and 2017.

The open commodity derivative positions as of December 31, 2019, are as follows (in thousands):

	December 31, 2019				
	Exchange Traded	Non-Exchange Traded			
Derivative Instruments	**Net Long & (Short) [1]**	**Long [2]**	**(Short) [2]**	**Unit of Measure**	**Commodity**
Futures	22,445			Bushels	Corn and Soybeans
Futures	(7,000)[3]			Bushels	Corn
Futures	(9,702)			Gallons	Ethanol
Futures	(41,664)[4]			Gallons	Ethanol
Futures	(8,428)			mmBTU	Natural Gas
Futures	(9,088)[3]			mmBTU	Natural Gas
Options	(201)			Bushels	Corn
Options	(20,954)			Gallons	Ethanol
Forwards		29,511	(1,374)	Bushels	Corn and Soybeans
Forwards		26,208	(389,298)	Gallons	Ethanol
Forwards		137	(592)	Tons	Distillers Grains
Forwards		3,840	(131,616)	Pounds	Corn Oil
Forwards		12,539	(1,736)	mmBTU	Natural Gas

(1) Exchange traded futures and options are presented on a net long and (short) position basis. Options are presented on a delta-adjusted basis.
(2) Non-exchange traded forwards are presented on a gross long and (short) position basis including both fixed-price and basis contracts.
(3) Futures or non-exchange traded forwards used for fair value hedges.
(4) Futures used for cash flow hedges.

Energy trading contracts that do not involve physical delivery are presented net in revenues on the consolidated statements of operations. Included in revenues are net gains of $12.3 million, $23.1 million, and $35.4 million for the years ended December 31, 2019, 2018, and 2017 respectively, on energy trading contracts.

12. DEBT

The components of long-term debt are as follows (in thousands):

	December 31,	
	2019	**2018**
Corporate:		
3.25% convertible notes due 2019 [1]	$ -	$ 53,457
4.125% convertible notes due 2022 [2]	149,256	142,708
4.00% convertible notes due 2024 [3]	83,497	-
Green Plains Partners:		
$200.0 million revolving credit facility [4]	132,100	134,000
$8.1 million promissory note	-	8,100
Other	16,512	17,804
Total	381,365	356,069
Unamortized debt issuance costs	(4,820)	(3,190)
Less: current portion of long-term debt	(132,555)	(54,769)
Total long-term debt	$ 243,990	$ 298,110

(1) Includes $0.4 million of unamortized debt issuance costs as of December 31, 2018.
(2) Includes $2.0 million and $2.8 million of unamortized debt issuance costs as of December 31, 2019 and 2018, respectively.
(3) Includes $2.8 million of unamortized debt issuance costs as of December 31, 2019.
(4) The Green Plains Partners revolving credit facility is included in current maturities of long-term debt balance on the consolidated balance sheet as of December 31, 2019 as its maturity date is July 1, 2020.

Scheduled long-term debt repayments, including full accretion of the 4.125% convertible notes due 2022 and of the 4.00% convertible notes due 2024 at maturity but excluding the effects of any debt discounts and debt issuance costs, are as follows (in thousands):

Year Ending December 31,		**Amount**
2020	$	132,555
2021		354
2022		170,345
2023		337
2024		115,331
Thereafter		14,690
Total	$	433,612

The components of short-term notes payable and other borrowings are as follows (in thousands):

	December 31,			
	2019		**2018**	
Green Plains Cattle:				
$500.0 million revolver [(1)]	$	-	$	-
Green Plains Trade:				
$300.0 million revolver		138,204		108,485
Green Plains Grain:				
$100.0 million revolver		40,000		41,000
$50.0 million inventory financing		-		-
Green Plains Commodity Management:				
$30.0 million hedge line		9,608		14,266
Total short-term notes payable and other borrowings	$	187,812	$	163,751

(1) As part of the GPCC disposition during the three months ended September 30, 2019, the December 31, 2018 outstanding balance of the Green Plains Cattle revolver of $374.5 million has been reclassified to current liabilities of discontinued operations. Refer to *Note 5 – Acquisitions, Dispositions and Discontinued Operations* for further discussion on discontinued operations.

Corporate Activities

On June 21, 2019, the company issued $105.0 million of 4.00% convertible senior notes due in 2024, or the 4.00% notes. The company used approximately $57.8 million of the net proceeds to repurchase the $56.8 million outstanding principal amount of its 3.25% convertible senior notes due October 1, 2019 in cash, including accrued and unpaid interest, in privately negotiated transactions concurrently with the offering of the 4.00% notes. On July 19, 2019, the company closed on the issuance of an additional $10.0 million aggregate principal amount of the 4.00% notes (the "Option Notes") to the initial purchasers. The Option Notes have the same terms as the 4.00% notes issued on June 21, 2019, and were issued under the same Indenture dated as of June 21, 2019. After the issuance of the Option Notes, total aggregate principal of the 4.00% notes outstanding is $115.0 million.

At issuance, the company separately accounted for the liability and equity components of the 3.25% convertible notes by bifurcating the gross proceeds between the indebtedness, or liability component, and the embedded conversion option, or equity component, by estimating an effective interest rate on the date of issuance for similar notes. The embedded conversion option was recorded in stockholders' equity. Since the company did not exercise the embedded conversion option associated with the notes, pursuant to the guidance within ASC 470, *Debt*, the company recorded a loss upon extinguishment of $1.6 million, measured by the difference between the fair value and carrying value of the liability portion of the notes. As a result, the company recorded a charge to interest expense in the consolidated financial statements of approximately $1.6 million during the three months ended June 30, 2019. This charge included $0.1 million of unamortized debt issuance costs related to the principal balance extinguished. The remaining settlement consideration transferred was allocated to the reacquisition of the embedded conversion option and recognized as a reduction of additional paid-in capital.

The 4.00% notes are senior, unsecured obligations of the company, with interest payable on January 1 and July 1 of each year, beginning January 1, 2020, at a rate of 4.00% per annum. The 4.00% notes will mature on July 1, 2024, unless earlier converted, redeemed or repurchased. The 4.00% notes will be convertible, at the option of the holders, into consideration consisting of, at the company's election, cash, shares of the company's common stock, or a combination of cash and shares of the company's common stock until the close of business on the scheduled trading day immediately preceding the maturity date. However, before January 1, 2024, the 4.00% notes will not be convertible unless certain conditions are satisfied. The

initial conversion rate is 64.1540 shares of common stock per $1,000 of principal, which is equal to a conversion price of approximately $15.59 per share. The conversion rate will be subject to adjustment upon the occurrence of certain events. In addition, the company may be obligated to increase the conversion rate for any conversion that occurs in connection with certain corporate events, including the company's calling the 4.00% notes for redemption.

