Green Plains Inc.
Form 10-K
February 22, 2017

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, 2016

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: Common Stock, $.001 par value

Name of exchanges on which registered: Nasdaq Global Market

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 and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted 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 and post such files).

Yes No

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

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

Large accelerated filer . Accelerated filer . Non-accelerated filer Smaller reporting company

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 30, 2016 (the last business day of the second quarter), based on the last sale price of the common stock on that date of $19.72, was approximately $694.7 million. For purposes of this calculation, executive officers and directors are deemed to be affiliates of the registrant.

As of February 14, 2017, there were 38,181,626 shares of the registrant's common stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive Proxy Statement for the 2017 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.

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Commonly Used Defined Terms

Green Plains Inc. and Subsidiaries:

Green Plains; the company	Green Plains Inc. and its subsidiaries
BioProcess Algae	BioProcess Algae LLC
Fleischmann's Vinegar	Fleischmann's Vinegar Company, Inc.
Green Plains Cattle	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
SCI Ingredients	SCI Ingredients Holdings, Inc.

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
LIBOR	London Interbank Offered Rate
LTIP	Green Plains Partners LP 2015 Long-Term Incentive Plan
Nasdaq	The Nasdaq Global Market
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
CBOB	Conventional blendstock for oxygenate blending, an 84 octane sub-grade gasoline
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
RFS II	Renewable Fuels Standard II
RIN	Renewable identification number
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,” “outloo
“plan,” “predict,” “may,” “could,” “should,” “will” and similar words and phrases as well as statements regarding future operat
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; risks related to acquisitions and achieving anticipated results; risks associated with merchant trading, cattle feeding operations, vinegar production 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 an ethanol producer. We have grown through acquisitions of operationally efficient ethanol production facilities and adjacent commodity processing businesses. We are focused on generating stable operating margins through our diversified 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. We own a 62.5% limited partner interest, a 2.0% general partner interest and all of the partnership’s incentive distribution rights. The public owns the remaining 35.5% limited partner interest. The partnership is consolidated in our financial statements.

As a result of acquisitions during the year, we implemented organizational segment changes during the fourth quarter of 2016. We now 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 17 ethanol plants in Illinois, Indiana, Iowa, Michigan, Minnesota, Nebraska, Tennessee, Texas and Virginia. At capacity, we expect to process approximately 524 million bushels of corn per year and produce approximately

1.5 billion gallons of ethanol, 4.1 million tons of distillers grains and 340 million pounds of industrial grade corn oil, making us the second largest consolidated owner of ethanol plants in North America.

· Agribusiness and Energy Services. Our agribusiness and energy services segment includes grain procurement, with approximately 60.3 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, crude oil, grain, natural gas and other commodities in various markets.

· Food and Food Ingredients. Our food and food ingredients segment includes a cattle feedlot operation with the capacity to support 73,000 head of cattle and grain storage capacity of approximately 2.8 million bushels, and Fleischmann's Vinegar, one of the world's largest producers of food-grade industrial vinegar.

· 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 39 ethanol storage facilities, 8 fuel terminal facilities and approximately 3,100 leased railcars.

Risk Management and Hedging Activities

Our profitability is highly dependent on commodity prices, particularly for ethanol, distillers grains, corn oil, corn, natural gas and cattle. Since market price fluctuations among these commodities are not always correlated, ethanol production or our cattle feedlot operation 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, or temporarily reduce production levels during periods of compressed margins. Our multiple businesses and revenue streams also help to diversify our operations and profitability.

We use forward contracts to sell a portion of our ethanol, distillers grains, corn oil and vinegar production or buy some of the corn, natural gas, cattle, 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, cattle and other commodities. The financial impact of these activities depends on price of the commodities involved and our ability to physically receive or deliver those commodities. We do not speculate on general price movements by taking significant unhedged positions on 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. 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 our 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 or temporarily reduce production levels during periods of compressed margins.

Acquisition and Integration Capabilities. We have the ability to acquire assets that create synergies and enhance our ability to mitigate risks. Our balance sheet allows us to be opportunistic in that process. Since inception, we built or acquired 17 ethanol plants and installed corn oil extraction technology at each of our ethanol plants to generate incremental returns. In addition, we purchased or built a grain handling and storage business, a cattle feedlot operation, a vinegar production business, and terminal and distribution facilities. Successful integration of these operations has enhanced our overall returns.

Operational Excellence. Our operations are staffed by 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. Our operational expertise provides us a cost advantage over most of our competitors and helps us improve the operating margins of acquired facilities.

Vertical Integration. Our vertically integrated platform reduces commodity and operational risk and increases pricing visibility in key markets. Combined, our ethanol production, agribusiness and energy services, food and food ingredients, and partnership segments provide efficiencies, which extend both within and outside the ethanol value chain.

Proven Management Team. Our senior management team averages more than 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 due to factors described below driven by volatile oil prices, heightened environmental concerns, energy independence goals and national security concerns:

- Emissions Reduction. 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, on a seasonal or year-round basis. Oxygenated gasoline is used to meet separate federal and state air emission standards. At the time, these oxygenates included ethanol and MTBE. However, the U.S. refining industry has since abandoned the use of MTBE, making ethanol the primary clean air oxygenate used.
- Octane Enhancer. Ethanol has an octane value of 113 and is the primary additive used by refiners to increase octane levels, producing regular grade gasoline from lower octane blend stocks and upgrading regular gasoline to premium grades, to improve engine performance. Refiners are producing more conventional blendstocks for oxygenate blending, or CBOB, which is an 84 octane sub-grade gasoline that requires ethanol or another octane source to meet the minimum octane requirements for the U.S. gasoline market. CBOB represented approximately 80% of total conventional gasoline sold in 2015.
- Fuel Stock Extender. Ethanol is a valuable blend component used by U.S. refiners to extend fuel supply. According to the EIA, ethanol comprised approximately 9.9% of the domestic gasoline supply, replacing nearly 750 million barrels of crude oil in 2016.

- E15 Blending Waiver. In October 2010, the EPA granted a waiver that permitted the use of E15 in model year 2001 and newer passenger vehicles, including cars, sport utility vehicles and light pickup trucks. In June 2012, the EPA approved the sale and use of E15 and in July 2012, the nation's first retail E15 was sold. On January 24, 2017, there were 627 retail fuel stations in 28 states offering E15 to consumers.
- Mandated Use of Renewable Fuels. In the United States, the federal government mandates the use of renewable fuels under RFS II, which has been a driving factor in the growth of domestic ethanol usage. The EPA assigns individual refiners, blenders and importers the volume of renewable fuels they are obligated to use based on their percentage of total fuel sales. In November 2016, the EPA announced the final 2017 renewable volume obligations for conventional ethanol of 15.0 billion gallons, which is currently on hold pending final review by the incoming presidential administration.
- Net Ethanol Exports. Prior to 2010, the United States had a long history as a net importer of ethanol. In 2010, according to the USDA, the United States became the largest exporter of ethanol to world markets and lowest-cost producer, surpassing Brazil. According to the EIA, U.S. ethanol exports, net of imports, were approximately 1.0 billion gallons in 2016 and 730 million gallons in 2015.

In light of our industry's environment, we intend to further develop and strengthen our business by pursuing the following growth strategies:

Grow Organically. We continually leverage our operational expertise to identify expansion projects that maximize our production capabilities at our ethanol and vinegar plants, and cattle feedlot operations. 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 also seek organic growth projects in adjacent businesses and downstream distribution services that take advantage of our existing assets' locations.

Acquire Strategic Assets. We maintain a disciplined evaluation process in pursuit of strategic assets, taking into consideration rigorous design, engineering, financial and geographic criteria, to ensure the assets will generate favorable returns. We seek acquisitions that leverage our core competencies in adjacent markets, products and services with attractive margins or more predictable revenue streams.

Conduct Safe, Reliable, Efficient Operations and Improve Operational Efficiency. We are committed to maintaining safe, reliable and environmentally compliant operations and employ an extensive production control system at each ethanol plant to continuously monitor performance. We use the performance data to develop strategies that can be applied across our platform. In addition, we research operational processes that may enhance our efficiency by increasing yields, lowering processing cost per gallon and growing production volumes.

Recent Developments

The following is a summary of our significant developments during 2016. Additional information about these items can be found elsewhere in this report or in previous reports filed with the SEC.

Effective January 1, 2016, we sold the storage and transportation assets of the Hereford, Texas and Hopewell, Virginia ethanol production facilities to the partnership for $62.3 million. The partnership used its revolving credit facility and cash on hand to fund the purchase of the assets, which included three ethanol storage facilities that support the plants' combined production capacity of 160 mmgy and 224 leased railcars. In connection with this transaction, Green Plains and the partnership amended the omnibus agreement, operational services agreement, and ethanol storage and throughput agreement.

Effective April 1, 2016, the company increased its ownership of BioProcess Algae to 82.8% and began consolidating the joint venture in its consolidated financial statements. Our ownership in BioProcess Algae is currently at 90.0% as of December 31, 2016. The joint venture is focused on growing algae in commercially viable quantities using feedstocks that are created as part of the ethanol production process.

On June 14, 2016, we announced the formation of a 50/50 joint venture with Jefferson Gulf Coast Energy Partners, a subsidiary of Fortress Transportation and Infrastructure Investors LLC, to construct and operate an intermodal export and import fuels terminal at Jefferson's existing Beaumont, Texas terminal. The joint venture is expected to invest approximately $55 million in its Phase I development, which will initially focus on storage and throughput capabilities for multiple grades of ethanol. The terminal will have direct access to multiple transportation options, including Aframax vessels, inland and coastwise barges, trucks, and unit trains with direct mainline service from the Union Pacific, BNSF and Kansas City Southern railroads. Commercial development is expected to be complete during the second half of 2017, at which time we will offer our interest in the joint venture to the partnership.

On August 15, 2016, we completed a private offering of 4.125% convertible senior notes for an aggregate principal amount of $170 million that will mature on September 1, 2022. The net proceeds from the offering were used to finance subsequent acquisitions.

On August 25, 2016, the partnership filed a shelf registration statement on Form S-3 with the SEC, which was declared effective September 2, 2016, registering an indeterminate number of debt and equity securities with a total offering price not to exceed $500,000,250. The partnership also registered 13,513,500 common units, consisting of 4,389,642 common units and 9,123,858 common units that may be issued upon conversion of subordinated units, in each case, currently held by Green Plains.

On September 23, 2016, we acquired three ethanol plants located in Madison, Illinois; Mount Vernon, Indiana; and York, Nebraska, from subsidiaries of Abengoa S.A. for approximately $234.9 million in cash, plus certain working capital adjustments. The plants have combined production capacity of approximately 230 mmgy. Concurrently, the partnership acquired the ethanol storage assets related to these production facilities from us for $90 million. The partnership used its revolving credit facility to fund the purchase of the assets. In connection with this transaction, Green Plains and the partnership amended the omnibus agreement, operational services agreement, and ethanol storage and throughput agreement.

