The Future is Now for Cellulose Ethanol

USDA-ERS Biofuels Modeling Workshop
Washington, DC

February 27, 2007

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Our Challenge

- **Global Warming**
  - The debate is over. It is the issue.
- **Dependency on Foreign Oil**
  - "For too long our nation has been dependent on foreign oil…it is in our vital interest to diversify America's energy supply."

    President George W. Bush, 2007 State of the Union
- **35 Billion Gallons by 2017**
  - The vision is clear.

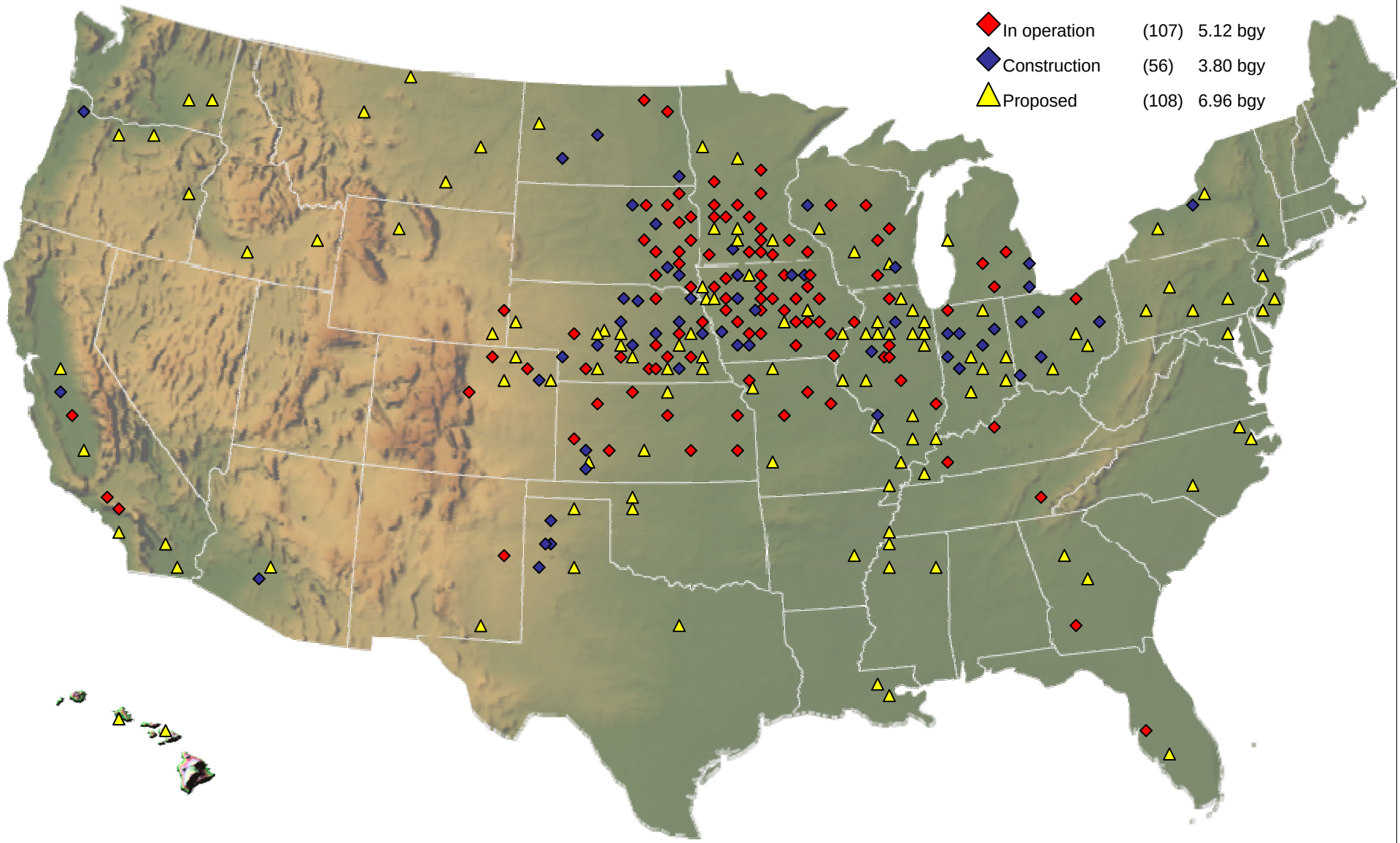
Why Cellulosic Ethanol?