On and after July 1, 2022, and prior to the maturity date, the company may redeem all, but not less than all, of the 4.00% notes for cash if the sale price of the company's common stock equals or exceeds 140% of the applicable conversion price for a specified time period ending on the trading day immediately prior to the date the company delivers notice of the redemption. The redemption price will equal 100% of the principal amount of the 4.00% notes to be redeemed, plus any accrued and unpaid interest to, but excluding, the redemption date. In addition, upon the occurrence of a fundamental change, holders of the 4.00% notes will have the right, at their option, to require the company to repurchase the 4.00% notes in cash at a price equal to 100% of the principal amount of the 4.00% notes to be repurchased, plus accrued and unpaid interest to, but excluding, the fundamental change repurchase date.

In August 2016, the company issued $170.0 million of 4.125% convertible senior notes due in 2022, or the 4.125% notes. The 4.125% notes are senior, unsecured obligations of the company, with interest payable on March 1 and September 1 of each year. The company may settle the 4.125% notes in cash, common stock or a combination of cash and common stock.

Prior to March 1, 2022, the 4.125% notes are not convertible unless certain conditions are satisfied. The initial conversion rate is 35.7143 shares of common stock per $1,000 of principal, which is equal to a conversion price of approximately $28.00 per share. The conversion rate is subject to adjustment upon the occurrence of certain events, including upon redemption of the 4.125% notes.

The company may redeem all, but not less than all, of the 4.125% notes at any time on or after September 1, 2020, if the company's common stock equals or exceeds 140% of the applicable conversion price for a specified time period ending on the trading day immediately prior to the date the company delivers notice of the redemption. The redemption price will equal 100% of the principal plus any accrued and unpaid interest. Holders of the 4.125% notes have the option to require the company to repurchase the 4.125% notes in cash at a price equal to 100% of the principal plus accrued and unpaid interest when there is a fundamental change, such as change in control. If an event of default occurs, it could result in the 4.125% notes being declared due and payable.

Ethanol Production Segment

The company has small equipment financing loans, finance leases on equipment or facilities, and other forms of debt financing.

Agribusiness and Energy Services Segment

Green Plains Trade has a $300.0 million senior secured asset-based revolving credit facility to finance working capital for marketing and distribution activities based on eligible collateral equal to the sum of percentages of eligible receivables and inventories, less miscellaneous adjustments. The credit facility matures on July 28, 2022 and consists of a $285 million credit facility and a $15 million first-in-last-out (FILO) credit facility, and includes an accordion feature that enables the credit facility to be increased by up to $70.0 million with agent approval. Advances are subject to variable interest rates equal to daily LIBOR plus 2.25% on the credit facility and daily LIBOR plus 3.25% on the FILO credit facility. The total unused portion of the revolving credit facility is also subject to a commitment fee of 0.375% per annum.

The terms impose affirmative and negative covenants for Green Plains Trade, including maintaining a minimum fixed charge coverage ratio of 1.15 to 1.00. Capital expenditures are limited to $1.5 million per year under the credit facility. The credit facility also restricts distributions related to capital stock, with an exception for distributions up to 50% of net income if, on a pro forma basis, (a) availability has been greater than $10.0 million for the last 30 days and (b) the borrower would be in compliance with the fixed charge coverage ratio on the distribution date.

Green Plains Grain has a senior secured asset-based revolving credit facility, which was amended on June 28, 2019, to extend the existing maturity date from July 26, 2019 to June 28, 2022 and lower the maximum commitment from $125.0 million to $100.0 million. The credit facility finances working capital up to the maximum commitment based on eligible collateral equal to the sum of percentages of eligible cash, receivables and inventories, less miscellaneous adjustments. Advances are subject to an interest rate equal to LIBOR plus 3.00% or the lenders' base rate plus 2.00%. The credit facility also includes an accordion feature that enables the facility to be increased by up to $75.0 million with agent approval. The credit facility can also be increased by up to $50.0 million for seasonal borrowings. Total commitments outstanding cannot

exceed $225.0 million. Depending on utilization, the total unused portion of the $100.0 million revolving credit facility is also subject to a commitment fee ranging from 0.375% to 0.50%.

Lenders receive a first priority lien on certain cash, inventory, accounts receivable and other assets owned by Green Plains Grain. The terms impose affirmative and negative covenants for Green Plains Grain, including maintaining minimum working capital to be the greater of (i) $18,000,000 and (ii) 18% of the sum of the then total commitment plus the aggregate seasonal line commitments. Minimum tangible net worth is required to be greater than 21% of the sum of the then total commitment plus the aggregate seasonal line commitments. The credit facility also requires the company to maintain a maximum annual leverage of 6.00 to 1.00. Capital expenditures are limited to $8.0 million per year under the credit facility, plus equity contributions from the company and unused amounts of up to $8.0 million from the previous year. In addition, if the company has long-term indebtedness on the date of calculation of greater than $10.0 million, the credit facility requires the company to maintain a minimum fixed charge coverage ratio of 1.25 to 1.00 and a maximum long term debt capitalization of 40%.

Green Plains Grain has entered into short-term inventory financing agreements with a financial institution. The company has accounted for the agreements as short-term notes, rather than sales, and has elected the fair value option to offset fluctuations in market prices of the inventory. The company had no short-term notes payable related to these inventory financing agreements as of December 31, 2019.

Green Plains Commodity Management has an uncommitted revolving credit facility, which was amended in October 2019, to increase the maximum commitment from $20.0 million to $30.0 million. The revolving credit facility, which matures April 30, 2023, is used to finance margins related to its hedging programs. Advances are subject to variable interest rates equal to LIBOR plus 1.75%.

Food and Ingredients Segment

On August 28, 2019, GPCC entered into an amended and restated $500 million senior secured asset-based revolving credit facility with a group of lenders led by Bank of the West and ING Capital LLC which was conditional upon the closing and formation of the GPCC joint venture which became effective on September 1, 2019. The amended and restated agreement includes revisions to certain covenants including the calculations of tangible net worth, restricted payments and excess cash reserves. The amended and restated agreement also updated the definition of a change in control as Green Plains owning less than 35% of GPCC, which previously had been Green Plains owning less than 100% of GPCC.

The December 31, 2018 outstanding balance of GPCC's senior secured asset-based revolving credit facility has been reclassified to current liabilities of discontinued operations. Upon the disposition of GPCC, the food and ingredient segment no longer records any forms of debt financing. Refer to *Note 5 – Acquisitions, Dispositions and Discontinued Operations* for further discussion on the disposition and discontinued operations classification.

Partnership Segment

Green Plains Partners, through a wholly owned subsidiary, has a $200.0 million revolving credit facility to fund working capital, acquisitions, distributions, capital expenditures and other general partnership purposes. The credit facility matures on July 1, 2020, and as a result, was reclassified to current maturities of long-term debt during the three months ended September 30, 2019. Advances under the credit facility are subject to a floating interest rate based on the preceding fiscal quarter's consolidated leverage ratio at a base rate plus 1.25% to 2.00% or LIBOR plus 2.25% to 3.00%. The credit facility can be increased by an additional $20.0 million without the consent of the lenders. The unused portion of the credit facility is also subject to a commitment fee of 0.35% to 0.50%, depending on the preceding fiscal quarter's consolidated leverage ratio.