On October 3, 2016, we acquired Fleischmann's Vinegar, one of the world's largest producers of food-grade industrial vinegar, for $258.3 million in cash, including certain post-closing adjustments. A portion of the purchase price was used to repay existing debt. The transaction was partially financed using $135 million of debt under a new credit agreement, consisting of a $130 million term loan and $5 million borrowed under a $15 million revolving credit facility. The balance of the transaction was paid from cash on hand.

We filed a shelf registration statement on Form S-3 with the SEC effective December 22, 2016, registering an indeterminate number of shares of common stock, warrants and debt securities.

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, can be handled efficiently and is in greater supply than other grains. According to the USDA, one bushel, or 56 pounds, of corn, produces approximately 2.8 gallons of ethanol, 15.5 pounds of distillers grains and 0.7 pounds of corn oil, on average. Outside of the Unites 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 octanes available on the market and its production costs are competitive with gasoline.

Ethanol Plants. We operate 17 dry mill ethanol production plants, located in nine states, that produce ethanol, distillers grains and corn oil:

Plant	Initial Operation or Acquisition Date	Technology	Plant Production Capacity (mmgy)
Atkinson, Nebraska	June 2013	Delta-T	55
Bluffton, Indiana (1)	Sept. 2008	ICM	120
Central City, Nebraska	July 2009	ICM	110
Fairmont, Minnesota	Nov. 2013	Delta-T	119

Hereford, Texas	Nov. 2015	ICM/Lurgi	100
Hopewell, Virginia (2)	Oct. 2015	Katzen	60
Lakota, Iowa	Oct. 2010	ICM/Lurgi	124
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	61
Otter Tail, Minnesota	Mar. 2011	Delta-T	55
Riga, Michigan	Oct. 2010	Delta-T	60
Shenandoah, Iowa (1)	Aug. 2007	ICM	75
Superior, Iowa (1)	July 2008	Delta-T	60
Wood River, Nebraska	Nov. 2013	Delta-T	121
York, Nebraska	Sept. 2016	Katzen	50
Total			1,470

(1) We constructed these four plants; all other ethanol plants were acquired.
(2) The Hopewell plant resumed ethanol production on February 8, 2016.

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.

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 20 million to 44 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 since ethanol competes with other fuels.

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 14 of our ethanol plants. Most farmers in close proximity of our plants store corn in their own storage facilities. This allows us to purchase much of the corn we need directly from farmers throughout the year. At three of our ethanol plants, we contract with a third-party grain originator to supply the corn necessary for ethanol production. These contracts terminate between August 2019 and 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 coarse 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 batch 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 dried 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 may be 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 and evaporated thin stillage through a decanter-style, or disk-stack, centrifuge. The centrifuges separate the relatively light corn oil from the heavier components of the syrup, eliminating the need for significant retention time. 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 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 40,000 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 1.5 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. Much 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 five grain elevators in four states with combined grain storage capacity of approximately 11.6 million bushels, and grain storage at our ethanol plants of approximately 48.7 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
Kismet, Kansas	1,928
St. Edward, Nebraska	2,110
Ethanol Plants	
Atkinson, Nebraska	5,109
Bluffton, Indiana	4,789
Central City, Nebraska	1,400
Fairmont, Minnesota	1,611

Hereford, Texas	4,913
Hopewell, Virginia	1,043
Lakota, Iowa	4,752
Madison, Illinois	1,015
Mount Vernon, Indiana	1,034
Obion, Tennessee	8,168
Ord, Nebraska	2,571
Otter Tail, Minnesota	2,504
Riga, Michigan	2,432
Shenandoah, Iowa	886
Superior, Iowa	2,804
Wood River, Nebraska	3,293
York, Nebraska	347
Total	60,319

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 and other international markets. Under these agreements, ethanol is priced under fixed and indexed pricing arrangements.

Also through Green Plains Trade, we market wet, modified wet and dried 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 modified wet distillers grains are sold to midwestern feedlot markets. Our dried distillers grains are shipped to feedlots and poultry markets, as well as Texas and West Coast rail markets. A substantial amount of dried distillers grains are shipped by barge and rail to regional and national 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. In 2016, we exported approximately 10% of our distillers grains production, with the largest export markets for distillers grains being Vietnam and Thailand. Access to diversified markets allows us to sell product to customers offering the highest net price.

Our corn oil is sold primarily to 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.

Our railcar fleet for the agribusiness and energy services segment consists of approximately 950 leased hopper cars to transport distillers grains and approximately 180 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 Food Ingredients Segment

Our cattle feedlot operation has the capacity to support 73,000 head of cattle and 2.8 million bushels of grain storage capacity. We buy feeder cattle from producers, order buyers and livestock auctions, the majority of which are from Kansas, Missouri, Oklahoma and Texas. The finished cattle are then sold to meat processors. Bulk cattle 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 cattle and cattle held in inventory, we enter into exchange-traded futures and options contracts that function as economic hedges at times.

Our vinegar operation includes seven production facilities. Vinegar is sold primarily to major food industry participants, including leading branded food companies, private label food manufacturers and companies serving the foodservice channel. Products include white distilled vinegar and numerous specialty vinegars for retail and industrial uses. Vinegar is distributed primarily in bulk using 5,600 gallon tanker trailers. We also have four distribution warehouses located in California, Oregon, Texas and Quebec, Canada.

Partnership Segment

Our partnership segment provides fuel storage and transportation services through (i) 39 ethanol storage facilities located at or near our 17 ethanol production plants, (ii) eight 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 3,100 leased tank cars for the transportation of ethanol. The initial terms of the lease contracts are for periods up to seven 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 operates fuel terminals at one owned and seven leased locations in seven states with combined storage capacity of approximately 7.4 mmg and throughput capacity of approximately 822 mmgy. We also have 39 ethanol storage facilities located at or near our 17 ethanol production plants with a combined storage capacity of approximately 38.6 mmg to support current ethanol production capacity of approximately 1.5 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

Nashville, Tennessee	160
Oklahoma City, Oklahoma	150
Ethanol Plants	
Atkinson, Nebraska (1)	2,074
Bluffton, Indiana	3,000
Central City, Nebraska	2,250
Fairmont, Minnesota	3,124
Hereford, Texas	4,406
Hopewell, Virginia	761
Lakota, Iowa	2,500
Madison, Illinois	2,855
Mount Vernon, Indiana	2,855
Obion, Tennessee	3,000
Ord, Nebraska	1,550
Otter Tail, Minnesota	2,000
Riga, Michigan	1,239
Shenandoah, Iowa	1,524
Superior, Iowa	1,238
Wood River, Nebraska	3,124
York, Nebraska	1,100
Total	46,022

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

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Our Competition

Domestic Ethanol Competitors

We are the second largest consolidated owner of ethanol plants in the United States. We compete with other domestic ethanol producers in a relatively fragmented industry. The top five producers account for approximately 45% of the domestic production capacity with production capacity ranging from 800 mmgy to 1,800 mmgy.

Our competitors also include plants owned by farmers, 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.

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 127 operational plants in the states where we have production facilities, including Illinois, Indiana, Iowa, Michigan, Minnesota, Nebraska, Tennessee, Texas and Virginia, as of December 1, 2016. The largest concentration of operational plants is located in Illinois, Iowa and Nebraska, where 50% of all operational production capacity is located.

Foreign Ethanol Competitors

We also complete globally with production from other countries. Brazil is the second largest ethanol producer in the world after the United States. Brazil 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.

In addition, we compete with other cattle feedlots and vinegar producers in competitive markets.

Regulatory Matters

Government Ethanol Programs and Policies

In the United States, the federal government mandates the use of renewable fuels under RFS II. The EPA assigns individual refiners, blenders and importers the volume of renewable fuels they are obligated to use 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 environment.

RFS II has been a driving factor in the growth of ethanol usage in the United States. When RFS II was established in October 2010, the required volume of renewable fuel 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 November 23, 2016, the EPA announced the final 2017 renewable volume obligations for conventional ethanol, which met the 15.0-billion-gallon congressional target for the first time, up from 14.50 billion gallons in 2016 and 14.05 billion gallons in 2015.

In January 2017, the Trump administration imposed a government-wide freeze on new and pending regulations, which included the 2017 renewable volume obligations that was originally intended to go into effect on February 10, 2017. Regulatory freezes are a common practice during a change in administration and we currently believe the new presidential administration will continue to be supportive of ethanol in accordance with the current laws.

Obligated parties use RINs to show compliance with RFS-mandated volumes. RINs are attached to renewable fuels by producers and detached when the renewable fuel is blended with transportation fuel or traded 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. In November 2016, the EPA proposed denying a petition to change the point of obligation under RFS II to the parties that own the gasoline before it is sold. In December 2016, the EPA extended the comment period to February 2017. The point of obligation does not directly impact ethanol producers; however, moving the point of obligation could indirectly affect ethanol producers.

On January 18, 2017, Valero Energy Corporation filed an action against the EPA, seeking to compel the EPA to perform certain non-discretionary duties required by the RFS program under the Clean Air Act. Within the filed action, Valero claims the EPA has failed to perform these duties, namely periodic reviews of the feasibility of achieving compliance with the requirements and the impact of the requirements on each individual and entity regulated under the program, i.e, point of obligation, since 2010. Valero has requested an injunction, which if granted would require the EPA to promptly conduct rulemaking to ensure the requirements of the program are met.

Several amendments to the Energy Policy Modernization Act were introduced in the U.S. Senate that were removed from consideration in early February 2016, including amendments to repeal RFS II, eliminate the corn ethanol mandate in RFS II and prohibit the U.S. Secretary of Agriculture from using Commodity Credit Corporation or other funds to construct blender pumps.

CAFE was first enacted by Congress in 1975 to reduce energy consumption by increasing the fuel economy of cars and light trucks. CAFE has helped the ethanol industry by encouraging the use of E85. CAFE provides a 54% efficiency bonus to flexible-fuel vehicles running on E85. According to HIS Automotive, there are nearly 20 million flexible fuel vehicles on U.S. roads today. In addition, E85 is sold at more than 3,100 fuel stations in 46 states.

Demand for cleaner, more sustainable transportation fuel is growing worldwide. Ethanol has become a crucial component of the global fuel supply as an economical oxygenate and source of octanes. According to the Global Renewable Fuels Alliance, 35 countries, including the EU which is regulated by a single policy with specific national targets for each country, have mandates or planned targets in place for blending ethanol and biodiesel with transportation fuels to reduce harmful emissions.

Government actions abroad can have significant impact on the ethanol industry. For example, China raised its 5% tariff on U.S. and Brazil fuel ethanol to 30%, effective January 1, 2017.

Environmental and Other Regulation

Our ethanol production, agribusiness and energy services, and food and food ingredients segment activities are subject to environmental and other regulations. We obtain environmental permits to construct and operate our ethanol 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 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.

