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Nebraska advanced biofuel opportunities utilizing grain sorghum as a feedstock

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ABENGOA BIOENERGY

Objectives

Abengoa Bioenergy believes that to be in position for long term success in the ethanol industry, it is critical for a project to have maximum logistical flexibility, proximity to end users, a strong commitment to developing technology, and a low cost advantage that must be sustainable throughout the life of the facility.

To that end, we have considered the existing Abengoa first generation ethanol production sites and project development options associated with each. We believe that the existing Ravenna site in Buffalo County meets all of our objectives and offers the best chance of success as an advanced biofuel formulation. This presentation is intended to communicate an outline of the information on which we base our conclusion and a summary of the project attributes that make this project so attractive.



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Abengoa bioenergy overview

Abengoa's intent is to expand upon our established expertise in the ethanol industry and modify one or more of the existing first generation (1G) plants, currently utilizing corn starch/grain, and transitioning those plants with milo sorghum as a sustainable feedstock for the 1G plant(s) on a go-forward basis.



To accomplish such goals, Abengoa Bioenergy will incorporate expertise from outside entities such as research institutions, business co-operatives, and agricultural boards. The Nebraska and National Sorghum Boards have each committed the full extent of their available resources in assisting Abengoa Bioenergy in making this conversion of the Ravenna operation.

Abengoa Bioenergía, S.A. ("Abengoa Bioenergy") is a wholly-owned subsidiary of Abengoa S.A. and the principal arm of Abengoa's bioenergy business. It is currently an international leader in ethanol production and bio-fuel research.

- ✓ #1 ethanol producer in Europe; ethanol sold in Spain, Germany, Brazil, Sweden and France.
- ✓ #6 ethanol producer in the US (currently).
- ✓ Dedicated research and development group with in-house engineers and scientists focused on the development of leading edge processing technology for ethanol production and co-products.
- ✓ Approximately \$1 billion invested to date in US ethanol production assets
- ✓ Approximately \$300 million invested in biomass-to-ethanol technology
- ✓ Total US employment in Abengoa Bioenergy exceeds 400 people
- ✓ Each new project provides ~ 10 - 20 new jobs over the existing 60 local positions with a direct added plant payroll of ~\$1 to \$2 million each year
- ✓ Indirectly sustains over 1,400 local jobs at each facility
- ✓ Currently, Abengoa Bioenergy owns and operates six ethanol plants in the U.S. (nearly 400 MMGPY of installed capacity), two plants in Brazil, and also operates and majority-owns six ethanol plants in Europe (a total exceeding 400 MMGPY of installed capacity). Total installed capacity for all plants worldwide exceeds 800 MMGY.

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Project overview

Abengoa Bioenergy of Nebraska, LLC, ("ABNE") is proposing to modify its 92 million gallon per year ("MMGPY") dry mill ethanol facility in Ravenna, Buffalo County, Nebraska (the "Project"). The site selected to develop this project was chosen based on the following issues:

- ✓ Based on EPA's decision to recognize milo sorghum as an "advanced biofuel".
- ✓ Existing milo market in NE.
- ✓ Significant "transitional" acres available for milo growth.
- ✓ Flexibility of milo crop growth under various weather and soil conditions.
- ✓ Existing utility and logistics services.
- ✓ Strong local support and incentives.



The Project's construction is planned to commence in Q4 2013/Q1 2014 and is expected to be completed in Q2/Q3 2014. This schedule is preliminary and subject to change.



The Project provides significant advantages to the State of Nebraska over other potential ethanol projects on a few key points:



- ✓ The Project is positioned to expand in the future, continuing Nebraska's growth as a major exporter of ethanol and distillers grains.
- ✓ The Project includes supporting the growing E85 needs of Nebraska, as Abengoa is already doing in other states (in Texas with GM and Kroger).
- ✓ Abengoa Bioenergy's significant commitment to R&D technologies will ensure that the Project and Nebraska will be at the leading edge of ethanol technology.