The partnership's obligations under the credit facility are secured by a first priority lien on (i) the capital stock of the partnership's present and future subsidiaries, (ii) all of the partnership's present and future personal property, such as investment property, general intangibles and contract rights, including rights under agreements with Green Plains Trade, and (iii) all proceeds and products of the equity interests of the partnership's present and future subsidiaries and its personal property. The terms impose affirmative and negative covenants including restricting the partnership's ability to incur additional debt, acquire and sell assets, create liens, invest capital, pay distributions and materially amend the partnership's commercial agreements with Green Plains Trade. The credit facility also requires the partnership to maintain a maximum consolidated net leverage ratio of no more than 3.50x and a minimum consolidated interest coverage ratio of no less than 2.75x, each of which is calculated on a pro forma basis with respect to acquisitions and divestitures occurring during the applicable period. The consolidated leverage ratio is calculated by dividing total funded indebtedness minus the lesser of cash in excess of $5.0 million or $30.0 million by the sum of the four preceding fiscal quarters' consolidated EBITDA. The consolidated interest coverage ratio is calculated by dividing the sum of the four preceding fiscal quarters' consolidated EBITDA by the sum of the four preceding fiscal quarters' interest charges.

The partnership had $132.1 million of its $200.0 million revolving credit facility outstanding as of December 31, 2019. The facility, which is supported by a group of financial institutions, will mature on July 1, 2020 unless extended by agreement of the lenders or replaced by another funding source. While the partnership has not yet renegotiated the credit facility or secured additional funding necessary to repay the loan, the partnership believes it is probable that it will source appropriate funding given the partnership's consistent and stable fee-based cash flows, ongoing profitability, low debt leverage and history of obtaining financing on reasonable commercial terms. In the unlikely scenario that the partnership is unable to refinance its debt with the lenders prior to its maturity, the partnership will consider other financing sources, including but not limited to, the restructuring or issuance of new debt with a different lending group, the issuance of additional partnership units or support from the company.

In June 2013, the partnership, through a wholly owned subsidiary, Birmingham BioEnergy, was a recipient of qualified low income community investment notes in conjunction with New Markets Tax Credits financing related to the Birmingham, Alabama terminal. Two promissory notes payable of $1.9 million and $8.1 million, and a note receivable of $8.1 million, were issued in connection with this transaction. On December 31, 2019, the parties to the transaction executed certain provisions under the agreements whereby the promissory notes payable totaling $10.0 million were assigned to BlendStar in satisfaction of the $8.1 million note receivable. The partnership previously accounted for the $1.9 million promissory note payable as grant revenue, which was reflected as a reduction in the carrying value of the property and equipment at Birmingham BioEnergy and recognized in earnings as a decrease in depreciation expense over the useful life of the assets. The remaining $8.1 million promissory note payable and note receivable between Birmingham BioEnergy and BlendStar were forgiven in conjunction with the closing on December 31, 2019.

Covenant Compliance

The company was in compliance with its debt covenants as of December 31, 2019 and 2018.

Restricted Net Assets

At December 31, 2019, there were approximately $67.4 million of net assets at the company's subsidiaries that could not be transferred to the parent company in the form of dividends, loans or advances due to restrictions contained in the credit facilities of these subsidiaries.

13. STOCK-BASED COMPENSATION

The company has an equity incentive plan that reserves 4,110,000 shares of common stock for issuance to its directors and employees. The plan provides for shares, including options to purchase shares of common stock, stock appreciation rights tied to the value of common stock, restricted stock, performance share awards, and restricted and deferred stock unit awards, to be granted to eligible employees, non-employee directors and consultants. The company measures stock-based compensation at fair value on the grant date, with no adjustments for estimated forfeitures. The company records noncash compensation expense related to equity awards in its consolidated financial statements over the requisite period on a straight-line basis. Substantially all of the existing stock-based compensation has been equity awards.

Grants under the equity incentive plans may include stock options, stock awards, performance share awards or deferred stock units:

- Restricted Stock Awards – Restricted stock awards may be granted to directors and employees that vest immediately or over a period of time as determined by the compensation committee. Stock awards granted to date vested immediately and over a period of time, and included sale restrictions. Compensation expense is recognized on the grant date if fully vested or over the requisite vesting period.

- Deferred Stock Units – Deferred stock units may be granted to directors and employees that vest immediately or over a period of time as determined by the compensation committee. Deferred stock units granted to date vest over a period of time with underlying shares of common stock that are issuable after the vesting date. Compensation expense is recognized on the grant date if fully vested, or over the requisite vesting period.

- Performance Share Awards – Performance share awards may be granted to directors and employees that cliff-vest after a period of time as determined by the compensation committee. Performance share awards granted to date cliff-vest after a period of time, and included sale restrictions. Compensation expense is recognized over the requisite vesting period.

- Stock Options – Stock options may be granted that can be exercised immediately in installments or at a fixed future date. Certain options are exercisable regardless of employment status while others expire following termination. Options issued to date may be exercised immediately or at future vesting dates, and expire five to eight years after the grant date. Compensation expense for stock options that vest over time is recognized on a straight-line basis over the requisite service period.

Restricted Stock Awards and Deferred Stock Units

The non-vested restricted stock award and deferred stock unit activity for the year ended December 31, 2019, are as follows:

	Non-Vested Shares and Deferred Stock Units	Weighted-Average Grant-Date Fair Value	Weighted-Average Remaining Vesting Term (in years)
Nonvested at December 31, 2018	882,288	$ 19.12	
Granted	497,118	15.40	
Forfeited	(138,110)	17.55	
Vested	(489,981)	18.31	
Nonvested at December 31, 2019	751,315	$ 17.48	1.6

Performance Share Awards

On February 19, 2019 and March 19, 2018, the board of directors granted performance shares to be awarded in the form of common stock to certain participants of the plan. Performance shares vest based on the company's average return on net assets (RONA) and the company's total shareholder return (TSR), as further described herein. The performance shares vest on the third anniversary of the grant, if the RONA and TSR criteria are achieved and the participant is then employed by the company. Fifty percent of the performance shares vest based upon the company's ability to achieve a predetermined RONA during the three year performance period. The remaining fifty percent of the performance shares vest based upon the company's total TSR during the three year performance period relative to that of the company's performance peer group.

The performance shares were granted at a target of 100%, but each performance share will reduce or increase depending on results for the performance period for the company's RONA, and the company's TSR relative to that of the performance peer group. If the company's RONA and TSR achieve the maximum goals, the maximum amount of shares available to be issued pursuant to the 2018 and 2019 awards are 428,104 performance shares or 150% of the 285,403 performance shares which remain outstanding. The actual number of performance shares that will ultimately vest is based on the actual percentile ranking of the company's RONA, and the company's TSR compared to the peer performance at the end of the performance period.