In January 2017, the USDA released a report providing evidence that greenhouse gas emissions associated with corn-based ethanol are 43% lower than gasoline. Numerous factors have led to improvements over the past ten years, including conservation practices by farmers, higher corn yields and advances in production technologies, which are expected to continue and has the potential to further reduce greenhouse gas emissions up to a 76% as compared with gasoline.

The U.S. ethanol industry relies heavily on tank cars to deliver its product to market. As of December 31, 2016, the company leases approximately 3,300 tank cars, including 3,100 leased by our partnership to transport ethanol. On May 1, 2015, the DOT finalized the Enhanced Tank Car Standards and Operational Controls for High-Hazard 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. We intend to strategically manage our leased railcar fleet to comply with these regulations. Currently, all of our railcar leases expire prior to the retrofit deadline of May 1, 2023.

Parts of our business are regulated by environmental laws and regulations governing the labeling, use, storage, discharge and disposal of hazardous materials. Our agribusiness operations are also subject to government regulation. Our production levels are indirectly affected by federal government programs, which include the USDA, acreage control and price support programs. In addition, the grain we sell must conform to official grade standards imposed by the USDA. Other examples of government policies that may impact our business include tariffs, duties, subsidies, import and export restrictions and outright embargos.

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 and plans, which includes 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 on or in livestock feed under the October 2015 revised Veterinary Feed Directive rule. Our cattle feedlot operation obtained all necessary prescriptions from a licensed veterinarian to use certain veterinary feed directive drugs, as appropriate.

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.

BioProcess Algae Joint Venture

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 human and animal nutrition, using proprietary technology to customize specific products, based on proven benefits, for relevant markets.

Employees

On December 31, 2016, we had 1,294 full-time, part-time, temporary and seasonal employees, including 177 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 read and copy any materials we file with the SEC at the SEC’s Public Reference Room at 100 F Street, NE, Washington, DC 20549 or 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 profitability is dependent on managing the spread between the price of corn, natural gas, ethanol, distillers grains, corn oil, cattle and vinegar.

Our operating results are highly sensitive to commodity prices, including the spread between the corn, natural gas, cattle and ethanol we purchase, and the ethanol, distillers grains, corn oil and vinegar we sell. Price and supply are subject to 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 our ethanol plants. No assurance can be given that we will purchase corn and natural gas or sell ethanol, distillers grains, corn oil and cattle at or near current prices. 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, corn oil and cattle prices.

We continuously monitor the profitability of 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 and narrowed significantly. 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.

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.

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 may adversely affect our results of operations and financial position.

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 harmed.

Ethanol imports also affect domestic supply and demand. Imported ethanol is not subject to an import tariff and, under 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.

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

Corn Oil. Industrial corn oil is generally marketed as a biodiesel feedstock; therefore, the price of corn oil is affected by demand for biodiesel. 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.

Cattle. The price and availability of feeder cattle are subject to volatile market conditions. These market conditions are often affected by factors beyond our control, such as weather, overall economic conditions and government regulations. Significant disruptions in feeder cattle supply could impair our ability to produce consistent results. Furthermore, increases in feeder cattle price or changes in our cost relative to our competitors may adversely affect our results of operations and financial position. In addition, a significant disruption in cattle processing capacity could impair our ability to market cattle at favorable prices which would affect our profitability.

Our risk management 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, corn oil and vinegar production or buy some of the corn, natural gas, cattle 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 and ethanol. The financial impact of these activities depends on the price of the commodities involved and 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 strategies effectively offset commodity price volatility. If we fail to offset such volatility, 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 usage could change and impact the ethanol market.

Under the provisions of the EISA, the EPA established a mandate setting the minimum volume of ethanol that must be blended with gasoline under the RFS II, which affects the domestic market for ethanol. The 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.

In January 2017, the Trump administration imposed a government-wide freeze on new and pending regulations, which included the 2017 renewable volume obligations that was originally intended to go into effect on February 10, 2017. Our operations could be adversely impacted by legislation that reduces the RFS II mandate. Similarly, should federal mandates regarding oxygenated gasoline be repealed, the market for domestic ethanol could be adversely impacted.

Future demand will 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 RFS II mandate. A significant increase in supply beyond the RFS II mandate could have an adverse impact on ethanol prices. Moreover, changes to RFS II which could significantly affect the market price of RINs could in turn negatively impact the price of ethanol or cause imported sugarcane ethanol to become more economical than domestic ethanol.

Flexible-fuel vehicles, which are designed to run on a mixture of fuels such as E85, receive preferential treatment to meet corporate average fuel economy standards. Absent CAFE preferences, auto manufacturers may not be willing to build flexible-fuel vehicles, reducing the growth of E85 markets and resulting in lower ethanol prices.

While we currently believe the new presidential administration will support the environmental laws that are currently in place, to the extent federal or state laws or regulations are modified, the demand for ethanol may be reduced, which could negatively and materially affect our ability to operate profitably.

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 biofuels and depletes water resources. 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.

There are limited markets for ethanol beyond the federal mandates. 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. 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. Consumer demand for gasoline may be impacted by emerging transportation trends, such as electric vehicles or ride sharing. Reduced demand for ethanol may depress the value of our products, erode our 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. Reduced demand for ethanol may erode our margins and reduce our ability to generate revenue and operate profitably.

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 significantly 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.

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 substantial portion of cash to be dedicated for debt payments, reducing the availability of cash flow for working capital, capital expenditures and other general business activities;
- requiring a substantial portion of cash reserves to be held for debt service, 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;
- being vulnerable to increases in prevailing interest rates;
- subjecting all or substantially all of our assets to liens, which means there may be no assets left for shareholders in the event of a liquidation; and
- limiting our ability to make operational decisions regarding our business, including limiting our ability to pay dividends, make capital improvements, sell or purchase assets or engage in transactions deemed appropriate and in our best interest.

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 of principal and interest, to make additional payments required under financial covenants, or to refinance our debt depends on our future performance, which is subject to economic, financial, competitive and other factors beyond our control. Our business may not continue generating cash flow sufficient to service our debt because of such factors, including the spread between corn prices and ethanol, corn oil and distillers grains prices. If we are unable to generate sufficient cash flows, we may be required to sell assets, restructure debt or obtain additional equity capital on terms that are onerous or highly dilutive. Our ability to refinance our debt will depend on capital markets and our financial condition at that time. We may not be able to engage in any of these activities or engage in these activities on desirable terms, which could result in default on our debt obligations.

We are not restricted from incurring additional debt, pledging assets, recapitalizing our debt or taking a number of other actions that could diminish our ability to make payments.

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. 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 may be viewed more favorably since the feedstock is not diverted from food production. In addition, cellulosic ethanol may have a smaller carbon footprint because the feedstock does not require energy-intensive fertilizers or industrial production processes. 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.

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

Our ethanol production and agribusiness and energy services segments are subject to extensive air, water and other environmental regulations. Ethanol production involves 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, particularly following a change in the presidential administration. 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.

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 Renewable Fuel Standard. 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.

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 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.

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.

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 45% of the domestic production capacity with production capacity ranging from 800 mmgy to 1,800 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. During the past five years, several oil refiners have acquired ethanol production plants. 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.

Sales of distillers grains depend on its continued market acceptance as livestock feed.

Antibiotics may be used during the fermentation process to control bacterial contamination; therefore, it is possible for antibiotics to be present in small quantities in our distillers grains, which is a co-product of the fermentation process and marketed as an animal feed. Should the FDA introduce regulations limiting the sale of such distillers grains in domestic or international markets, the market value of our distillers grains could be diminished, which would negatively impact our profitability.

Independently, if public perception regarding distillers grains as an acceptable animal feed were to change or if the public became concerned about the impact of distillers grains in the food supply, the market for distillers grains could be negatively impacted, which would adversely affect our profitability.

We extract industrial grade corn oil from the whole stillage process before producing distillers grains. Several universities are trying to determine how corn oil extraction affects nutritional energy values of the resulting distillers grains. If it is determined that corn oil extraction adversely affects the digestible energy content of distillers grains, the value of our distillers grains may be affected, which could have a negative impact on our profitability.

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 2016, we exported 13% of our ethanol production and 10% of our distillers grains production. In 2013, the EU imposed a five-year tariff of $83.33 per metric ton on U.S. ethanol to discourage foreign competition. China raised its 5% tariff on U.S. and Brazil fuel ethanol to 30%, effective January 1, 2017.

In 2013, China began rejecting U.S. dried distillers grains because it contained genetically modified corn not yet approved for import. In early 2015, China lifted this ban and imported 6.3 million metric tons of U.S. distillers grains that year. In January 2016, China's Ministry of Commerce once again 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%. According to the USDA, in 2016, approximately 31% of distillers grain produced in the United States was exported, down from 34% in 2015. With reduced exports, the value of our distillers grains may be affected, which could have a negative impact on our profitability.

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.

Owning and operating a cattle feedlot operation involves numerous external factors that are outside of our control.

Our cattle feedlot operation 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 livestock and feed ingredients and the sales price of our cattle;
- outbreak of disease in our feedlot 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;
- contamination or allegations of contamination of our products or our competitors' products, which could subject us to product liability claims or product recalls;
- liabilities in excess of our insurance policy limits or related uninsurable risks if outbreaks of disease or other conditions result in significant losses;
- inability to attract sufficient customers to maximize operational efficiencies;
- loss of one or more major customers, a substantial decline in customer orders or a significant decrease in beef prices for a sustained period of time;
- customer defaults on cattle, feed or other input financing;
- 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;
- reduced red meat consumption due to dietary changes or other issues, 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

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· risks relating to environmental hazards.

Owning and operating a vinegar production business involves numerous external factors that are outside of our control.

Our Fleischmann's Vinegar operations involve numerous risks that could lead to increased costs or decreased demand for products, which could have an adverse effect on our results of operations and financial condition, including:

· we use many different products in the production of vinegar, which are subject to price volatility caused by market fluctuations, and potentially volatile supply and demand. Commodity price increases may increase raw material, packaging, energy and operating costs. We may not be able to increase our product prices to fully offset these increased costs, which may result in reduced sales volume, margins and profitability;
· changes in our relationships with significant customers or suppliers could adversely affect us, as the loss of a significant customer or a material reduction in sales to a significant customer could materially and adversely affect our product sales and results of operations;
· our ability to manufacture, transport and sell our products is critical to our success and any disruptions in our supply chain could have an adverse impact on our business and results of operations;
· the food ingredients industry is highly competitive and further consolidation in the industry would likely increase competition;
· our customers have continued to consolidate, resulting in fewer customers upon which we can rely for business. These consolidations have produced large sophisticated customers with increased buying power and negotiating strength, which could have a negative impact on profits;
· consumer preferences evolve over time and the success of our products depends on our ability to identify the tastes of consumers and work with manufacturers to develop products that appeal to those preferences;
· food ingredients used in products for human consumption may be subject to product liability claims and product recalls which could negatively impact our profitability;
· our facilities and products are subject to many laws and regulations administered by various federal, state and local government agencies related to processing, packaging, storage, distribution, quality and safety of food products, the health and safety of our employees and the protection of the environment. Failure to comply with applicable laws and regulations could subject us to lawsuits, administrative penalties and civil remedies including fines, injunctions and recalls of our products; and
· A portion of our workforce is unionized and we may face labor disruptions that may interfere with our operations.

