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Our Transformation is Underway . . .

- Green Plains (GPRE) is transforming from traditional ethanol into a sustainable biorefinery platform, innovating ٠ through ag technology to produce higher-value products with stable cash flows, for tomorrow's sustainable economy
- Investments in critical technology, infrastructure and strategic partnerships are driving progress to accelerate the ٠ transformation into the Biorefinery Platform of the Future
- Our transition into highly specialized production aims to meet the world's demand for sustainably sourced products, low ٠ carbon ingredients and cleaner technologies
- **GPRE** is a \$1.5 billion¹ market capitalization and \$2.0 billion¹ enterprise value company transforming agriculture and ٠ energy supply chains





... to a Sustainable Future

Tracking our Transformation Through Milestones

Milestones Completed

- \blacksquare Partner with Novozymes in protein production
- ☑ Ultra-High Protein production begins at Shenandoah biorefinery
- \blacksquare Complete \$75 million loan facility
- ☑ Breaks ground at second high protein project at Wood River biorefinery
- \blacksquare Sell Cattle for \$80 million
- \blacksquare Form exclusive partnership with Hayashikane
- \blacksquare Complete sale of Hereford and Ord plants
- Acquire majority stake in Fluid Quip Technologies with Ospraie and BlackRock
- ☑ Completes York USP Upgrade
- \blacksquare Announce Clean Sugar project at York Innovation Center
- ☑ Partner with funds and accounts managed by BlackRock to provide financing to fund transformation plan
- ☑ Announce carbon sequestration partnership with Summit Carbon Solutions
- ☑ Complete concurrent offerings of common stock and convertible senior notes due 2027 (Fully funded)

Key Milestones

- Announce Fagen, Inc. as general contractor to accelerate protein construction
- Announce construction sequence and begin MSC rollout across platform
- □ Begin Clean Sugar production at York Innovation Center
- Begin Ultra-High Protein production at Wood River, further developing recurring earnings and cash flow
- □ Complete Project 24, reducing costs and carbon footprint
- □ Complete GNS upgrade at York and USP upgrade at Wood River
- Commercial agreements for 58%+ Protein, moving up "J-curve" for margins
- Achieve 60%+ Ultra-High Protein production
- Commercialize MSC protein technology to third-party plants
- Select and begin conversion to Clean Sugar Technology, first "Biorefinery Platform of the Future"
- Develop new innovations in proteins, yeasts, oils, aquafeed, and clean sugar
- Develop strategic partnerships aligning with Green Plains 2.0
 - Begin carbon sequestration pipeline construction
- \Box Begin sequestering carbon, reducing CI of biorefinery platform



We Have Created a Powerful Ag Tech Platform

Acquisition and partnerships accelerate technology deployment



- The company owns significant intellectual property and is one of the only commercially proven sustainable ultra-high protein technologies for dry mill production facilities
- Successful operational track record: proven deployment of technologies with notable existing engagements has led to consistent growth
- Enables Green Plains to accelerate their transformation and allows the Company to focus on higher value proteins and clean sugars
- Supported by a wide patent portfolio with more patents pending





The partnership forms a powerful ag tech alliance to focus on innovation, value-added opportunities and sustainability

BlackRock

- Drives acceleration of transformation through access to new strategic partnerships and customers on a global scale
- Leverages Green Plains' scope and scale to create value-added opportunities in key ingredients, redefining investment in biorefining industry world-wide
- Provides further validation of Green Plains' strategy and helps to accelerate sustainable ultra-high protein and clean sugar technology deployment



Introducing the Biorefinery Platform of the Future



Our acquisition of Fluid Quip Technologies, combining exclusive partnerships with BlackRock & Ospraie



Aligned with experts to maximize value across various product lines

Our biorefineries' role in whole kernel solutions

- Fluid Quip provides the cornerstone technology for our sustainable transformation, creating a powerful ag tech platform
- Transforms the commodity into its most valuable components proteins, oils, sugars
- Integrated with key technology players through exclusive partnerships to drive a collaborative transformation of our business
- Production of higher protein with better renewable corn oil yields, optimizing valued components



Upgrade to sustainable protein technology across the platform providing valueadded ingredients and expanded corn oil production