The company used the Monte Carlo valuation model to estimate the fair value of the performance shares on the date of the grant. The weighted average assumptions used by the company in applying the Monte Carlo valuation model for performance share grants are illustrated in the following table:

	FY 2019 Performance Awards	FY 2018 Performance Awards
Risk-free interest rate	2.45 %	2.44 %
Dividend yield	3.13 %	2.64 %
Expected volatility	41.69 %	45.11 %
Monte Carlo valuation	99.62 %	97.39 %
Closing stock price on the date of grant	$ 15.34	$ 18.15

The non-vested performance share award activity for the year ended December 31, 2019, are as follows:

	Performance Shares	Weighted-Average Grant-Date Fair Value	Weighted-Average Remaining Vesting Term (in years)
Nonvested at December 31, 2018	134,022	$ 17.92	
Granted	216,703	15.43	
Forfeited	(65,322)	16.38	
Nonvested at December 31, 2019	285,403	$ 16.38	1.9

Green Plains Partners

Green Plains Partners has adopted the LTIP, an incentive plan intended to promote the interests of the partnership, its general partner and affiliates by providing incentive compensation based on units to employees, consultants and directors to encourage superior performance. The incentive plan reserves 2,500,000 common units for issuance in the form of options, restricted units, phantom units, distributable equivalent rights, substitute awards, unit appreciation rights, unit awards, profits interest units or other unit-based awards. The partnership measures unit-based compensation related to equity awards in its consolidated financial statements over the requisite service period on a straight-line basis.

The non-vested unit-based awards activity for the year ended December 31, 2019, are as follows:

	Non-Vested Shares and Deferred Stock Units	Weighted-Average Grant-Date Fair Value	Weighted-Average Remaining Vesting Term (in years)
Non-Vested at December 31, 2018	18,582	$ 16.96	
Granted	22,856	14.00	
Vested	(18,582)	16.96	
Nonvested at December 31, 2019	22,856	$ 14.00	0.5

Stock Options

The fair value of the stock options is estimated on the date of the grant using the Black-Scholes option-pricing model, a pricing model acceptable under GAAP. The expected life of the options is the period of time the options are expected to be outstanding. The company did not grant any stock option awards during the years ended December 31, 2019, 2018 and 2017.

The activity related to the exercisable stock options for the year ended December 31, 2019, is as follows:

	Shares	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Term (in years)	Aggregate Intrinsic Value (in thousands)
Outstanding at December 31, 2018	128,750	$ 12.72	1.0	$ 89
Exercised	(118,750)	12.36	-	340
Outstanding at December 31, 2019	10,000	$ 16.95	0.2	$ -
Exercisable at December 31, 2019 [(1)]	10,000	$ 16.95	0.2	$ -

(1) The weighted average exercise price for options exercisable at December 31, 2019 was above the company's stock price at December 31, 2019.

Option awards allow employees to exercise options through cash payment for the shares of common stock or simultaneous broker-assisted transactions in which the employee authorizes the exercise and immediate sale of the option in the open market. The company uses newly issued shares of common stock to satisfy its stock-based payment obligations.

Stock-Based and Unit-Based Compensation Expense

Compensation costs for stock-based and unit-based payment plans during the years ended December 31, 2019, 2018 and 2017, were approximately $9.7 million, $11.4 million and $12.2 million, respectively. The decrease in stock compensation for the year ended December 31, 2019 was largely due to current year forfeitures, offset by additional expense recorded due to the accelerated vesting of stock awards during the year. At December 31, 2019, there were $9.8 million of unrecognized compensation costs from stock-based and unit-based compensation related to non-vested awards. This compensation is

expected to be recognized over a weighted-average period of approximately 1.7 years. The potential tax benefit related to stock-based payment is approximately 24.3% of these expenses.

14. EARNINGS PER SHARE

Basic earnings per share, or EPS, is calculated by dividing net income available to common stockholders by the weighted average number of common shares outstanding during the period.

The company computed diluted EPS by dividing net income on an if-converted basis, adjusted to add back net interest expense related to the convertible debt instruments, by the weighted average number of common shares outstanding during the period, adjusted to include the shares that would be issued if the convertible debt instruments were converted to common shares and the effect of any outstanding dilutive securities. In addition, due to the presentation of GPCC as discontinued operations, the company has presented basic and diluted earnings per share from both continuing operations and from discontinued operations.

The basic and diluted EPS are calculated as follows (in thousands):

	Year Ended December 31,		
	2019	2018	2017
Basic EPS:			
Net income (loss) from continuing operations [1]	$ (167,689)	$ 4,384	$ 56,063
Net income from discontinued operations	829	11,539	4,998
Net income (loss) attributable to Green Plains	$ (166,860)	$ 15,923	$ 61,061
Weighted average shares outstanding - basic	38,111	40,320	39,247
EPS from continuing operations - basic	$ (4.40)	$ 0.11	$ 1.43
EPS from discontinued operations - basic	0.02	0.28	0.13
EPS - basic	$ (4.38)	$ 0.39	$ 1.56
Diluted EPS:			
Net income (loss) from continuing operations [1]	$ (167,689)	$ 4,384	$ 56,063
Interest and amortization on convertible debt, net of tax effect:			
3.25% notes	-	-	4,433
4.125% notes	-	-	8,159
Net income (loss) from continuing operations -diluted	$ (167,689)	$ 4,384	$ 68,655
Net income from discontinued operations - diluted	829	11,539	4,998
Net income (loss) attributable to Green Plains - diluted	$ (166,860)	$ 15,923	$ 73,653
Weighted average shares outstanding - basic	38,111	40,320	39,247
Effect of dilutive convertible debt:			
3.25% notes	-	-	4,209
4.125% notes	-	-	6,071
Effect of dilutive stock-based compensation awards	-	934	713
Weighted average shares outstanding - diluted	38,111	41,254	50,240
EPS from continuing operations - diluted	$ (4.40)	$ 0.11	$ 1.37
EPS from discontinued operations - diluted	0.02	0.28	0.10
EPS - diluted	$ (4.38)	$ 0.39	$ 1.47
Anti-dilutive weighted-average convertible debt and stock-based compensation [2]	10,560	7,283	-

(1) Net income (loss) from continuing operations can be recalculated from the consolidated statements of operations by taking the net income (loss) from continuing operations including noncontrolling interest less net income attributable to noncontrolling interests.
(2) The effect related to the company's convertible debt and stock-based compensation awards have been excluded from diluted EPS for the periods presented as the inclusion of these shares would have been antidilutive.

15. STOCKHOLDERS' EQUITY

Treasury Stock

The company holds 10.9 million shares of its common stock at a cost of $119.8 million. Treasury stock is recorded at cost and reduces stockholders' equity in the consolidated balance sheets. When shares are reissued, the company will use the weighted average cost method for determining the cost basis. The difference between the cost and the issuance price is added or deducted from additional paid-in capital.