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 ether 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 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, corn oil, cattle and vinegar 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.

Information security risks have generally increased in recent years as a result of the proliferation of new technologies and the increased sophistication and frequency of cyber-attacks and data security breaches. To manage the risk associated with potential technology security breaches, we have implemented security measures to protect us against cyber-based attacks and disaster recovery plans for our critical systems. However, our information technology systems and network infrastructure may be subject to unauthorized access or attack at any time and there can be no assurances that our infrastructure protection technologies and disaster recovery plans are sufficient to prevent a technology systems breach, systems failure, business interruption or loss of sensitive data. The potential impact of any of these incidents, should they occur, could be material and have an adverse impact to our revenues, operating results, financial condition or damage our reputation.

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.

We have had a history of operating losses and could incur future operating losses.

In the last five 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.

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

The loan agreements governing our secured debt financing and our convertible senior notes contain a number of restrictive affirmative and negative covenants, which limit our ability to incur additional debt; exceed certain limits; pay dividends or distributions; or merge, consolidate or dispose of substantially all of our assets.

We are required to maintain specified financial ratios, including minimum cash flow coverage, working capital and tangible net worth under certain loan agreements. Other agreements require us to use a portion of excess cash flow generated by our operations to prepay the respective term debt. 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.

Some ethanol producers have faced financial distress, culminating to bankruptcy filings by several companies over the past seven years. This, combined with capital market volatility, has resulted in reduced available capital for the ethanol industry in general. The majority of our ethanol plants’ operations are funded by long-term credit facilities. 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 subsidiaries’ debt facilities have ongoing payment requirements that we generally expect to meet from their operating cash flow. 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.

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

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, cattle packers, food companies 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.

We may incur a loss should our counterparty fail to perform under a third-party marketing agreement.

Under a third-party marketing agreement, we purchase their ethanol production and sell it in various markets for future deliveries. Under the terms of the agreement, the third-party is not obligated to produce a minimum volume, therefore, we may not receive the full amount of ethanol the third-party plant is expected to produce. Any interruption or curtailment of production could force us to purchase ethanol at higher prices to meet contractual obligations. Recoveries would be dependent on the third party's ability to pay, which could negatively impact our profitability.

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, fuel terminals and vinegar operations 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.

Disruptions in the credit market or a downgrade in our credit rating could limit our access to capital.

We may need additional capital to fund our growth or other business activities in the future. If our credit rating is downgraded, 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.

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 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 sometimes 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.

A substantial portion of our owned real property is used to secure our loans. See Note 11 – Debt included as part of the notes to consolidated financial statements for information about our loan agreements.

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 2,800 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 1.5 billion gallons of ethanol per year.

Agribusiness and Energy Services Segment

We own approximately 63 acres of land at our five grain elevators. As detailed in our discussion in Item 1 – Business, our agribusiness and energy services segment facilities include five grain elevators with combined grain storage capacity of approximately 11.6 million bushels, and grain storage capacity at our ethanol plants of approximately 48.7 million bushels.

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

Food and Food Ingredients Segment

We own approximately 2,590 acres of land at our cattle feedlot operation. We also own approximately 64 acres of land and lease approximately three acres of land at our vinegar operation. We also lease office space for our vinegar operation in Cerritos, California and Quebec, Canada. As detailed in our discussion of the food and food ingredients segment in Item 1 – Business, our cattle feedlot operation has the capacity to support 73,000 head of cattle and 2.8 million bushels of grain storage capacity, and our vinegar operation has seven production facilities and four distribution warehouses.

Partnership Segment

Our partnership owns approximately five acres of land and leases approximately 19 acres of land at eight locations in seven states, as disclosed in Item 1 – Business, where its fuel terminals are located and owns approximately 54 acres and leases approximately two acres 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.

Our common stock trades under the symbol "GPRE" on Nasdaq. The following table lists the common stock's highest and lowest price and quarterly cash dividends per share for the periods indicated:

Year Ended December 31, 2016	High	Low	Quarterly Cash Dividend Per Share
Three months ended December 31, 2016 (1)	$ 29.85	$ 22.40	$ 0.12
Three months ended September 30, 2016	26.82	19.73	0.12
Three months ended June 30, 2016	20.86	14.46	0.12
Three months ended March 31, 2016	23.26	12.39	0.12

Year Ended December 31, 2015	High	Low	Quarterly Cash Dividend Per Share
Three months ended December 31, 2015	$ 24.42	$ 18.52	$ 0.12
Three months ended September 30, 2015	28.16	17.13	0.12
Three months ended June 30, 2015	34.05	26.60	0.08
Three months ended March 31, 2015	30.20	20.31	0.08

(1) The closing price of our common stock on December 30, 2016 was $27.85.

Holders of Record

We had 2,160 holders of record of our common stock, not including beneficial holders whose shares are held in names other than their own, on February 14, 2017. This figure does not include approximately 35.0 million shares held in depository trusts.

Dividend Policy

In August 2013, our board of directors initiated a quarterly cash dividend, which we have paid every quarter since and anticipate paying in future quarters. On February 8, 2017, our board of directors declared a quarterly cash dividend of $0.12 per share. The dividend is payable on March 17, 2017, to shareholders of record at the close of business on February 24, 2017. Future declarations are subject to board approval and may be adjusted as our cash position, business needs or market conditions change.

Issuer Purchases of Equity Securities

Employees surrender shares when restricted stock grants are vested to satisfy statutory minimum required payroll tax withholding obligations. There were no shares that were surrendered during the fourth quarter of 2016.

In August 2014, we announced a share repurchase program of up to $100 million of our common stock. 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. There were no shares repurchased under the program during the fourth quarter of 2016. Approximately $90.0 million of shares are remaining to be repurchased 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, 2016. The graph assumes a $100 investment in our common stock and each index at December 31, 2011, and that all dividends were reinvested.

	12/11	12/12	12/13	12/14	12/15	12/16
Green Plains Inc.	$ 100.00	$ 81.05	$ 199.52	$ 256.94	$ 241.72	$ 301.17
S&P Smallcap 600	100.00	116.33	164.38	173.84	170.41	215.67
Nasdaq Clean Edge Green Energy	100.00	107.45	212.14	223.41	241.05	227.07

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 income data for the years ended December 31, 2016, 2015 and 2014 and the balance sheet data as of December 31, 2016 and 2015 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 income data for the years ended December 31, 2013 and 2012 and the balance sheet data as of December 31, 2014, 2013 and 2012 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,				
	2016	2015	2014	2013	2012
Statement of Income Data:					
(in thousands, except per share information)					
Revenues	$ 3,410,881	$ 2,965,589	$ 3,235,611	$ 3,041,011	$ 3,476,870
Costs and expenses	3,319,193	2,904,512	2,949,337	2,933,160	3,459,118
Gain on disposal of assets (1)	-	-	-	-	47,133
Operating income	91,688	61,077	286,274	107,851	64,885
Total other expense	53,337	39,612	35,844	35,570	39,729
Net income	30,491	15,228	159,504	43,391	11,763
Net income attributable to Green Plains	10,663	7,064	159,504	43,391	11,779
Earnings per share attributable to Green Plains:					
Basic	$ 0.28	$ 0.19	$ 4.37	$ 1.44	$ 0.39
Diluted	$ 0.28	$ 0.18	$ 3.96	$ 1.26	$ 0.39
Other Data: (Non-GAAP)					
EBITDA (unaudited and in thousands)	$ 174,428	$ 127,781	$ 352,477	$ 156,492 `	$ 115,505

	December 31, 2016	2015	2014	2013	2012
Balance Sheet Data (in thousands):					
Cash and cash equivalents	$ 304,211	$ 384,867	$ 425,510	$ 272,027	$ 254,289
Current assets	1,000,576	912,577	903,415	633,305	568,035
Total assets	2,506,492	1,917,920	1,821,062	1,532,045	1,349,734
Current liabilities	594,946	438,669	511,540	409,197	432,384
Long-term debt	782,610	432,139	399,440	480,746	362,549
Total liabilities	1,527,301	959,011	1,023,613	986,687	859,232
Stockholders' equity	979,191	958,909	797,449	545,358	490,502

(1) In December 2012, we sold 12 grain elevators located in northwestern Iowa and western Tennessee consisting of approximately 32.6 million bushels of grain storage capacity and all of our agronomy and retail petroleum operations.

Management uses earnings before interest, income taxes, depreciation and amortization, or EBITDA, to compare the financial performance of our business segments and manage those segments. Management believes EBITDA is a useful measure to compare our performance against other companies. EBITDA should not be considered an alternative to, or more meaningful than, net income or cash flow, which are determined in accordance with GAAP. EBITDA calculations may vary from company to company. Accordingly, our computation of EBITDA may not be comparable with a similarly titled measure of another company.

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

	Year Ended December 31,				
	2016	2015	2014	2013	2012
Net income	$ 30,491	$ 15,228	$ 159,504	$ 43,391	$ 11,763
Interest expense	51,851	40,366	39,908	33,357	37,521
Income tax expense	7,860	6,237	90,926	28,890	13,393
Depreciation and amortization	84,226	65,950	62,139	50,854	52,828
EBITDA (unaudited)	$ 174,428	$ 127,781	$ 352,477	$ 156,492	$ 115,505

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 an ethanol producer. We have grown through acquisitions of operationally efficient ethanol production facilities and adjacent commodity processing businesses, and are focused on generating stable operating margins through our diversified 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, natural gas and cattle. 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 each of our 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

Domestic ethanol production increased to an estimated 15.3 billion gallons in 2016 from 14.8 billion gallons in 2015, according to the EIA. Production capacity grew predominantly through plant optimization and expansions versus new construction projects. There were 213 ethanol plants with total production capacity of 15.8 bgy as of December 1, 2016, compared with 216 ethanol plants with production capacity of 15.7 bgy one year ago according to the Renewable Fuels Association.

Ethanol consumption is correlated with consumer gasoline demand, which reached a ten-year high in 2016 in the U.S. of 143.2 billion gallons. Ethanol accounted for approximately 10% of the U.S. gasoline market in 2016, or 14.2 billion gallons, up from 13.9 billion gallons in 2015. Ethanol is used by oil refiners, integrated oil companies and gasoline retailers to reduce vehicle emissions and increase octane levels. Despite trading at a premium to gasoline for most of 2016, ethanol continued to be the most economical oxygenate over Gulf Coast alkylate and reformate substitutes, and the most affordable source of octane over Gulf Coast 93 and toluene substitutes.