Deploy technology, to provide industrial sugars for use in ag tech, biotech and synthetic biology markets

Carbon Capture and Sequestration



Initiative to reduce carbon intensity for biofuel and ingredients with option to coinvest in the pipeline, further benefiting from project economics

Five Main Verticals in Addition to 1.0 Platform

- **Sustainable Ultra-High Protein** sustainable ingredients for high-value global markets in pet, aquaculture, dairy and poultry industries
- **Renewable Corn Oil** low carbon feedstock for high-growth renewable diesel industry
- Specialty Alcohol high purity alcohol for use in cleaners, sanitizers, disinfectants and beverage industries
- **Clean Sugar Technology** clean glucose and dextrose for a variety of biochem, bioplastics, synthetic biology, and food industries
- **Carbon Capture & Sequestration** building one of the largest carbon capture and storage (CCS) platforms in the world through the recently announced relationship with Summit Carbon Solutions (SCS)





Protein Drives a Transformation Inflection Point ...

- As Ultra-High Protein is deployed, our platform transitions to higher gross margins, even prior to potential uplift from ٠ the J-curve
- Over 50% of platform is anticipated to be converted by mid 2022
- Platform transitions to double digit gross margin %
- At capacity, Ultra-High Protein adds ~\$140 million of additional gross margin by 2024 at \$0.15/gallon
- At capacity, each \$0.10 / lb uplift in renewable corn oil pricing adds ~ \$40 million
- Specialty Alcohol, Clean Sugar Technology and Carbon Capture and Sequestration can further enhance Gross Margins
- With moderate uplift from specialty alcohol, CST and CCS, gross margins could well exceed 14% •



Protein and Corn Oil Drive Gross Margin





... Toward Our 2024E* Run-Rate EBITDA



Assumptions

- Assets produce at 95% of capacity on 958 MGY of capacity
- Potential contributions from fuel ethanol business excluded

Sustainable Ultra-High Protein

- Protein capital investment of ~\$400M based on 11 ethanol plants, with ~\$340M remaining to be spent
- Protein crush margin uplift for base of \$0.15 per gallon for 50% pro and upside of \$0.21 per gallon for 53% pro, with potential to go higher
- Higher renewable corn oil yields at historical pricing is part of structural advantage of MSC technology and included in protein uplift

Renewable Corn Oil

- Increased pricing of \$0.10 per pound to \$0.45 with upside of \$0.20 per pound to \$0.55, with potential to go higher
- Renewable corn oil capacity increased by 50% to ~396 million pounds through deployment of sustainable Ultra-High Protein technology

Specialty Alcohol

Premiums to fuel ethanol of ~ \$0.66 per gallon for base with upside of \$1.00 per gallon 75 MGY of specialty alcohol capacity

Clean Sugar Technology

- Clean Sugar Technology capital investment of ~ \$1.00 per gallon of capacity converted
- Base assumes 55 MGY of capacity converted to CST with \$0.67 per gallon uplift
- Upside assumes 150 MGY converted to CST with 0.67 per gallon uplift

Carbon Capture and Sequestration

- ***Beginning in 2025**, CO₂ offtake of 658 MGY of capacity with Summit Carbon Solutions pipeline at \$0.15 per gallon before carbon credits with base assuming 50% online, and Upside assuming 100% online by end of 2024
- Opportunity to add carbon sequestration at remaining 300 MGY of capacity and the right to invest directly in the development company allow for potential additional upside

Sustainable Ultra-High Protein – Our New Product

Product Advantages

- Flexible protein concentration starting at 50%
- Animal free source: vegetable (75%) and fungal (25%)
- Cornerstone ingredient for developing new feed rations, freedom of formulation
- High digestibility and additional species-specific benefits improving animal health and performance

Continuous Product Development and Partnership Advantages

- Improved product characteristics through yeast enhancement
- Ongoing targeted removal of anti-nutritional factors
- Direct application into specialty feeds and premixes through innovative aquafeed solutions
- Value multiplier through combinations with other proprietary technologies developed through Optimal Aquafeed and strategic partnerships like Hayashikane