Share Repurchase Program

On October 30, 2019, the company's board of directors authorized an additional $100 million share repurchase taking the previously authorized amount from $100 million to $200 million. Under the program, the company may repurchase shares in open market transactions, privately negotiated transactions, accelerated share buyback programs, tender offers or by other means. The timing and amount of repurchase transactions are determined by its management based on market conditions, share price, legal requirements and other factors. The program may be suspended, modified or discontinued at any time without prior notice. The company repurchased 5,396,608 shares of common stock for approximately $61.6 million during 2019. Since inception, the company has repurchased 6,515,957 shares of common stock for approximately $81.4 million under the program.

Dividends

On June 18, 2019, the company announced that its board of directors decided to suspend its future quarterly cash dividend following the June 14, 2019 dividend payment, in order to retain and redirect cash flow to the company's Project 24 operating expense equalization plan, the deployment of high-protein technology and its stock repurchase program.

For each calendar quarter commencing with the quarter ended September 30, 2015, the partnership agreement provides for a quarterly distribution to be paid within 45 days after the end of the quarter, proided the partnership has sufficient available cash. Available cash generally means, all cash and cash equivalents on hand at the end of that quarter less cash reserves established by the general partner of the partnership plus all or any portion of the cash on hand resulting from working capital borrowings made subsequent to the end of that quarter. On January 16, 2020, the board of directors of the general partner of the partnership declared a cash distribution of $0.475 per unit on outstanding common units. The distribution is payable on February 7, 2020, to unitholders of record at the close of business on January 31, 2020.

Accumulated Other Comprehensive Income

Changes in accumulated other comprehensive income are associated primarily with gains and losses on derivative financial instruments. Amounts reclassified from accumulated other comprehensive income are as follows (in thousands):

	Year Ended December 31,			Statements of Operations Classification
	2019	2018	2017	
Gains (losses) on cash flow hedges:				
Commodity derivatives	$ -	$ 3,648	$ 42,710	(1)
Commodity derivatives	-	1,258	(11,765)	(2)
Total gains on cash flow hedges from continuing operations	-	4,906	30,945	(3)
Gains (losses) on cash flow hedges from discontinued operations, net of income taxes	38,795	(10,092)	(15,566)	(4)
Income tax benefit	-	1,483	11,454	(5)
Amounts reclassified from accumulated other comprehensive income (loss)	$ 38,795	$ (6,669)	$ 3,925	

(1) Revenues
(2) Costs of goods sold
(3) Income (loss) from continuing operations before income taxes and income (loss) from equity method investees
(4) Net income from discontinued operations, net of income taxes
(5) Income tax benefit

At December 31, 2019 and 2018, the company's consolidated balance sheets reflected unrealized losses of $11.1 million and $16.0 million, net of tax, in accumulated other comprehensive loss, respectively.

16. RESTRUCTURING ACTIVITIES

In the second quarter of 2018, the company announced its portfolio optimization program of which one of the five strategic objectives was to reduce controllable expenses. As part of the program, the company implemented a workforce reduction at certain of its facilities, including its corporate location. The associated severance costs were recognized at the time both the employee and employer were irrevocably committed to the terms of the separation. As of December 31, 2018, the company recognized a $4.2 million charge for such workforce reductions it had implemented through that date with $3.8 million classified as selling, general and administrative expense and $0.4 million classified as costs of goods sold. Of the $4.2 million charge, $3.1 million was recorded in the corporate segment, $0.7 million was recorded in the agribusiness and energy services segment, $0.4 million was recorded in the ethanol production segment. Approximately $2.7 million of the total charge was included in accrued liabilities as of December 31, 2018 and paid in full during 2019.

17. INCOME TAXES

Income taxes are accounted for under the asset and liability method. Deferred tax assets and liabilities are recognized for the future tax consequences attributable to differences between the carrying amounts of existing assets and liabilities and their respective tax bases, and net operating loss and tax credit carry-forwards. Deferred tax assets and liabilities are measured using enacted rates expected to be applicable to taxable income in the years those temporary differences are recovered or settled. The effect on deferred tax assets and liabilities from a change in tax rates is recognized in income during the period that includes the enactment date. A valuation allowance is recorded by the company when it is more likely than not that some portion or all of a deferred tax asset will not be realized.

Green Plains Partners is a limited partnership, which is treated as a flow-through entity for federal income tax purposes and is not subject to federal income taxes. As a result, the consolidated financial statements do not reflect such income taxes on pre-tax income or loss attributable to the noncontrolling interest in the partnership.

Income tax expense (benefit) consists of the following (in thousands):

	Year Ended December 31,		
	2019	2018	2017
Current	$ (2,177)	$ 7,758	$ (43,705)
Deferred	(18,881)	(24,484)	(81,077)
Total	(21,058)	(16,726)	(124,782)
Less: Income tax expense - discontinued operations	258	3,421	7,279
Income tax benefit - continuing operations	$ (21,316)	$ (20,147)	$ (132,061)

Differences between income tax expense from continuing operations at the statutory federal income tax rate and as presented on the consolidated statements of operations are summarized as follows (in thousands):

	Year Ended December 31,		
	2019	2018	2017
Tax expense at federal statutory rate	$ (36,317)	$ 1,060	$ (19,400)
State income tax expense, net of federal benefit	(7,839)	702	(1,159)
Nondeductible compensation	762	921	222
Noncontrolling interests	(3,961)	(4,370)	(7,199)
Unrecognized tax benefits	36	15,148	25,720
R&D credits	(323)	(34,979)	(74,033)
Increase in valuation allowance	25,314	-	-
Disposition of subsidiary	(373)	(1,022)	-
Tax Cuts and Jobs Act impact	-	278	(57,223)
Stock compensation	369	993	-
Audit adjustments	-	559	-
Amended return adjustments	-	374	-
Other	1,016	189	1,011
Income tax benefit	$ (21,316)	$ (20,147)	$ (132,061)

Significant components of deferred tax assets and liabilities are as follows (in thousands):

	December 31, 2019	December 31, 2018
Deferred tax assets:		
Net operating loss carryforwards - Federal	$ 27,935	$ -
Net operating loss carryforwards - State	8,788	4,004
Tax credit carryforwards - Federal	49,937	47,956
Tax credit carryforwards - State	7,750	9,369
Derivative financial instruments	342	-
Deferred revenue	795	2,236
Interest expense carryforward	5,539	2,048
Investment in partnerships	46,774	50,009
Inventory valuation	1,560	3,603
Stock-based compensation	1,347	1,458
Accrued expenses	4,325	5,439
Leases	6,993	2,516
Other	51	43
Total	162,136	128,681
Valuation allowance	(33,337)	(7,413)
Total deferred tax assets	128,799	121,268
Deferred tax liabilities:		
Convertible debt	(12,266)	(7,508)
Fixed assets	(107,909)	(118,330)
Derivative financial instruments	-	(1,573)
Organizational and start-up costs	(4,484)	(3,980)
Right-of-use assets	(4,140)	-
Total deferred tax liabilities	(128,799)	(131,391)
Deferred income taxes	$ -	$ (10,123)

At December 31, 2019, the company has federal R&D credits of $49.7 million which will begin to expire in 2033. The company also has $7.8 million of state credits which will expire beginning in 2021. The company has federal net operating losses of $27.9 million which do not expire.