- Corn-to-ethanol provided the foundation for the ethanol industry
- Joint study by the USDA and DOE concluded that the U.S. could produce 60 billion gallons of ethanol by 2030
- Opportunity to utilize the existing corn to ethanol infrastructure to accelerate cellulose ethanol production

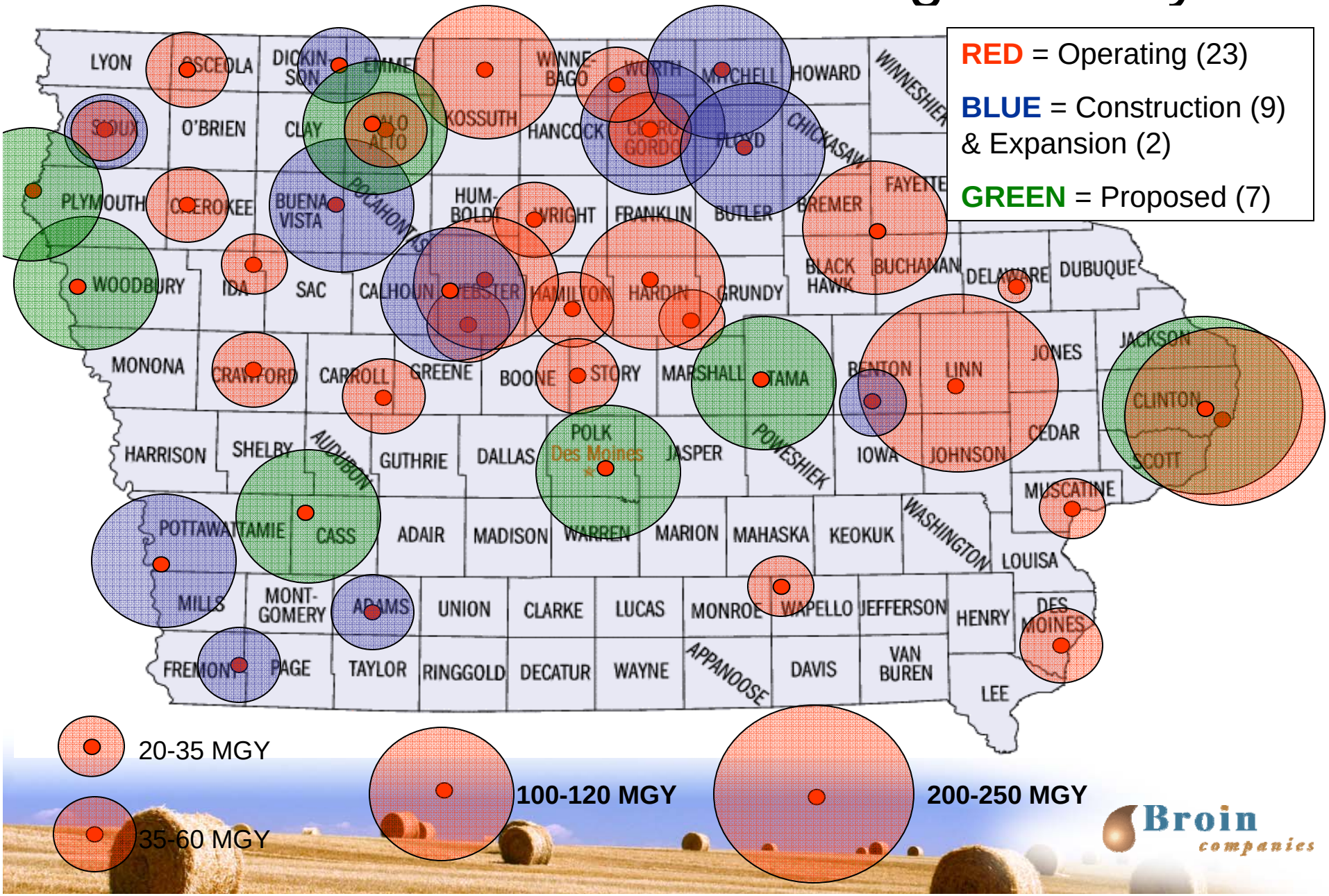
NCGA
www.ncga.com

U.S. Ethanol Plants

AS OF: November 2006



Corn to Ethanol Reaching Maturity



Corn Biomass Advantages

- Consistent crop acreage to meet competing demand
- Continued improvements in crop biotechnology
- Established cropping practices
- Soil quality maintenance considerations understood
- Opportunity to coordinate with farm and energy policy

Why Broin?

- Extensive corn to ethanol infrastructure
- A technology provider committed to research collaborations with world-class leaders.
- Broin is about innovation and integration.
- Defining the future by building the first biorefinery of its kind to produce ethanol from stover and fiber.