Increased automaker approval, consumer acceptance and availability of higher ethanol blends such as E15 also helped to support domestic demand. Automakers have explicitly approved the use of E15 in more than 70% of 2016 models sold in the

United States. In 2014, a broad U.S. ethanol industry group formed Prime the Pump, a nonprofit organization, to invest private funds into retail gasoline infrastructure to increase the number of retail outlets offering higher blends of ethanol. In 2015, the USDA provided funding through the Biofuel Infrastructure Partnership, adding to the private funds provided by ethanol industry participants. There were 627 retail fuel stations in 28 states offering E15 to consumers as of January 24, 2017.

Federal mandates supporting the use of renewable fuels are also a significant driver of ethanol demand in the United States. Ethanol policies are influenced by environmental concerns and an interest in reducing the country's dependence on foreign oil. When RFS II was established in October 2010, the required volume of conventional renewable fuel 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 November 23, 2016, the EPA announced the final 2017 renewable volume obligations for conventional ethanol, which met the 15.0-billion-gallon congressional target for the first time, up from 14.5 billion gallons in 2016 and 14.05 billion gallons in 2015. The 2017 renewable volume obligations are pending final review by the incoming presidential administration.

Global Ethanol Supply and Demand

The United States and Brazil account for more than 80% of all ethanol production worldwide, according to the USDA. Global production increased to 25.7 billion gallons in 2015 from approximately 24.6 billion gallons in 2014, according to the Renewable Fuels Association. The United States has been the world's largest producer and consumer of ethanol since 2010. Approximately 7% of the ethanol produced domestically is marketed worldwide and competes globally with other sources of octane and oxygenates.

Demand for cleaner, more sustainable transportation fuel is growing worldwide. Ethanol has become a crucial component of the global fuel supply as an economical oxygenate and source of octanes. According to the Global Renewable Fuels Alliance, 35 countries, including the EU which is regulated by a single policy with specific national targets for each country, have mandates or planned targets in place for blending ethanol and biodiesel with transportation fuels to reduce harmful emissions. As countries establish mandates or raise their required blend percentages, new export opportunities for U.S. producers are likely to emerge.

Government actions abroad can have a significant impact on the ethanol industry. For example, China indicated its intention to raise its 5% tariff on U.S. and Brazil fuel ethanol to 30%, effective January 1, 2017. 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 in 2017.

Overall, the U.S. ethanol industry is producing at levels to meet current domestic and export demand. According to the EIA, in 2016, U.S. net exports were approximately 1.0 billion gallons. Brazil and Canada remained the two largest export destinations for U.S. ethanol, which accounted for 26% and 25%, respectively, of U.S. ethanol exports. China, India and the Philippines accounted for 17%, 8% and 5%, respectively, of U.S. ethanol exports.

Co-Product Supply and Demand

According to the USDA, the United States produced approximately 48 million tons of distillers grains resulting from ethanol production in 2016, of which 11.5 million tons were exported. Approximately 70% of the volume went to the following six countries, China, Mexico, Vietnam, South Korea, Turkey and Thailand, which accounted for 21%, 17% 10%, 8%, 7% and 7% of domestic exports, respectively.

Legislation and Regulation

In the United States, the federal government mandates the use of renewable fuels under RFS II, which has been a driving factor in the growth of domestic ethanol usage. The EPA assigns individual refiners, blenders and importers the volume of renewable fuels they are obligated to use based on their percentage of total fuel sales. In November 2016, the EPA announced the final 2017 renewable volume obligations for conventional ethanol of 15.0 billion gallons.

Obligated parties use RINs to show compliance with RFS-mandated volumes. RINs are attached to renewable fuels by producers and detached when the renewable fuel is blended with transportation fuel or traded 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. In November 2016, the EPA also proposed denying a petition to change the point of obligation under RFS II to the parties that own the gasoline before it is sold. In December 2016, the EPA extended the comment period to February 2017.

The point of obligation does not directly impact ethanol producers; however, moving the point of obligation could indirectly affect ethanol producers.

In January 2017, the Trump administration imposed a government-wide freeze on new and pending regulations, which included the 2017 renewable volume obligations that was originally intended to go into effect on February 10, 2017. Regulatory freezes are a common practice during a change in administration and we believe the current administration will continue to be supportive of ethanol in accordance with the current laws.

Consumer acceptance of E15 and E85 fuels and flex-fuel vehicles is one factor that may be necessary before ethanol can achieve significant growth in U.S. market share. Another important factor is a waiver in the Clean Air Act, known as the “One-Pound Waiver,” which allows E10 blends during the summer months, even though it exceeds the Reid vapor pressure limitation of 9 pounds per square inch. The One-Pound Waiver does not apply to E15, even though it has similar physical properties to E10. Industry groups are focused on securing the One-Pound Waiver for E15.

The U.S. ethanol industry relies heavily on tank cars to deliver its product to market. The company leases approximately 3,300 tank cars, including 3,100 leased by our partnership to transport ethanol. 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 final 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. Currently, all of our railcar leases expire prior to the retrofit deadline of May 1, 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 and plans, which includes 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 on or in livestock feed under the October 2015 revised Veterinary Feed Directive rule. Our cattle feedlot operation obtained all necessary prescriptions from a licensed veterinarian to use certain veterinary feed directive drugs, as appropriate.

On January 18, 2017, Valero Energy Corporation filed an action against the EPA, seeking to compel the EPA to perform certain non-discretionary duties required by the RFS program under the Clean Air Act. Within the filed action, Valero claims the EPA has failed to perform these duties, namely periodic reviews of the feasibility of achieving compliance with the requirements and the impact of the requirements on each individual and entity regulated under the program, i.e, point of obligation, since 2010. Valero has requested an injunction, which if granted would require the EPA to promptly conduct rulemaking to ensure the requirements of the program are met.

Variability of Commodity Prices

Our business is highly sensitive to commodity price fluctuations, particularly for corn, ethanol, corn oil, distillers grains, natural gas and cattle, 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 periods of commodity price variability or compressed margins, we may reduce or cease operations at certain ethanol plants. Slowing down production increases the ethanol yield per bushel of corn, optimizing cash flow in lower margin environments. In 2016, our ethanol facilities ran at approximately 90% of our daily average capacity, largely due to the low margin environment during the first half of the year driven by historically low crude oil prices resulting from record world supply.

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 revenues when there is evidence that an arrangement exists, title of product and risk of loss are transferred to the customer, the price is fixed and determinable, and collectability is reasonably assured.

Sales of ethanol, distillers grains, corn oil and other commodities by our marketing business are recognized when title of product and risk of loss are transferred to an external customer. Revenues related to third-party marketing are presented on a gross basis when we take title of the product and assumes risk of loss. Unearned revenue is recorded for goods in transit when we have received payment but the title 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 fixed-price, physical-delivery energy commodity purchase and sale agreements. At times, we settle these transactions by transferring our obligation to another counterparty rather than delivering the physical commodity. These transactions are reported net as a component of revenue. Revenues also include realized gains and losses on related derivative financial instruments, ineffectiveness on cash flow hedges and reclassifications of realized gains and losses on effective cash flow hedges from accumulated other comprehensive income or loss.

Sales of products including agricultural commodities, cattle and vinegar, are recognized when title of product and risk of loss are transferred to the customer, which depends on the terms of the agreement. The sales terms provide passage of title when shipment is made or the commodity is delivered and the customer has agreed to final weights, grades and settlement prices. Revenues related to grain merchandising are presented gross and include shipping and handling, which is also a component of cost of goods sold. Revenue from grain storage is recognized when services are rendered.

A substantial portion of our partnership revenues are derived from fixed-fee commercial agreements for storage, terminal or transportation services. The partnership recognizes revenues when there is evidence an arrangement exists; risk of loss and title transfer to the customer; the price is fixed or determinable; and collectability is reasonably ensured. Revenues from base storage, terminal or transportation services are recognized once these services are performed, which occurs when the product is delivered to the customer.

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

Depreciation of Property and Equipment

Property and equipment are stated at cost less accumulated depreciation. Depreciation on our ethanol production and grain storage facilities, railroad tracks, computer equipment and software, office furniture and equipment, vehicles, and other fixed assets is provided using the straight-line method over the estimated useful life of the asset, which currently ranges from 3 to 40 years.

Land improvements are capitalized and depreciated. Expenditures for property betterments and renewals are capitalized. Costs of repairs and maintenance are charged to expense when incurred.

We periodically evaluate whether events and circumstances have occurred that warrant a revision of the estimated useful life of the asset, which is accounted for prospectively.

Carrying Value of Intangible Assets

Our intangible assets consist of trademarks, customer relationships, research and development technology and licenses acquired through acquisitions. These assets were capitalized at their fair value at the date of the acquisition and are being amortized over their estimated useful lives.

Impairment of Long-Lived Assets and Goodwill

Our long-lived assets consist of property and equipment and intangible assets. 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, food and food ingredient and partnership segments. We review goodwill at the segment level for impairment at least annually or more frequently whenever events or changes in circumstances indicate that an impairment may have occurred.

We assess the qualitative factors of goodwill to determine whether it is necessary to perform a two-step goodwill impairment test. Under the first step, we compare the estimated fair value of the reporting unit with its carrying value including goodwill. If the estimated fair value is less than the carrying value, we complete a second step to determine the amount of the goodwill impairment that we should record. In the second step, we allocate the reporting unit’s fair value to all of its assets and liabilities other than goodwill to determine an implied fair value. We compare the result with the carrying amount and record an impairment charge for the difference.

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, sales of comparable properties and third-party independent appraisals. Changes in estimated fair value could result in a write-down of the asset.

Derivative Financial Instruments

We use various derivative financial instruments to minimize the adverse effect price changes related to corn, ethanol, natural gas and cattle may have on our operating results. We monitor and manage this exposure as part of our overall risk management policy. These commodities may be hedged to mitigate risk, however, there may be situations when these hedging activities themselves result in losses.

Using derivatives exposes us 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 this risk by entering into transactions with high quality counterparties, limiting the amount of financial exposure we have with each counterparty and monitoring their financial condition. We manage the risk that the value of the financial instrument is exposed to by a change in commodity prices or interest rates, or market risk, by incorporating parameters to monitor our exposure within our risk management strategy. These parameters limit the types of derivative instruments and strategies we can use and the degree of market risk we can take by using derivative instruments.

We evaluate our physical delivery contracts to determine if they qualify for normal purchase or sale exemptions and 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, hedge accounting treatment.

Certain qualifying derivatives related to the ethanol production and agribusiness and energy services segments are designated as cash flow hedges. We evaluate the derivative instrument to determine its effectiveness prior to entering into cash flow hedges. Ineffectiveness is recognized in current period results, while other unrealized gains and losses are reflected in accumulated other comprehensive income 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. These derivative financial instruments are recognized in current assets or other current liabilities at fair value.