The company increased the valuation allowance for its net deferred tax assets due to uncertainty that it will realize these assets in the future. The valuation allowance on deferred tax assets was recognized as a result of negative evidence, including cumulative losses in recent years, outweighing the more subjective positive evidence. Management considers whether it is more likely than not that some or all of the deferred tax assets will be realized, which is dependent on the generation of future taxable income and other tax attributes during the periods those temporary differences become deductible. Scheduled reversals of deferred tax liabilities, projected future taxable income, and tax planning strategies are considered to make this assessment. The company will continue to regularly assess the realizability of deferred tax assets. Changes in earnings performance and future earnings projections, among other factors, may cause the company to adjust its valuation allowance on deferred tax assets, which would impact the company’s results of operations in the period it is determined that these factors have changed.

The company’s federal income tax returns for the tax years ended December 31, 2014 and December 31, 2017 are currently under audit. The company’s federal returns for the tax years ended December 31, 2015, 2016 and 2018 are still subject to audit. A reconciliation of unrecognized tax benefits is as follows (in thousands):

Unrecognized Tax Benefits	
Balance at January 1, 2019	$ 51,558
Additions for prior year tax positions	6
Additions for current year tax positions	32
Balance at December 31, 2019	$ 51,596

Recognition of these tax benefits would favorably impact the company’s effective tax rate. Unrecognized tax benefits of $51.6 million include $40.8 million recorded as a reduction of the deferred asset associated with the federal tax credit carryforwards. Interest and penalties associated with uncertain tax positions are accrued as part of income taxes payable.

We believe it is reasonably possible that approximately $12.5 million in unrecognized tax benefits related to R&D credits may be settled within the coming year as a result of the ongoing federal audit. In addition, the results of the current audit may cause the company to significantly increase or decrease the unrecognized tax benefits associated with R&D credits for periods not under audit. At this time, the company does not have enough information to be able to estimate the potential adjustment.

18. COMMITMENTS AND CONTINGENCIES

Adoption of ASC 842

On January 1, 2019, the company adopted the amended guidance in ASC 842, *Leases*, and all related amendments ("new lease standard") and applied it to all leases using the optional transition method which requires the amended guidance to be applied at the date of adoption. The standard does not require the guidance to be applied to the earliest comparative period presented in the financial statements. As such, comparative information has not been restated and continues to be reported under the accounting standards in effect for those periods. The new lease standard had a material impact on the company's consolidated balance sheets, increasing total assets and total liabilities for continuing operations by $60.2 million upon adoption. It did not have an impact on the consolidated statement of operations for the year ended December 31, 2019.

The impact on the consolidated balance sheet as of December 31, 2019 for the adoption of the new lease standard, excluding leases for discontinued operations, was as follows (in thousands):

	Balance at December 31, 2018 (audited)	Adjustments Due to ASC 842	Balance at January 1, 2019
Assets			
Operating lease right-of-use assets	$ -	$ 60,557	$ 60,557
Other assets	365	(365)	-
Liabilities			
Accounts payable	196	(196)	-
Operating lease current liabilities	-	17,650	17,650
Operating lease long-term liabilities	-	45,571	45,571
Other liabilities	3,240	(3,240)	-

The company's leases do not specify an implicit interest rate. Therefore, the incremental borrowing rate was used based on information available at commencement date to determine the present value of future payments.

Practical Expedients

Under the new lease standard, companies may elect various practical expedients upon adoption. The company elected the package of practical expedients related to transition, which states that an entity need not reassess initial direct costs for existing leases, the lease classification for any expired or existing leases, and whether any expired or existing contracts are or contain leases.

The company elected to utilize a portfolio approach for lease classification, which allows for an entity to group together leases with similar characteristics provided that its application does not create a material difference when compared to accounting for the leases at a contract level. For railcar leases, the company elected to combine the railcars within each rider and account for each rider as an individual lease.

The company also elected the practical expedient for lessees to include both the lease and non-lease components as a single component and account for them as a lease. Certain of the company's railcar agreements provide for maintenance costs to be the responsibility of the company as incurred or charged by the lessor. This maintenance cost is a non-lease component that the company elected to combine with the monthly rental payment and account for the total cost as operating lease expense. In addition, the company has a land lease that contains a non-lease component for the handling and unloading services the landlord provides. The company elected to combine the cost of services with the land lease cost and account for the total as operating lease expense.

A lessee may elect not to apply the recognition requirements in the new lease standard for short-term leases. Instead, the lease payments may be recognized into profit or loss on a straight-line basis over the lease term. The company has elected to

use this short-term lease exemption, and therefore will not record a lease liability or right-of-use asset for leases with a term of one year or less. The company did not incur any material short-term lease expense for the year ended December 31, 2019.

Lease Expense

The company leases certain facilities, parcels of land, and equipment, with remaining terms ranging from less than one year to 17.9 years. The land and facility leases include renewal options. The renewal options are included in the lease term only for those sites or locations in which they are reasonably certain to be renewed. Equipment renewals are not considered reasonably certain to be exercised as they typically renew with significantly different underlying terms.

The company may sublease certain of its railcars to third parties on a short-term basis. The subleases are classified as operating leases, with the associated sublease income being recognized on a straight-line basis over the lease term.

The components of lease expense are as follows (in thousands):

	Year Ended December 31, 2019	
Lease expense		
Operating lease expense	$	20,806
Variable lease expense [1]		824
Total lease expense	$	21,630

(1) Represents amounts incurred in excess of the minimum payments required for the handling and unloading of railcars for a certain land lease, offset by railcar lease abatements provided by the lessor when railcars are out of service during periods of maintenance or upgrade.

Supplemental cash flow information related to operating leases is as follows (in thousands):

	Year Ended December 31, 2019	
Cash paid for amounts included in the measurement of lease liabilities:		
Operating cash flows from operating leases	$	21,459
Right-of-use assets obtained in exchange for lease obligations:		
Operating leases		11,176
Right-of-use assets and lease obligations derecognized due to lease modifications:		
Operating leases		1,726

Supplemental balance sheet information related to operating leases is as follows:

	December 31, 2019
Weighted average remaining lease term	6.6 years
Weighted average discount rate	5.46%

Aggregate minimum lease payments under the operating lease agreements for future fiscal years as of December 31, 2019 are as follows (in thousands):

Year Ending December 31,		Amount
2020	$	18,867
2021		11,008
2022		8,993
2023		5,832
2024		3,955
Thereafter		17,972
Total		66,627
Less: Present value discount		(11,687)
Lease liabilities	$	54,940

Aggregate minimum lease payments remaining under the operating lease agreements under ASC 840, *Leases* as of December 31, 2018 are as follows (in thousands):

Year Ending December 31,		Amount
2019	$	22,934
2020		16,855
2021		9,194
2022		6,706
2023		2,976
Thereafter		20,041
Total	$	78,706

Lease Revenue

As described in *Note 4 – Revenue*, the majority of the partnership's segment revenue is generated though their storage and throughput services and rail transportation services agreements with Green Plains Trade and are accounted for as lease revenue. Leasing revenues do not represent revenues recognized from contracts with customers under ASC 606, and are accounted for under ASC 842, *Leases*. Lease revenue associated with agreements with Green Plains Trade are eliminated upon consolidation. The remaining lease revenue is not material to the company.