BROIN COMPANIES PREMIER PARTNER PLANTS

MAP LEGEND

- = Plant In Operation
- = Plant Under Construction

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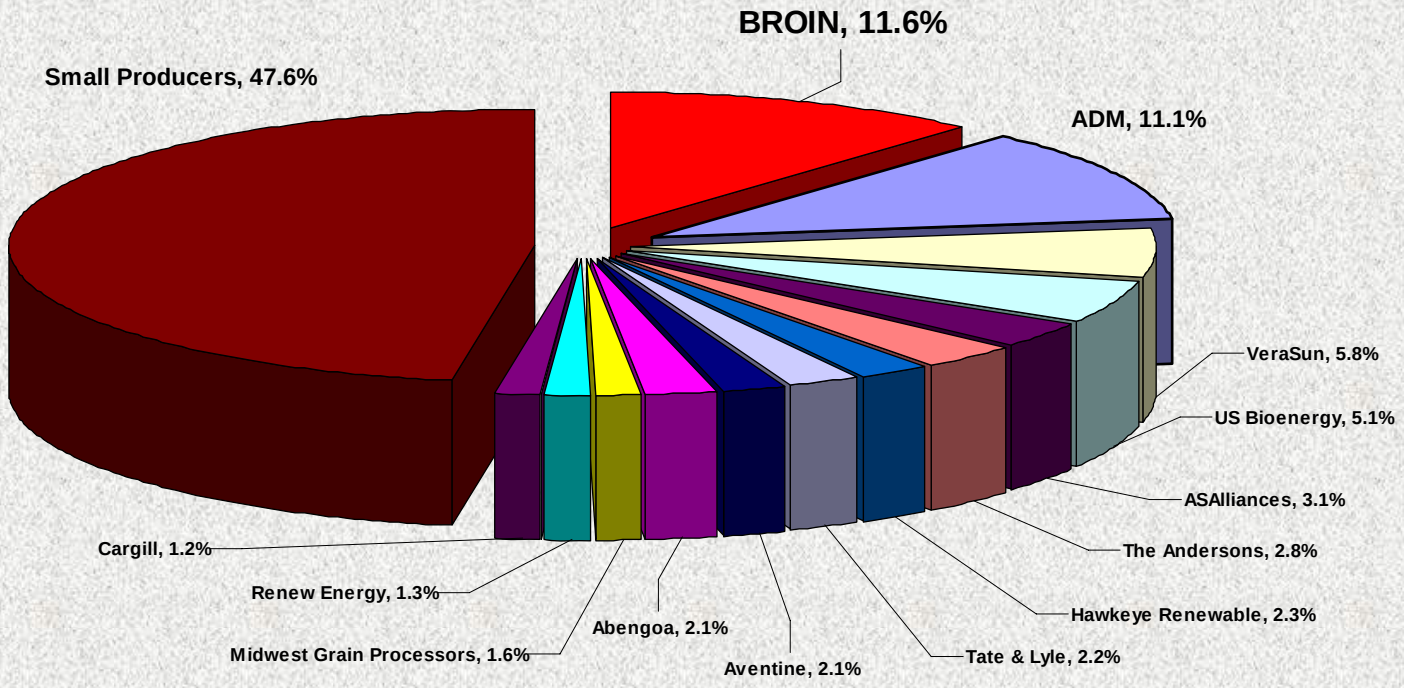
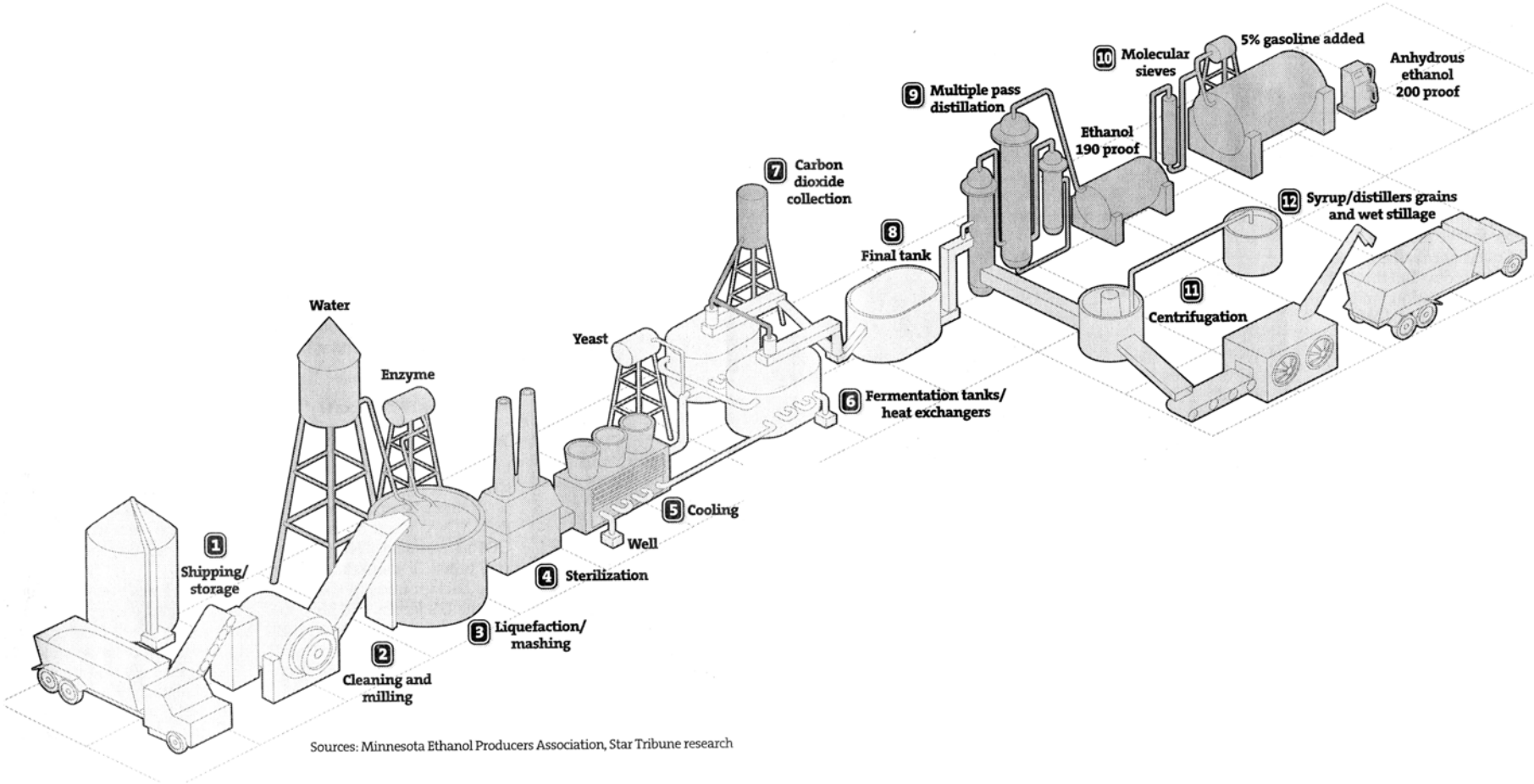
ETHANOL. BIOREFINING. LEADING THE REVOLUTION