At times, we hedge our exposure to changes in inventory value and designate qualifying derivatives as fair value hedges. The carrying amount of the hedged inventory is adjusted in current period results for changes in fair value. Ineffectiveness 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. 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 other than the operating leases, which are entered into during the ordinary course of business and disclosed in the Contractual Obligations section below.

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, 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. Revenues include net gains or losses from derivatives related to the products sold. For our food and food ingredients segment, the sale of cattle and vinegar 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.

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 food ingredients segment, the cattle feedlot operation includes costs of cattle, feed and veterinary supplies, direct labor and feedlot overhead, which are accumulated as inventory and included as a component of cost of goods sold when the cattle are sold. Direct labor includes compensation and related benefits of non-management personnel involved in the feedlot operation. Feedlot overhead costs include feedlot utilities, repairs and maintenance and yard expenses. For the vinegar operation, 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 vinegar operations. Overhead consists primarily of plant utilities and outbound freight charges. Food-grade ethanol is the most significant raw material cost.

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, are the largest expenditure. Selling, general and administrative expenses that cannot be allocated to an operating segment are referred to as corporate activities.

Other Income (Expense). Other income (expense) includes interest earned, interest expense, equity earnings in nonconsolidated subsidiaries and other non-operating items.

Results of Operations

Comparability

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

June 2014	Kismet, Kansas cattle feedlot business was acquired
July 2015	Green Plains Partners completed its IPO
October 2015	Hopewell, Virginia ethanol plant was acquired
November 2015	Hereford, Texas ethanol plant was acquired
January 2016	Partnership acquired certain storage and transportation assets of the Hereford and Hopewell ethanol plants
April 2016	

	Increased ownership of BioProcess Algae and began consolidating within our consolidated financial statements
September 2016	Madison, Illinois, Mount Vernon, Indiana, and York, Nebraska ethanol plants were acquired and the partnership acquired certain storage assets of the these plants
October 2016	Fleischmann's Vinegar Company was acquired

The year ended December 31, 2014, includes approximately six months of operations at our Kansas cattle feedlot business. The year ended December 31, 2015, includes approximately two months of operations at our Hereford plant. Our Hopewell plant, which was not operational at the time of its acquisition, resumed ethanol production on February 8, 2016. The year ended December 31, 2016, includes approximately nine months of consolidated operations of BioProcess Algae, and approximately three months of operations at the Madison, Mount Vernon, and York ethanol plants and Fleischmann's Vinegar Company.

Segment Results

As a result of acquisitions during the year, we implemented segment organizational changes during the fourth quarter of 2016, whereby we now 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 and marketing and merchant trading for company-produced and third-party ethanol, distillers grains, corn oil, natural gas and other commodities, (3) food and food ingredients, which includes the vinegar operations and cattle feedlot operations and (4) partnership, which includes fuel storage and transportation services. Prior periods have been reclassified to conform to the revised segment presentation.

Under GAAP, when transferring assets between entities under common control, the entity receiving the net assets initially recognizes the carrying amounts of the assets and liabilities at the date of transfer. The transferee's prior period financial statements are restated for all periods its operations were part of the parent's consolidated financial statements. On July 1, 2015, Green Plains Partners received ethanol storage and railcar assets and liabilities in a transfer between entities under common control. Effective January 1, 2016, the partnership acquired the storage and transportation assets of the Hereford and Hopewell production facilities in a transfer between entities under common control and entered into amendments to the related commercial agreements with Green Plains Trade. The transferred assets and liabilities are recognized at our historical cost and reflected retroactively in the segment information of the consolidated financial statements presented in this Form 10-K. The partnership's assets were previously included in the ethanol production and agribusiness and energy services segments. Expenses related to the ethanol storage and railcar assets, such as depreciation, amortization and railcar lease expenses, are also reflected retroactively in the following segment information. There are no revenues related to the operation of the ethanol storage and railcar assets in the partnership segment prior to their respective transfers to the partnership, when the related commercial agreements with Green Plains Trade became effective.

Corporate activities incudes selling, general and administrative expenses, consisting primarily of compensation, professional fees and overhead costs not directly related to a specific operating segment. When we evaluate segment performance, we review the following operating segment information as well as earnings before interest, income taxes, depreciation and amortization, or EBITDA.

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.

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

	Year Ended December 31,		
	2016	2015	2014
Revenues:			
Ethanol production:			
Revenues from external customers (1)	$ 2,409,102	$ 2,063,172	$ 2,590,428
Intersegment revenues	-	-	-
Total segment revenues	2,409,102	2,063,172	2,590,428
Agribusiness and energy services:			
Revenues from external customers (1)	675,446	674,719	607,323

Intersegment revenues	34,461	24,114	24,535
Total segment revenues	709,907	698,833	631,858
Food and food ingredients:			
Revenues from external customers (1)	318,031	219,310	29,376
Intersegment revenues	150	75	-
Total segment revenues	318,181	219,385	29,376
Partnership:			
Revenues from external customers	8,302	8,388	8,484
Intersegment revenues	95,470	42,549	4,359
Total segment revenues	103,772	50,937	12,843
Revenues including intersegment activity	3,540,962	3,032,327	3,264,505
Intersegment eliminations	(130,081)	(66,738)	(28,894)
Revenues as reported	$ 3,410,881	$ 2,965,589	$ 3,235,611

(1) Revenues from external customers include realized gains and losses from derivative financial instruments.

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	Year Ended December 31,		
	2016	2015	2014
Cost of goods sold:			
Ethanol production	$ 2,280,906	$ 1,939,824	$ 2,230,141
Agribusiness and energy services	650,538	639,470	555,200
Food and food ingredients	294,396	216,661	26,538
Partnership	-	-	-
Intersegment eliminations	(129,761)	(66,588)	(28,834)
	$ 3,096,079	$ 2,729,367	$ 2,783,045

	Year Ended December 31,		
	2016	2015	2014
Operating income (loss):			
Ethanol production	$ 28,125	$ 43,266	$ 285,579
Agribusiness and energy services	34,039	37,253	52,176
Food and food ingredients	16,436	(952)	1,200
Partnership	60,903	12,990	(19,975)
Intersegment eliminations	(170)	-	-
Corporate activities	(47,645)	(31,480)	(32,706)
	$ 91,688	$ 61,077	$ 286,274

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

	Year Ended December 31,	
	2016	2015
Total assets (1):		
Ethanol production	$ 1,206,155	$ 1,004,342
Agribusiness and energy services	579,977	418,168
Food and food ingredients	406,429	110,775
Partnership	74,999	81,430
Corporate assets	257,652	314,068
Intersegment eliminations	(18,720)	(10,863)
	$ 2,506,492	$ 1,917,920

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

Year Ended December 31, 2016 Compared with the Year Ended December 31, 2015

Consolidated Results

Consolidated revenues increased by $445.3 million in 2016 compared with 2015. Revenues were impacted by an increase in ethanol volumes sold, along with an increase in volumes of cattle sold, plus the addition of Fleischmann's Vinegar during the fourth quarter. The increase in ethanol revenues was partially offset by a decrease in merchant trading activity volumes and lower average realized prices for grain.

Operating income increased by $30.6 million in 2016 compared with 2015 primarily due to increased cattle margins, partially offset by lower margins in ethanol production and an increase in corporate expenses. Interest expense increased by $11.5 million compared with 2015 due to higher average debt balances outstanding and higher average borrowing costs. Income tax expense increased by $1.6 million to $7.9 million in 2016 compared with 2015 due to higher pre-tax income.

The following discussion provides greater detail about our year-to-date segment performance.

Ethanol Production Segment

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

	Year Ended December 31,	
	2016	2015
Ethanol sold (thousands of gallons)	1,147,630	947,557
Distillers grains sold (thousands of equivalent dried tons)	3,064	2,540
Corn oil sold (thousands of pounds)	273,901	244,047
Corn consumed (thousands of bushels)	401,065	332,417

Revenues in the ethanol production segment increased by $345.9 million in 2016 compared with 2015 primarily due to an increase in ethanol and corn oil volumes sold. The average price realized for ethanol was relatively unchanged in 2016 compared with 2015. The increased volumes produced was primarily due to increased production at our existing ethanol plants and the acquisition of the Hereford, Hopewell, Madison, Mount Vernon, and York ethanol plants, which produced approximately 185.3 mmg of ethanol and 26.0 million pounds of corn oil during the year ended December 31, 2016.

Cost of goods sold in the ethanol production segment increased by $341.1 million for 2016 compared with 2015 due to higher production volumes. Operating income for the ethanol production segment decreased by $15.1 million for 2016 compared with the same period in 2015 as a result of the factors identified above, as well as additional general and administrative expenses due to the additional ethanol plants acquired. Depreciation and amortization expense for the ethanol production segment was $68.7 million for the year ended December 31, 2016, compared with $55.6 million during 2015.

Agribusiness and Energy Services Segment

Revenues in the agribusiness and energy services segment increased by $11.1 million and operating income decreased by $3.2 million in 2016 compared with 2015. The increase in revenues was primarily due to an increase in ethanol and distillers grain trading activity, partially offset by a decrease in grain trading activity volumes and lower average realized prices. Operating income decreased primarily as a result of lower margins on merchant trading activity, partially offset by increased intersegment marketing and corn origination fees.

Food and Food Ingredients Segment

Revenues in our food and food ingredients segment increased by $98.8 million in 2016 compared with 2015. The increase in revenues was primarily due to an increase in cattle volumes sold as well as the acquisition of Fleischmann's Vinegar, partially offset by lower average realized cattle prices.

Operating income for the food and food ingredients segment increased by $17.4 million in 2016 compared with 2015, primarily due to an increase in cattle margins, as well as the acquisition of Fleischmann's Vinegar.

Partnership Segment

Revenues generated from the partnership's storage and throughput agreement and rail transportation services agreement with Green Plains Trade, executed in connection with the IPO and effective beginning July 1, 2015, were $89.1 million for 2016 compared with $36.9 million for 2015. Increased revenues were attributable to a full year of commercial operations in 2016, as well as higher throughput volumes due to acquired ethanol storage assets and higher railcar volumetric capacity provided by the partnership to transport incremental production volumes. Revenues generated by trucking and terminal services increased $0.7 million in 2016 compared with 2015, primarily due to increased trucking volumes with Green Plains Trade and third parties.

Operating income for the partnership segment increased by approximately $47.9 million due to the increase in revenues above, partially offset by an increase in operations and maintenance expenses of $4.6 million for 2016, compared with the same period for 2015. The increase was primarily due to higher railcar lease expense as a result of an increased railcar fleet, partially offset by rate reductions; higher wages as a result of an increased railcar fleet and plant acquisitions; and higher

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general repairs and maintenance expense. General and administrative expenses increased $1.3 million in 2016 compared with 2015, primarily due to administrative costs incurred as a publicly traded entity.