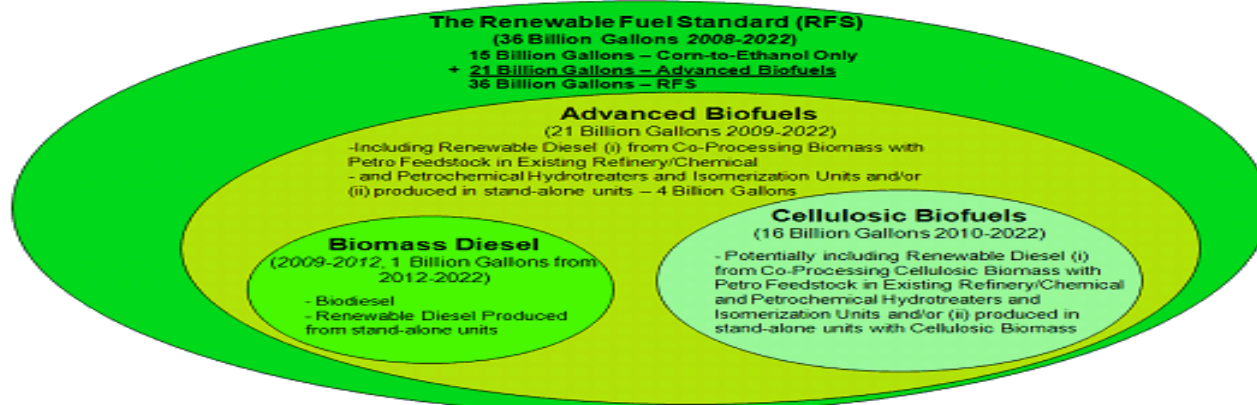
Milo:

Milo is a major crop in the U.S. grown primarily in the Midwest. Yields continue to increase over time as more milo acres are planted and genetics continue to improve. Livestock and poultry feeding makes up over half of the U.S. market consumption.

Ethanol:

Although the ethanol industry has several large participants, the industry is highly fragmented with many small, independent firms and cooperatives. Ethanol production tends to be concentrated in the Midwest due to close proximity to feedstock supplies, while demand is primarily on the east coast, west coast and the Midwest, where concerns about air pollution and MTBE effect receive higher scrutiny.

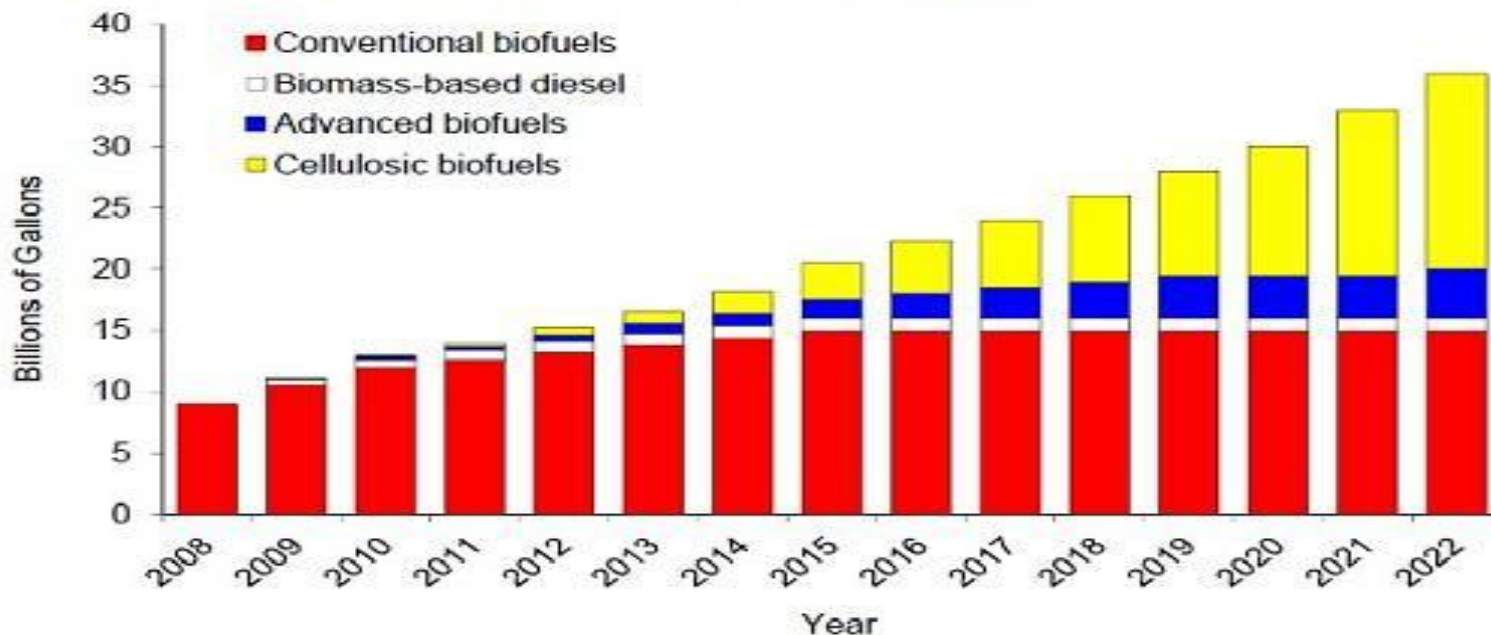
New Renewable Fuel Standard Law



Source: Michael McAdams, Advanced Biofuels Coalition and Mark Riedy, Andrews Kurth

Based on formal approval from EPA, milo grain sorghum qualifies as an “advanced biofuel”, one of the four biofuel categories (denoted below in the chart) designated by EPA to meet the 36 billion gallon Renewable Fuel Standard (RFS) by 2022. The greenhouse gas (GHG) evaluation and petition process reviewed by EPA, addressed the full complement of GHG reductions.