Protein Technology Generates Structural Uplift

Sustainable Ultra-High Protein

• Biorefinery economics see significant improvement

- Base Ultra-High Protein at 50% is valued at ~ 2.5x distillers grains values, driven by traditional relationship between corn and soybeans.
- Ultra-High Protein is an ideal high-value product for pet, dairy, poultry and aquafeed rations.
- Distillers Dried Grains (DDGS) historically price at corn-parity values, whereas MSC Protein prices at a premium, undergirded by 48% protein soybean meal prices
- Fluid Quip's MSC is the market leader for protein upgrading technologies, providing end product and capital efficiencies
- Upon completion, Green Plains would produce ~ 0.6 million tons of Ultra-High Protein, assuming 3.5 pounds / bushel production
- The entire 17 billion gallon industry would only convert ~ 10 million tons annually of DDGS to Ultra-High Protein – less than 3% of the 350 mmt global protein meal market
- Fluid Quip's MSC also results in up to 50% increase in renewable corn oil yields, further demonstrating the value of this technology





Renewable Corn Oil (Renewable Diesel Input)

Renewable Corn Oil Demand Growth

Driven by sustainability initiatives, renewable corn oil volumes are growing exponentially with renewable diesel

Global Renewable Diesel Demand (MGY)



California Annual Diesel Demand Forecast





Taking Advantage of the Unique Drivers in Renewable Corn Oil

Corn Oil EBITDA								Corn Oil EBITDA per Gallon										
Pounds per bushel								Pounds per bushel										
	0.8 1.0			L. O	1.2		1.4		1.6				0.8	1.0	1.2	1.4	1.6	
ice per pound	0.25	\$	34	\$	42	\$	51	\$	59	\$	68	ice per pound	0.25	\$0.035	\$0.044	\$0.053	\$0.062	\$0.071
	0.35	\$	60	\$	75	\$	90	\$	105	\$	120		0.35	\$0.062	\$0.078	\$0.094	\$0.109	\$0.125
	0.45	\$	86	\$	107	\$	129	\$	150	\$	171		0.45	\$0.089	\$0.112	\$0.134	\$0.157	\$0.179
	0.55	\$	112	\$	139	\$	167	\$	195	\$	223		0.55	\$0.116	\$0.146	\$0.175	\$0.204	\$0.233
	0.65	\$	137	\$	172	\$	206	\$	241	\$	275		0.65	\$0.143	\$0.179	\$0.215	\$0.251	\$0.287
Ρ	0.75	\$	163	\$	204	\$	245	\$	286	\$	327	\mathbf{Pr}	0.75	\$0.170	\$0.213	\$0.256	\$0.298	\$0.341

- Fluid Quip's MSC protein technology enhances renewable corn oil yields, delivering a sustainable structural advantage over Green Plains 1.0
- Increase in renewable corn oil pricing driven by growth in renewable diesel production
- Each \$0.10 per lb. increase in renewable corn oil price represents a lockstep ~\$40M renewable corn oil EBITDA increase with planned production capacity expansion to 1.2 lbs. / bu.
- Upside to renewable corn oil pricing is 100% incremental margin as it is part of the core product process in ethanol production

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Renewable Corn Oil

A Sustainable Low Carbon Feedstock for Renewable Diesel

- Corn Oil's lower CI puts it at an advantage relative to the majority of competing feedstocks
- As an inedible waste oil, increased production of corn oil can be achieved without expansion of cropland acreage
- As Renewable Diesel overtakes Biodiesel in LCFS markets, we believe the low CI value of corn oil will translate into a premium to competing veg oils

Average CI Pathways for Biodiesel and Renewable Diesel Feedstock



Source: California Air Resources Board, Company Analysis of CARB pathways

Creating Value Through Protein Innovation

J-Curve of Protein Opportunity





¹Value per ton of protein is based on underlying Dried Distiller's Grain (DDG) of \$150 per ton and should be adjusted based on current DDG values. ²Upon reaching redundant scale and moving through commercial contracting year

Premium High-Purity, Specialty Alcohol

Industry Update

- Consumer demand for sanitizers and disinfectants has vastly accelerated with the ongoing COVID-19 pandemic and heightened consumer awareness of infection prevention
- Specialty alcohol demands are more sustainable and expected to be more permanent as increased cleaning and hand sanitizer use becomes increasingly normal