Intersegment Eliminations

Intersegment eliminations of revenues increased by $63.3 million for 2016 compared with 2015, due to the increase in transportation and storage fees paid to the partnership segment by the agribusiness and energy services segment of $52.2 million, as well as increased intersegment marketing and corn origination fees paid to the agribusiness and energy services segment by the ethanol production segment. Intersegment eliminations of operating income remained relatively unchanged in 2016 compared with 2015.

Corporate Activities

Operating income was impacted by an increase in operating expenses for corporate activities of $16.2 million for 2016 compared with 2015, primarily due to an increase in personnel costs, an increase in transaction costs due to the acquisitions of the Abengoa ethanol plants and Fleischmann’s Vinegar and the consolidation of BioProcess Algae in the corporate activities’ segment.

Income Taxes

We recorded income tax expense of $7.9 million for 2016 compared with $6.2 million in 2015. The effective tax rate (calculated as the ratio of income tax expense to income before income taxes) was approximately 20.5% for 2016 compared with 29.1% for 2015. The decrease in the effective tax rate was due primarily to the impact of the noncontrolling interest in the partnership on the consolidated financial results, as well as a change in estimate related to our filing positions in various jurisdictions.

Year Ended December 31, 2015 Compared with the Year Ended December 31, 2014

Consolidated Results

Consolidated revenues decreased by $270.0 million in 2015 compared with 2014. Revenues were impacted by a decrease in ethanol, distillers grains, and other grains average realized prices, partially offset by increased merchant trading activity volumes of grains and the acquisition of the cattle feedlot operation in June 2014.

Operating income decreased by $225.2 million in 2015 compared with 2014 as a result of the factors discussed above, partially offset by a decrease in cost of goods sold, due to lower corn and other commodity prices. Interest expense increased by $0.5 million compared with 2014 due to higher average debt balances outstanding, partially offset by lower average borrowing costs. Income tax expense was $6.2 million in 2015 compared with $90.9 million in 2014.

The following discussion provides greater detail about our year-to-date segment performance.

Ethanol Production Segment

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

	Year Ended December 31,	
	2015	2014
Ethanol sold (thousands of gallons)	947,557	966,176
Distillers grains sold (thousands of equivalent dried tons)	2,540	2,670
Corn oil sold (thousands of pounds)	244,047	234,632
Corn consumed (thousands of bushels)	332,417	343,892

Revenues in the ethanol production segment decreased by $527.3 million in 2015 compared with 2014 primarily due to lower average ethanol and distillers grains prices, as well as lower volumes produced and sold. The average price realized for ethanol was 32% lower in 2015 compared with 2014. The ethanol production segment produced 947.6 mmg of ethanol, representing approximately 91% of daily average production capacity, during 2015. During 2015, we sold 244.0 million pounds of corn oil compared with 234.6 million pounds in 2014. The average price realized for corn oil was 21% lower in 2015 compared with 2014.

Cost of goods sold in the ethanol production segment decreased by $290.3 million for 2015 compared with 2014. The decrease is due to a decrease in corn consumption of approximately 11.5 million bushels, as well as a 10% decrease in the average cost per bushel during 2015 compared with 2014. As a result of the factors identified above, operating income for the ethanol production segment decreased by $242.3 million for 2015 compared with the same period in 2014. Depreciation and amortization expense for the ethanol production segment was $55.6 million for the year ended December 31, 2015, compared with $53.5 million during 2014.

Agribusiness and Energy Services Segment

Revenues in the agribusiness and energy services segment increased by $67.0 million and operating income decreased by $14.9 million in 2015 compared with 2014. Revenues were impacted by an increase in distillers grains, other grains and natural gas revenues, partially offset by a decrease in ethanol revenues. Distillers grains, other grains, and natural gas revenues increased as a result of increased volumes sold, partially offset by lower average realized prices. Ethanol revenues decreased as a result of lower average realized prices, partially offset by an increase in volumes sold. Operating income decreased primarily as a result of lower margins on merchant trading activity.

Food and Food Ingredients Segment

Revenues in our food and food ingredients segment increased by $190.0 million and operating income decreased by $2.2 million in 2015 compared with 2014. Revenues increased as a result of the cattle feedlot operation that was acquired during the second quarter of 2014. Operating income decreased as a result of a decrease in cattle margins.

Partnership Segment

As a result of the IPO on July 1, 2015, we contributed downstream ethanol transportation and storage assets to the partnership. Expenses related to these contributed assets, such as depreciation, amortization and railcar lease expenses, are reflected in the partnership segment. No revenues related to the operation of the ethanol storage and railcar contributed assets are reflected in this segment for periods prior July 1, 2015, the date the related commercial agreements with Green Plains Trade became effective, which impacts the comparability between periods. Revenues generated by the partnership segment from the new storage and railcar commercial agreements were approximately $36.9 million for the six months ended December 31, 2015.

Operating income for the partnership segment increased by approximately $33.0 million due to the increase in revenues above, partially offset by an increase in operations and maintenance expenses of $3.2 million for 2015, compared with the same period for 2014. The increase was primarily due to increased railcar lease expenses, wages and fuel costs associated with our partnership's trucking company, related to an increase in the number of trucks in service and locations where our partnership's trucking company does business. This was partially offset by a decrease in throughput unloading fees.

Intersegment Eliminations

Intersegment eliminations of revenues increased by $37.8 million for 2015 compared with 2014, due to the transportation and storage fees paid to the partnership segment by the agribusiness and energy services segment of $36.9 million as a result of the IPO. There were no intersegment eliminations of operating income for 2015 or 2014.

Corporate Activities

Operating income was impacted by a decrease in operating expenses for corporate activities of $1.2 million for 2015 compared with 2014, primarily due to a decrease in personnel costs.

Income Taxes

We recorded income tax expense of $6.2 million for 2015 compared with $90.9 million in 2014. The effective tax rate (calculated as the ratio of income tax expense to income before income taxes) was approximately 29.1% for 2015 compared with 36.3% for 2014. The decrease in the effective tax rate was due primarily to the impact of the noncontrolling interest in the partnership on the consolidated financial results. This was partially offset by a change in estimate related to our filing positions in various jurisdictions as well as comparable permanent differences on lower amounts of income before taxes for the 2015 period compared with the 2014 period.

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, 2016, we had $304.2 million in cash and equivalents, excluding restricted cash, consisting of $189.0 million held at our parent company and the remainder at our subsidiaries. We also had $120.8 million available under our 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, 2016, our subsidiaries had approximately $835.0 million of net assets that were not available to us in the form of dividends, loans or advances due to restrictions contained in their credit facilities.

Net cash provided by operating activities was $83.0 million in 2016 compared with $10.2 million in 2015. Operating activities compared to the prior year were primarily affected by changes in working capital and higher adjustments for deferred income tax expense in the comparable period of the prior year. Working capital increased for the twelve months ended December 31, 2016, as an increase in accounts receivable, inventories, and derivative financial instruments were partially offset by an increase in accounts payable and accrued liabilities. Net cash used by investing activities was $572.6 million in 2016, due primarily to the acquisitions of the Abengoa ethanol plants and Fleischmann’s Vinegar, along with capital expenditures at our existing ethanol plants. Net cash provided by financing activities was $409.0 million in 2016 due primarily to our issuance of $170 million of 4.125% convertible senior notes in August 2016 and a new $130 million term loan and $5 million borrowed under a new $15 million revolving credit facility to partially fund the acquisition of Fleischmann’s Vinegar. In addition, the partnership has made net borrowings of $129 million during the twelve months ended December 31, 2016, primarily to finance the acquisitions of the storage and transportation assets of the Hereford and Hopewell ethanol plants on January 1, 2016, and the Mount Vernon, Madison and York ethanol plants on September 23, 2016. Additionally, Green Plains Trade, Green Plains Cattle and Green Plains Grain use revolving credit facilities to finance working capital requirements. We frequently draw on 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 $56.4 million in 2016 for projects, including expansion projects of approximately $16.0 million for ethanol production capacity, leasehold improvements for the new corporate headquarters and various other maintenance projects. The current projected estimate for capital spending for 2017 is approximately $55.0 million, which is subject to review prior to the initiation of any projects. The budget includes additional expenditures for expansion projects at our operations, 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.

Our business is highly sensitive to the price of commodities, particularly for corn, ethanol, distillers grains, corn oil, natural gas and cattle. 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, 2016, we had $50.6 million in margin deposits for broker margin requirements. 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.

We have paid a quarterly cash dividend since August 2013 and anticipate declaring a cash dividend in future quarters on a regular basis. Future declarations of dividends, however, are subject to board approval and may be adjusted as our liquidity, business needs or market conditions change. On February 8, 2017, our board of directors declared a quarterly cash dividend of $0.12 per share. The dividend is payable on March 17, 2017, to shareholders of record at the close of business on February 24, 2017.

For each calendar quarter commencing with the quarter ended September 30, 2015, the partnership agreement requires us to distribute all available cash, as defined, to our partners within 45 days after the end of each calendar quarter. Available cash generally means all cash and cash equivalents on hand at the end of that quarter less cash reserves established by our general partner 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 23, 2017, the board of directors of the general partner of the partnership declared a cash distribution of $0.43 per unit on outstanding common and subordinated units. The distribution is payable on February 14, 2017, to unitholders of record at the close of business on February 3, 2017.

In August 2014, we announced a share repurchase program of up to $100 million of our common stock. 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. We repurchased 323,290 shares of common stock for approximately $6.0 million during the second quarter of 2016. To date, we have repurchased 514,990 shares of common stock for approximately $10.0 million under the program.

On August 25, 2016, the partnership filed a shelf registration statement on Form S-3 with the SEC, declared effective September 2, 2016, registering an indeterminate number of debt and equity securities with a total offering price not to exceed $500,000,250. The partnership also registered 13,513,500 common units, consisting of 4,389,642 common units and 9,123,858 common units that may be issued upon conversion of subordinated units, in each case, currently held by Green Plains.

On December 22, 2016, we filed an automatically effective shelf registration statement on Form S-3 with the SEC, registering an indeterminate number of shares of common stock, warrants and debt securities.

We believe we have sufficient working capital for our existing operations. A sustained period of unprofitable operations, however, may strain our liquidity making it difficult to maintain compliance with our financing arrangements. We may sell additional equity or borrow capital to improve or preserve our liquidity, expand our business or build additional or acquire existing 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

See Note 11 – Debt included as part of the notes to consolidated financial statements for more information about our debt.

We were in compliance with our debt covenants at December 31, 2016. Based on our forecasts and the current margin environment, 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.

Effective January 1, 2016, we adopted ASC 835-30, Interest - Imputation of Interest: Simplifying the Presentation of Debt Issuance Costs, which resulted in the reclassification of approximately $11.4 million from other assets to long-term debt within the balance sheet as of December 31, 2015. As of December 31, 2016, there was $16.9 million of debt issuance costs recorded as a direct reduction of the carrying value of our long-term debt.