Refer to *Note 4 – Revenue* for further discussion on lease revenue.

Commodities

As of December 31, 2019, the company had contracted future purchases of grain, corn oil, natural gas, ethanol and distillers grains, valued at approximately $265.9 million.

Legal

The company is currently involved in litigation that has arisen in the ordinary course of business, but does not believe any pending litigation will have a material adverse effect on its financial position, results of operations or cash flows.

19. EMPLOYEE BENEFIT PLANS

The company offers eligible employees a comprehensive employee benefits plan that includes health, dental, vision, life and accidental death, short-term disability and long-term disability insurance, and flexible spending accounts. The company also offers a 401(k) plan enabling eligible employees to save for retirement on a tax-deferred basis up to the limits allowed under the Internal Revenue Code and matches up to 4% of eligible employee contributions. Employee and employer contributions are 100% vested immediately. Employer contributions to the 401(k) plan for the years ended December 31, 2019, 2018 and 2017 were $1.6 million, $2.0 million and $2.0 million, respectively.

The company contributes to a defined benefit pension plan. Since January of 2009, the benefits under the plan were frozen; however, the company remains obligated to ensure the plan is funded according to its requirements. As of December 31, 2019, the plan's assets were $5.5 million and liabilities were $6.7 million. At December 31, 2019 and 2018, net liabilities of $1.2 million and $1.6 million were included in other liabilities on the consolidated balance sheets, respectively.

20. RELATED PARTY TRANSACTIONS

Green Plains Cattle Company LLC

The company engages in certain related party transactions with GPCC. The company provides a variety of shared services to GPCC, including accounting and finance, payroll and human resources, information technology, legal, communications and treasury activities. The company reduced selling, general and administrative expenses by $0.5 million related to shared services provided for the year ended December 31, 2019. The company had $2.2 million outstanding receivables related to the shared service agreement and expenses paid on behalf of GPCC as of December 31, 2019.

Green Plains Trade Group, a subsidiary of the company, enters into certain sale contracts with GPCC during the normal course of business. Revenues subsequent to the disposition of GPCC were $4.0 million for the year ended December 31, 2019.

Mr. Ejnar Knudsen, a member of the company's board of directors, has an indirect ownership interest in GPCC of 0.0736% by reason of his ownership in TGAM Agribusiness Fund LP. Based on the purchase price, the value of that ownership interest is approximately $0.1 million. Mr. Knudsen also is the CEO and partial owner of AGR Partners LLC (AGR) which provides investment advisory services to TGAM Agribusiness Fund LP pursuant to a sub-advisory agreement between AGR Partners LLC and Nuveen Alternative Advisors LLC, which is the investment manager for TGAM Agribusiness Fund LP.

Aircraft Leases

Effective January 1, 2015, the company entered into two agreements with an entity controlled by Wayne Hoovestol for the lease of two aircrafts. Mr. Hoovestol is chairman of the company's board of directors. The company agreed to pay $9,766 per month for the combined use of up to 125 hours per year of the aircrafts. Flight time in excess of 125 hours per year will incur additional hourly charges. During the years ended December 31, 2019, 2018 and 2017, payments related to these leases totaled $129 thousand, $159 thousand and $182 thousand, respectively. The company had $17 thousand in outstanding payables related to these agreements at December 31, 2019 and no outstanding payables related to these agreements at December 31, 2018.

21. EQUITY METHOD INVESTMENTS

Green Plains Cattle Company LLC

On September 1, 2019, the company formed a joint venture with TGAM and StepStone. Such parties entered into the Second Amended and Restated Limited Liability Company Agreement of GPCC effective as of September 1, 2019. GPCC was previously a wholly owned subsidiary of Green Plains. Green Plains also entered into a Securities Purchase Agreement with TGAM and StepStone, whereby TGAM and StepStone purchased an aggregate of 50% of the membership interests of GPCC from Green Plains. After closing, GPCC is no longer consolidated in the company's consolidated financial statements and the GPCC investment is accounted for using the equity method of accounting. GPCC results prior to its disposition are classified as discontinued operations in our current and prior period financials.

GPCC conducts the business of the joint venture, including (i) owning and operating the cattle feeding operations (as defined below), and (ii) any other activities approved by GPCC's board of managers. GPCC continues to have the capacity to support 355,000 head of cattle and has approximately 24.1 million bushels of grain storage capacity.

The company does not consolidate any part of the assets or liabilities or operating results of its equity method investee. The company's share of net income or loss in the investee increases or decreases, as applicable, the carrying value of the investment. With respect to GPCC, the company determined that this entity does not represent a variable interest entity and consolidation is not required. In addition, although the company has the ability to exercise significant influence over the joint venture through board representation and voting rights, all significant decisions require the consent of the other investors without regard to economic interest.

Summarized Financial Information

During the periods ended December 31, 2019 and 2018, our equity method investees were considered related parties and included:

- Green Plains Cattle Company LLC, a joint venture formed on September 1, 2019, in which we have a 50% noncontrolling interest. See description of GPCC above.
- JGP Energy Partners LLC, in which we owned a 50% noncontrolling interest, until the sale of our 50% noncontrolling interest during the fourth quarter of 2019. JGP Energy Partners LLC operates an intermodal export and import fuels terminal in Beaumont, Texas, with storage capacity of 550 thousand barrels to support various export and domestic grades of ethanol. In addition, we recognized a gain within other income of $4.8 million related to the sale of our 50% interest in JGP Energy Partners LLC.
- Optimal Aqua LLC, in which we have a 50% noncontrolling interest. Optimal Aqua LLC produces high-quality aquaculture feeds utilizing proprietary techniques and high-protein feed ingredients.
- NLR Energy Logistics LLC, in which the partnership has a 50% noncontrolling interest. NLR Energy Logistics LLC operates a unit train terminal in the Little Rock, Arkansas area with capacity to unload 110-unit cars and provide approximately 100,000 barrels of storage.

Our equity method investments are summarized in the following table (in thousands):

	Ownership as of December 31, 2019	Year Ended December 31,	
		2019	2018
Green Plains Cattle Company LLC [1]	50%	$ 64,161	$ -
JGP Energy Partners LLC [2]	0%	-	25,362
Optimal Aqua LLC	50%	508	704
NLR Energy Logistics LLC	50%	4,329	3,648
Total		$ 68,998	$ 29,714

(1) The equity method investment in GPCC is offset by the impact of AOCI.
(2) On December 11, 2019, the company completed the sale of our 50% joint venture interest in JGP Energy Partners LLC.