Green Plains Initiatives

- Green Plains expects specialty alcohol to provide stable free cash flow due to positive underlying trends
- York now produces United States Pharmacopeia (USP) grade alcohol with an annual capacity of 50 MGY, and is reviewing the timing to upgrade to Grain Neutral Spirits (GNS)
- Upgrading to GNS alcohol production at York would enable use in both pharmacy grade alcohol and beverage alcohol
- Long term trend, customers will be selective in quality leading to a sustainable advantage for Green Plains

US Annual Sales of Cleaning Products (\$bn)



Clean Sugar Market

- New sugar demand growth is being driven by biology focused companies who use sugar as a feedstock for their bio-processes
 - Increased penetration of bio-based processes drives additional 'sugar' needs of 7-14 billion pounds
 - Growing demand for fermentation to produce a variety of products without petroleum additives requires dextrose / glucose
- FQT is engineering and constructing a fully scalable commercial CST production facility at the York Innovation center
- CST uses proprietary separation equipment and systems to produce multiple specification, purity sugars to meet any customer's needs
 - CST produces an equivalent sugar quality to that of a wet corn mill process, with a production cost advantage and up to ~50% reduction in the carbon footprint
 - Able to expand industrial glucose capabilities at a fraction of building a new wet mill and produce at lower operating costs



Specialty Chemical and Material Markets Requiring Glucose / Dextrose Total Addressable Market of \$450 billion



Specialty Polymers ~8% of market



Surfactants ~6% of market



Catalysts ~5% of market



Construction ~8% of market



Flavors / Fragrances ~5% of market



Oilfield Chemicals ~5% of market



Ind. Cleaners ~7% of market



Specialty Coating ~5% of market



Food Additives ~4% of market



Electronics ~7% of market



Water Soluble Polymers ~5% of market



Plastic Additives ~4% of market



Carbon Capture and Sequestration Initiatives







Opportunity to increase margins by \$0.15 / gallon with no capital required from the ethanol facilities, in addition to potential for carbon credits, 45Q tax incentives and direct returns on investments in the pipeline and Summit Carbon Solutions (SCS)

	• Green Plains provides SCS with plant carbon dioxide for 12 years for an estimated ~658 MGY of capacity
Partnership	 Green Plains annual commitment is estimated to be ~1.9 million metric tons of carbon dioxide, the same amount of carbon sequestered by 2.3 million acres of U.S. forests in a year, according to the EPA.
	 SCS is responsible for pipeline construction, operation, carbon dioxide sequestration and all reporting requirements
	Pipeline expected to begin operation in late 2024
Partnership Details	 CCS should result in attractive low CI ingredients, furthering the sustainability appeal of renewable corn oil, sustainable Ultra-High Protein and clean sugars produced at these locations
	• Green Plains has the option to acquire additional ownership in the development company, resulting in a pro-rata incremental return on all carbon dioxide contributed to the pipeline from other facilities
Direct Inject	• Additional margin opportunity exists through standalone projects at the three remaining Green Plains biorefineries

Fully Funded Protein Transformation

(\$ in millions)	Mar-21	Changes	Proforma
Cash, cash equivalents & restricted cash	\$654.4		\$654.4
Debt ¹			
4.125% convertible notes due 2022	34.3		34.3
4.000% convertible notes due 2024	115.0	(51.0)	64.0
2.250% convertible notes due 2027	230.0		230.0
MSC project financing ²	155.0		155.0
Short-term notes payable & other	174.1		174.1
Green Plains Partners credit facility	62.8		62.8
Other	2.2		2.2
Total Debt	773.4	(51.0)	722.4
Total stockholders' equity	920.5	51.0	971.5
Total Capitalization	\$1,693.9	-	\$1,693.9

- **Green Plains is fully funded** to deploy Fluid Quip's MSC protein technology & corn oil upgrades across our full platform
- Green Plains capital structure has been greatly simplified with a ~43% reduction in total debt as of March 31, 2021 from previous 2017 levels