Ethanol Production Segment

Green Plains Processing has a $345 million senior secured credit facility. The term loan is secured by twelve of our ethanol production facilities and matures in June of 2020. At December 31, 2016, the outstanding principal balance was $301.1 million and our interest rate was 6.5%. Our scheduled principal payments are $0.9 million each quarter. Available excess cash flow may be distributed to us after a quarterly excess cash flow payment is made to the lenders, subject to certain limitations, as defined in the loan agreement.

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

Agribusiness and Energy Services Segment

Green Plains Grain has a $125.0 million senior secured asset-based revolving credit facility to finance working capital up to the maximum commitment based on eligible collateral. The facility matures in July of 2019. This facility can be increased by up to $75.0 million with agent approval and up to $50.0 million for seasonal borrowings. Total commitments outstanding under the facility cannot exceed $250.0 million. At December 31, 2016, the outstanding principal balance was $102.0 million and our interest rate was 4.5%.

Green Plains Trade has a $150.0 million senior secured asset-based revolving credit facility to finance working capital up to the maximum commitment based on eligible collateral. The facility matures in November of 2019. This facility can be increased by up to $75.0 million with agent approval. At December 31, 2016, the outstanding principal balance was $125.7 million and our interest rate was 3.7%.

Food and Food Ingredients Segment

Green Plains Cattle 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. The facility matures in October of 2017. This facility can be increased by up to $50.0 million with agent approval. At December 31, 2016, the outstanding principal balance was $63.5 million and our interest rate was 2.9%.

On October 3, 2016, through certain of our subsidiaries, we partially financed our acquisition of Fleischmann's Vinegar using borrowings under a new credit agreement with a group of lenders, consisting of a term loan and a revolving loan commitment. We borrowed $130.0 million under the term loan. The term loan principal is scheduled to be repaid in installments of $325,000 per quarter beginning December 31, 2016 through September 30, 2022, with a final balloon payment of $122.2 million on October 3, 2022. The revolving loan commitment provides for principal borrowings of up to $15 million through October 3, 2022. We initially borrowed $5.0 million under the revolving loan commitment. At December 31, 2016, the outstanding principal balances were $129.7 million and $4.0 million on the term loan and revolving loan, respectively, and our interest rate on each of the loans was 8.0%.

Partnership Segment

Green Plains Partners, through a wholly owned subsidiary, has a $155.0 million secured revolving credit facility to fund working capital, acquisitions, distributions, capital expenditures and other general partnership purposes. This credit facility was amended on September 16, 2016, increasing the revolving credit facility available from $100.0 million to $155.0 million. The amended facility can be increased by up to $100.0 million without the consent of the lenders. The facility matures in July of 2020. At December 31, 2016, the outstanding principal balance was $129.0 million on the facility and our interest rate was 3.4%.

Corporate Activities

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.

In September 2013, we issued $120.0 million of 3.25% convertible senior notes due in 2018, or 3.25% notes, which are senior, unsecured obligations with interest payable on April 1 and October 1 of each year. Prior to April 1, 2018, the 3.25% notes are not convertible unless certain conditions are satisfied. The conversion rate is subject to adjustment upon the occurrence of certain events, including when the quarterly cash dividend exceeds $0.04 per share. The conversion rate was recently adjusted as of December 31, 2016 to 49.4123 shares of common stock per $1,000 of principal, which is equal to a conversion price of approximately $20.24 per share. We may settle the 3.25% notes in cash, common stock or a combination of cash and common stock.

Contractual Obligations

Contractual obligations as of December 31, 2016 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)	$ 1,174,160	$ 330,281	$ 132,408	$ 395,670	$ 315,801
Interest and fees on debt obligations (2)	215,935	58,285	87,797	47,342	22,511
Operating lease obligations (3)	115,257	35,170	42,950	16,484	20,653
Other	8,678	1,744	1,621	2,319	2,994
Purchase obligations					
Forward grain purchase contracts (4)	298,077	287,506	6,654	2,000	1,917
Other commodity purchase contracts (5)	206,352	206,352	-	-	-
Other	28,106	9,880	18,226	-	-
Total contractual obligations	$ 2,046,565	$ 929,218	$ 289,656	$ 463,815	$ 363,876

(1) Includes the current portion of long-term debt 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 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 all of our business in U.S. dollars and are not currently exposed to 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 $4.6 million per year. At December 31, 2016, we had $1.1 billion in debt, $843.8 million of which had variable interest rates.

See Note 11 – 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, distillers grains, corn oil, corn, natural gas and cattle. Corn prices are affected by weather conditions, yield, changes in domestic and global supply and demand, and government programs and policies. 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. 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. Distillers grains prices are impacted by livestock numbers on feed, prices for feed alternatives and supply, which is associated with ethanol plant production.

To reduce the risk associated with fluctuations in the price of corn, natural gas, ethanol, distillers grains, corn oil and cattle, 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 and the New York 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.

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. 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. For the year ended December 31, 2016, revenues included net losses of $2.0 million and cost of goods sold included net losses of $32.7 million associated with derivative instruments.

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, 2016, 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	1,470,000	Gallons	$ 136,768
Corn	524,000	Bushels	$ 116,325
Distillers grains	4,100	Tons (2)	$ 22,241
Corn Oil	340,000	Pounds	$ 6,547
Natural gas	41,700	MMBTU	$ 6,622

(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 income.

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 $537 thousand for grain at December 31, 2016. Our market risk at that date, based on the estimated net income effect resulting from a hypothetical 10% change in price, was approximately $33 thousand.

Food and Food Ingredients Segment

In the food and food ingredients 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 cattle, 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 purchase and sale contracts for cattle. 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 income.

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 $5.6 million for cattle at December 31, 2016. Our market risk at that date, based on the estimated net income effect resulting from a hypothetical 10% change in price, was approximately $0.4 million.

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.

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, 2016, 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, 2016, based on the Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. We completed the acquisition of three ethanol plants from Abengoa S.A. on September 23, 2016 and the acquisition of SCI, the holding company of Fleischmann's Vinegar Company Inc., on October 3, 2016 (collectively, the acquired businesses), and management excluded from its assessment of the effectiveness of the company's internal control over financial reporting as of December 31, 2016, the acquired businesses' internal control over financial reporting associated with the acquired assets which represent approximately 22% of the company's consolidated total assets and approximately 4% of the company's consolidated total revenues as of and for the year ended December 31, 2016. Our audit of internal control over financial reporting of the company also excluded an evaluation of the internal control over financial reporting of the acquired businesses.

Based on this assessment, management concluded that our internal control over financial reporting was effective as of December 31, 2016. KMPG LLP, an independent registered public accounting firm, has audited and issued a report on our internal control over financial reporting as of December 31, 2016, which is included in this report.

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. During the three months ended December 31, 2016, we acquired Fleischmann's Vinegar, resulting in process changes and, therefore, changes in internal control over financial reporting. We have not identified any other 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

The Board of Directors and Stockholders

Green Plains Inc. and subsidiaries:

We have audited Green Plains Inc. and subsidiaries' (the company) internal control over financial reporting as of December 31, 2016, based on criteria established in Internal Control – Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). 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 conducted our audit in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, 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.

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.

In our opinion, the company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2016, based on criteria established in Internal Control – Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

The company completed the acquisition of three ethanol plants from Abengoa S.A. on September 23, 2016 and the acquisition of SCI, the holding company of Fleischmann's Vinegar Company Inc., on October 3, 2016 (collectively, the acquired businesses), and management excluded from its assessment of the effectiveness of the company's internal control over financial reporting as of December 31, 2016, the acquired businesses' internal control over financial reporting associated with the acquired assets which represent approximately 22% of the company's consolidated total assets and approximately 4% of the company's consolidated total revenues as of and for the year ended December 31, 2016. Our audit of internal control over financial reporting of the company also excluded an evaluation of the internal control over financial reporting of the acquired businesses.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States), the consolidated balance sheets of the company as of December 31, 2016 and 2015, and the related consolidated statements of income, comprehensive income, stockholders' equity, and cash flows for each of the years in the three-year period ended December 31, 2016, and our report dated February 22, 2017 expressed an unqualified opinion on those consolidated financial statements.

/s/ KPMG LLP

Omaha, Nebraska
February 22, 2017

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Item 9B. Other Information.

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

Information in our Proxy Statement for the 2017 Annual Meeting of Stockholders (“Proxy Statement”) under “Information about the Board of Directors and Corporate Governance,” “Proposal 1 – Election of Directors,” “Executive Officers,” 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 “Information about the Board of Directors and Corporate Governance,” “Director Compensation” 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 “Principal Shareholders,” “Equity Compensation Plans” and “Executive Compensation” is incorporated by reference.

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

Information in the Proxy Statement under “Information about the Board of Directors and Corporate Governance” and “Certain Relationships and Related Party Transactions” 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.

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(2) Financial Statement Schedules. The following condensed financial information and notes are filed as part of this annual report on Form 10-K.

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All other 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(a)	Asset Purchase Agreement by and among Ethanol Holding Company, LLC, Green Plains Renewable Energy, Inc., Green Plains Wood River LLC and Green Plains Fairmont LLC dated November 1, 2013 (Incorporated by reference to Exhibit 2.1 of the company's Current Report on Form 8-K filed November 25, 2013)
2.1(b)	

	Amendment to Asset Purchase Agreement by and among Ethanol Holding Company, LLC, Green Plains Renewable Energy, Inc., Green Plains Wood River LLC and Green Plains Fairmont LLC dated November 22, 2013 (Incorporated by reference to Exhibit 2.2 of the company's Current Report on Form 8-K filed November 25, 2013)
2.2	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 by reference to Exhibit 2.1 to the company's Current Report on Form 8-K dated November 12, 2015)
2.3(a)	Asset Purchase Agreement, dated June 12, 2016, by and among Green Plains Inc. and Abengoa Bioenergy of Illinois, LLC and Abengoa Bioenergy of Indiana, LLC (Incorporated by reference to Exhibit 2.1 to the company's Current Report on Form 8-K dated June 13, 2016)
2.3(b)	Amended and Restated Asset Purchase Agreement, dated August 25, 2016, by and among Green Plains Inc. and Abengoa Bioenergy Company, LLC (Incorporated by reference to Exhibit 2.1 to the company's Current Report on Form 8-K dated September 1, 2016)
2.4(a)	Asset Purchase Agreement, dated September 23, 2016, by and among Green Plains Inc., Green Plains Madison LLC, Green Plains Mount Vernon LLC, Green Plains York LLC, Green Plains Holdings LLC, Green Plains Partners LP, Green Plains Operating Company LLC, Green Plains Ethanol Storage LLC and Green Plains Logistics LLC (Incorporated by reference to Exhibit 2.1 to the company's Current Report on Form 8-K dated September 26, 2016)

2.4(b) Amended and Restated Asset Purchase Agreement, dated August 25, 2016, by and among Green Plains Inc., Abengoa BioEnergy of Illinois, LLC and Abengoa BioEnergy of Indiana, LLC (Incorporated by reference to Exhibit 2.2 to the company’s Current Report on Form 8-K dated