Earnings from equity method investments, net of income taxes, were as follows:

	Year Ended December 31,		
	2019	2018	2017
Green Plains Cattle Company LLC [1]	$ 2,839	$ -	$ -
NLR Energy Logistics LLC	516	(13)	(11)
All others	(558)	(583)	(263)
Total income (loss) from equity method investments, net of income taxes	$ 2,797	$ (596)	$ (274)
Distributions from equity method investments	$ 320	$ -	$ -
Earnings from equity method investments, net of distributions	$ 2,477	$ (596)	$ (274)

(1) Pretax equity method earnings of GPCC were $3.8 million during the four months ended December 31, 2019.

The company reports its proportional share of equity method investment income (loss) in the consolidated statements of operations. The company's share of equity method investees other comprehensive income arising during the period is included in accumulated other comprehensive loss in the consolidated balance sheet.

The following tables present summarized financial information of GPCC.

	Four Months Ended December 31, 2019
Total revenues	$ 370,383
Total operating expenses	362,878
Net income	$ 7,505

	December 31, 2019
Balance sheet:	
Current assets	$ 516,324
Noncurrent assets	73,922
Current liabilities	461,534
Noncurrent liabilities	390
Net assets	$ 128,322

22. QUARTERLY FINANCIAL DATA (Unaudited)

The following table includes unaudited financial data for each of the quarters within the years ended December 31, 2019 and 2018 (in thousands, except per share amounts), which is derived from the company's consolidated financial statements. In management's opinion, the financial data reflects all of the adjustments necessary for a fair presentation of the quarters presented. The operating results for any quarter are not necessarily indicative of results for any future period.

	Three Months Ended (1)			
	December 31, 2019	September 30, 2019	June 30, 2019	March 31, 2019
Revenues	$ 715,677	$ 632,350	$ 630,570	$ 438,641
Costs and expenses	730,599	674,715	677,215	477,279
Operating loss	(14,922)	(42,365)	(46,645)	(38,638)
Other expense	(2,286)	(9,694)	(10,759)	(7,633)
Income tax benefit (expense) (2)	(19,514)	12,565	15,322	12,943
Net loss from continuing operations including noncontrolling interest	(34,459)	(38,850)	(42,118)	(33,402)
Net income (loss) from discontinued operations, net of income taxes	-	3,359	1,939	(4,469)
Net loss attributable to Green Plains	$ (39,749)	$ (38,970)	$ (45,342)	$ (42,799)
Basic earnings per share (3):				
Loss per share from continuing operations	$ (1.13)	$ (1.15)	$ (1.18)	$ (0.95)
Income (loss) per share from discontinued operations	-	0.09	0.05	(0.11)
Loss per share attributable to Green Plains	$ (1.13)	$ (1.06)	$ (1.13)	$ (1.06)
Diluted earnings per share (3):				
Loss per share from continuing operations	$ (1.13)	$ (1.15)	$ (1.18)	$ (0.95)
Income (loss) per share from discontinued operations	-	0.09	0.05	(0.11)
Loss per share attributable to Green Plains	$ (1.13)	$ (1.06)	$ (1.13)	$ (1.06)

	Three Months Ended (1)			
	December 31, 2018	September 30, 2018	June 30, 2018	March 31, 2018
Revenues	$ 583,508	$ 789,048	$ 807,709	$ 803,667
Costs and expenses (4)	480,580	792,833	804,113	816,452
Operating income (loss)	102,928	(3,785)	3,596	(12,785)
Other expense	(28,292)	(18,826)	(18,971)	(18,221)
Income tax benefit (expense)	(14,457)	14,941	12,498	7,165
Net income (loss) from continuing operations including noncontrolling interest	60,072	(7,920)	(2,979)	(23,978)
Net income (loss) from discontinued operations, net of income taxes	(215)	501	6,730	4,523
Net income (loss) attributable to Green Plains	$ 53,503	$ (12,469)	$ (994)	$ (24,117)
Basic earnings per share (3):				
Income (loss) per share from continuing operations	$ 1.33	$ (0.32)	$ (0.19)	$ (0.71)
Income (loss) per share from discontinued operations	(0.01)	0.01	0.17	0.11
Income (loss) per share attributable to Green Plains	$ 1.32	$ (0.31)	$ (0.02)	$ (0.60)
Diluted earnings per share (3):				
Income (loss) per share from continuing operations	$ 1.13	$ (0.32)	$ (0.19)	$ (0.71)
Income (loss) per share from discontinued operations	-	0.01	0.17	0.11
Income (loss) per share attributable to Green Plains	$ 1.13	$ (0.31)	$ (0.02)	$ (0.60)

(1) GPCC results prior to its disposition are classified as discontinued operations in current and prior period consolidated financial statements.
(2) The fourth quarter of 2019 includes the recognition of a $25.3 million valuation allowance which impacted income tax expense.
(3) Basic and diluted earnings per share are calculated independently for each of the quarters presented. Accordingly, the sum of the quarterly earnings per share amounts may not agree with the total year.
(4) The fourth quarter of 2018 includes the net gain on the sale of assets of $150.4 million related to the sale of three ethanol plants and Fleischmann's Vinegar.

Corporate Information

BOARD OF DIRECTORS

WAYNE HOOVESTOL, Chairman
Owner and President
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Moly-Cop

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President and Chief Executive Officer
Green Plains Inc. | Green Plains Holdings LLC

JAMES CROWLEY[1]
Chairman and Managing Partner
Old Strategic, LLC

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Retired Executive Vice President and
Chief Development Officer
Valero Energy Corporation

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Director
Heartland Agriculture, LLC | Brunswick State Bank
Vice President and Director
Edgar and Frances Reynolds Foundation, Inc.

EJNAR KNUDSEN
Founding and Managing Partner
AGR Partners

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Founder and Chief Executive Officer
Nu-Tek Salt, LLC

BRIAN PETERSON[3]
President and Chief Executive Officer
Whiskey Creek Enterprises

ALAIN TREUER,[2,3] VICE CHAIRMAN
Chief Executive Officer
Tellac Reuert Partners SA

Member of: (1) Audit Committee, (2) Compensation Committee and/or (3) Nominating and Governance Committee

EXECUTIVE OFFICERS

TODD BECKER
President and Chief Executive Officer

PATRICH SIMPKINS
Chief Financial Officer

WALTER CRONIN
Chief Commercial Officer

PAUL KOLOMAYA
Chief Accounting Officer

MICHELLE MAPES
Chief Legal and Administration Officer

MARK HUDAK
Executive Vice President
Human Resources

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The Nasdaq Global Market
Stock Ticker Symbol: GPRE

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Green Plains