Recent Financings and Transactions

- \$201 million equity offering
- \$230 million convertible notes due 2027
 - Proceeds used to redeem approximately \$136 million of 2022 convertible notes
- \$125 million mezzanine notes with BlackRock
- \$64 million plus working capital for Ord, Neb. plant sale
 - \$27 million for storage and transportation assets used to reduce debt on Green Plains Partners revolving credit facility
- \$51 million 2024 convertible note exchange for ~ 3.6 million shares

A Real ESG Story

Carbon Capture and Sequestration (CCS)

- **Zero Carbon Footprint** With an opportunity to meter and sequester carbon, Green Plains can lead a zerocarbon footprint for the renewable fuels industry, creating one of the largest projects globally
- *Lower CI Scores* Biofuels from plants with CCS comparable to other low CI fuels such as renewable diesel and Brazilian sugar cane
- **LCFS Programs** Expanded market opportunity as LCFS programs spread to other states and countries, demand for low CI fuels can be supplied by Green Plains

MSC (Protein & Corn Oil) Technology

- Lower Carbon +50% Increased Distillers Corn Oil (DCO) recovery –feedstock for production of renewable diesel and biodiesel end markets
- *Lower Transportation Costs* Shipping a concentrated corn protein end- product vs whole kernel or traditional DDGS reduces shipping costs and carbon footprint
- Lower Land Use Corn-based protein solutions reduces deforestation no need to plant additional acres
- *Reduce Stress of Oceans* Reduce reliance on fishmeal in aquaculture diets, lowering stress on ocean ecosystems
- Lower Emissions Reduced BTUs per gallon of ethanol produced
- **Further Sustainability** Zero Carbon Intensity (CI) high protein production possible by reclaiming ring dryer vapors

Clean Sugar Technology

- Lower Carbon Reduced CI to produce sugar from dry mill relative to a wet mill
- Lower GHG Sugars can be used in protein production such as plant-based burgers
- **Sustainable and Renewable** Carbon used in green chemical production is derived from sustainable corn sugars vs carbon from petroleum

Project 24

- *Lower Energy* Installation of Project 24 technology reduces gas use by 20% and power use by 20%
- *Higher Efficiency* Lowers overall operating cost in terms of chemical use by 15%, water requirements by 10%, and increases renewable corn oil recovery by 10%

Measuring Our Global Impact





Meet the world's growing food and dietary protein demands with ultra-high protein, plant-based feeds



Reduce the need to feed animals to animals and overfish our oceans



Improve the food system to be more secure with healthier livestock and aquacultures



Reduce need to further deforest land for agricultural purposes by using corn sustainably farmed and sourced locally





Investment Highlights

Fully Funded	 Strong balance sheet with ample liquidity to execute our strategy Fully funded implementation of MSC Ultra-High Protein technology across the platform
Sustainable Ag Tech	 Fluid Quip owns a significant disruptive IP portfolio that adds value to several ag processing disciplines Technology in higher value proteins and clean sugar are "game changers" for Green Plains' portfolio Diversify products into more stable and valuable margin streams, reducing reliance on biofuels Technology helps build a structural advantage in renewable corn oil to provide feedstock to the growing renewable diesel industry
ESG Focused	 Transforming to be a world class provider of sustainable Ultra-High Protein, renewable corn oil and novel feed ingredients, and closed loop and sustainable biofuels with a focus on lowering the carbon footprint Carbon capture and sequestration project supports lower carbon intensity for our biorefinery platform
Innovation & Higher Margin Opportunity	 Control of technology enables development and monetization of high value, on trend technologies Cultivating strategic partnerships to help drive innovation across our platform – Ultra-High Protein with a "J-curve" opportunity for higher margins York Innovation Center and Shenandoah Aquaculture Center allow for development and validation of new solutions with key customers and continued creation of game changing IP

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Glossary

- **BOS** Brix Oil Separation System
- **CCS** Carbon Capture and Storage
- **CI –** Carbon Intensity
- **CST** Clean Sugar Technology
- **DDG** Dried Distillers Grains
- **FQT** Fluid Quip Technologies
- **GPRE** Green Plains Inc.
- **GNS** Grain Neutral Spirits
- GPP Green Plains Partners
- LCFS Low Carbon Fuel Standard
- **MGY** Million Gallons per Year
- **MSC** Maximized Stillage Co-Products
- **SCS** Summit Carbon Solutions
- **USP** United States Pharmacopeia