The Renewable Fuel Standard Consumption Mandate



Source: National Academy of Sciences

Various options exist whereby conventional corn-based ethanol plants can modify operations to qualify for advanced biofuel production as long as certain technologies are incorporated as part of this transition to running grain sorghum feedstock.

One of the largest challenges to the success of grain sorghum as an advanced biofuel is its incorporation on a large-scale basis supporting an ethanol operation, as a row crop in the United States.



To compete with longstanding corn-corn or corn-soybean crop rotations as are the common practices in the Midwestern United States, presents a significant challenge for a number of reasons.

- Seed companies invested heavily in corn industry to “perfect” the seed
- Genetic developments favoring herbicide tolerant corn and soybean seed
- Corn displays a slight advantage when getting to full maturity
- Corn industry has grown proportionally to the ethanol industry, furthering seed advancements

To avoid the issues previously discussed, identifying a geographical location whereby sorghum can be grown without displacing row crop corn, would be highly advantageous.

Ravenna offers this opportunity as a recent evaluation conducted by Ceres, Inc., on behalf of Abengoa Bioenergy in 2011, identified the availability of more than 2 million acres of herbaceous grasslands.

This categorization is exclusive of grazing pastureland or CRP acres and currently has no cropping activities, except hay baling acres.

While a good portion of this land categorization is steep slope areas whereby combining activities would not be feasible, what makes this land non-viable for crop usage is the sandy soil composition. This however, in many cases, should not be an obstacle for sorghum growth as grain sorghum, and the many hybrids that have been developed in recent years, can thrive in these less desirable soil conditions. Numerous visits to Buffalo County and its surrounding region confirm such land classifications are in abundance. Issues to consider as part of a milo planting program:

Crop Rotation

Cover Crops

Biomass Potential

Soil Quality/Composition (% sand, N/P/K Balance, Water Holding Capacity)

No-Till Management

Non-Irrigated Sections

Seed Supply/Optimal Hybrids

Double-Cropping

Stalk Height/Cuts

Adequate Grain Storage



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Project details

Project Description:

ABNE is an existing 1G corn-based ethanol project located in Buffalo County, Nebraska. The plant is located near the high corn producing counties in western central Nebraska. The facility will consume 32 million bushels of milo per year

Site:

The existing site encompasses 201 acres and is located one mile north of intersecting roadways Highway 2 and Navaho Road in Ravenna, NE. Interstate highway I-80 is within 25 miles of the facility. No property purchases would be required to modify the plant.

Production:

The Abengoa Bioenergy of Nebraska, (ABNE) plant in Ravenna, Nebraska is designed to produce 92 million gallons per year of fuel alcohol from corn, utilizing wet and dry milling processes.



Distillers Grains:

DDGS and/or DWGS have entered the markets from the Ravenna plant since 2007. Abengoa Bioenergy Trading (ABT) will market the Project's DDGS and DWGS. ABT currently markets DDGS and DWGS produced by Abengoa Bioenergy's five other ethanol plants in the US. Additionally, based on the advanced research conducted by Kansas State and Texas A & M universities, there are a number of potential value-added products to consider.



The Project has land availability to accommodate needed milo production

- ✓ Nearly 300,000 acres of milo sorghum would be necessary to accommodate current ethanol production levels

The Project can pursue an aggressive schedule to market

- ✓ Preliminary plan to be starting production by Q3 2014. All of this benefits the state of Nebraska and the community, generating revenue and creating jobs sooner than other similar projects.

The Project will benefit the Central Nebraska Region

- ✓ New jobs created directly and indirectly.
- ✓ ABNE will seek to work with as many local companies as possible, both during construction and operation.



The Project will benefit Nebraska more than a typical ethanol plant

- ✓ The Project includes supporting the growing E85 needs of Nebraska, and potential growth opportunity for E15 on a national basis
- ✓ Potential value-added products from the grain sorghum process
- ✓ The grain sorghum crop can serve a multi-use function for the operation and provide a multiple income source for landowners when the biomass (stalk/stover) component of the milo is considered as part of this process and utilized as feed for the biomass boiler.
- ✓ The biomass component of the project will serve as a strong foundation to add a potential second generation cellulosic conversion plant to the Ravenna operation in the future.

- ✓ **Cropping Systems – Economic & Technological**
- ✓ **Agronomic/Crop Protection & Optimization**
- ✓ **Grain Variety Selection**
- ✓ **Input Cost Identification**
- ✓ **Market Growth**
- ✓ **Field Trial Program**



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Thank you!!



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