US Ethanol Market Share

Including Plants Under Construction
November 2006



How Ethanol is Made



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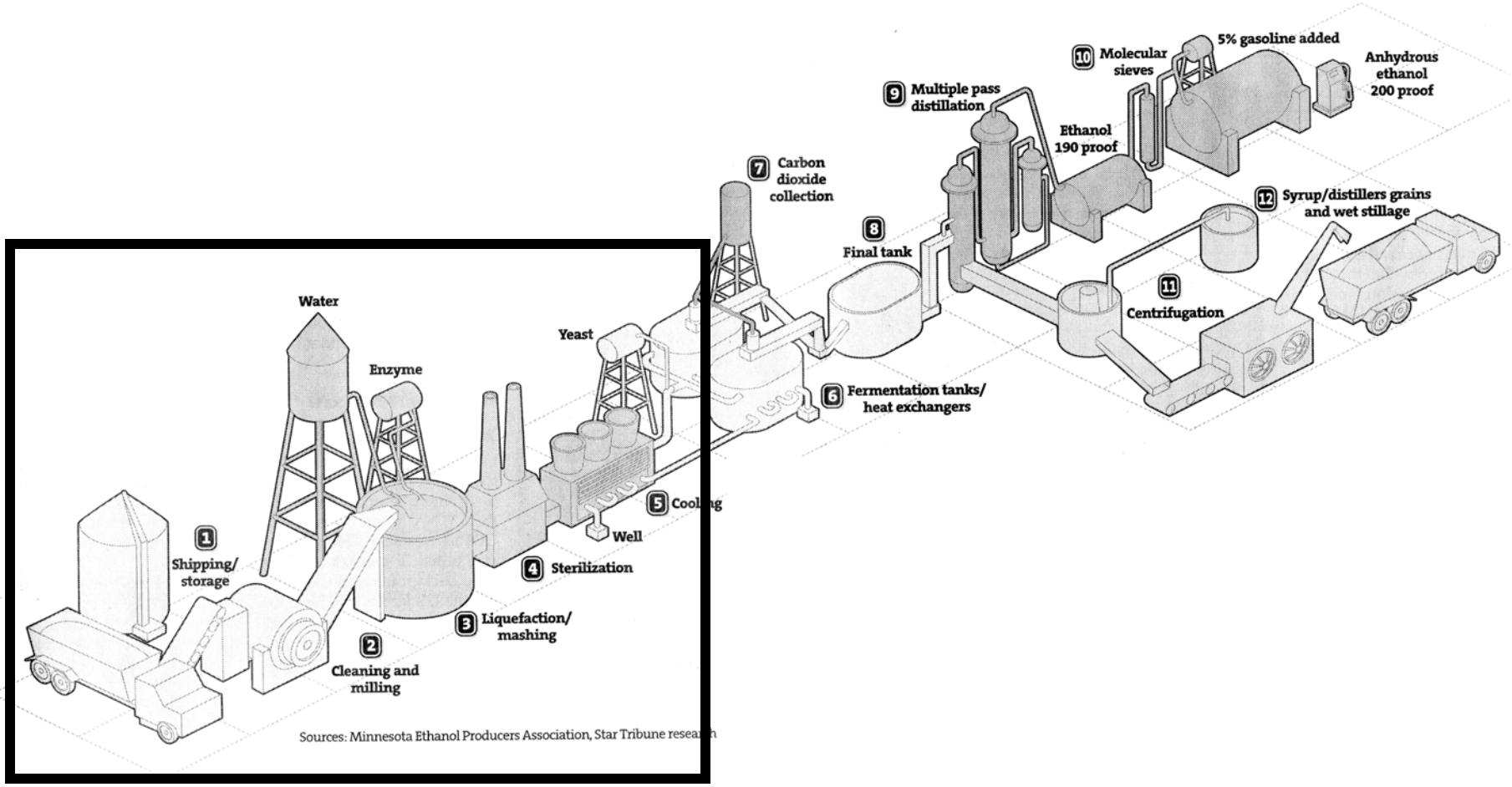
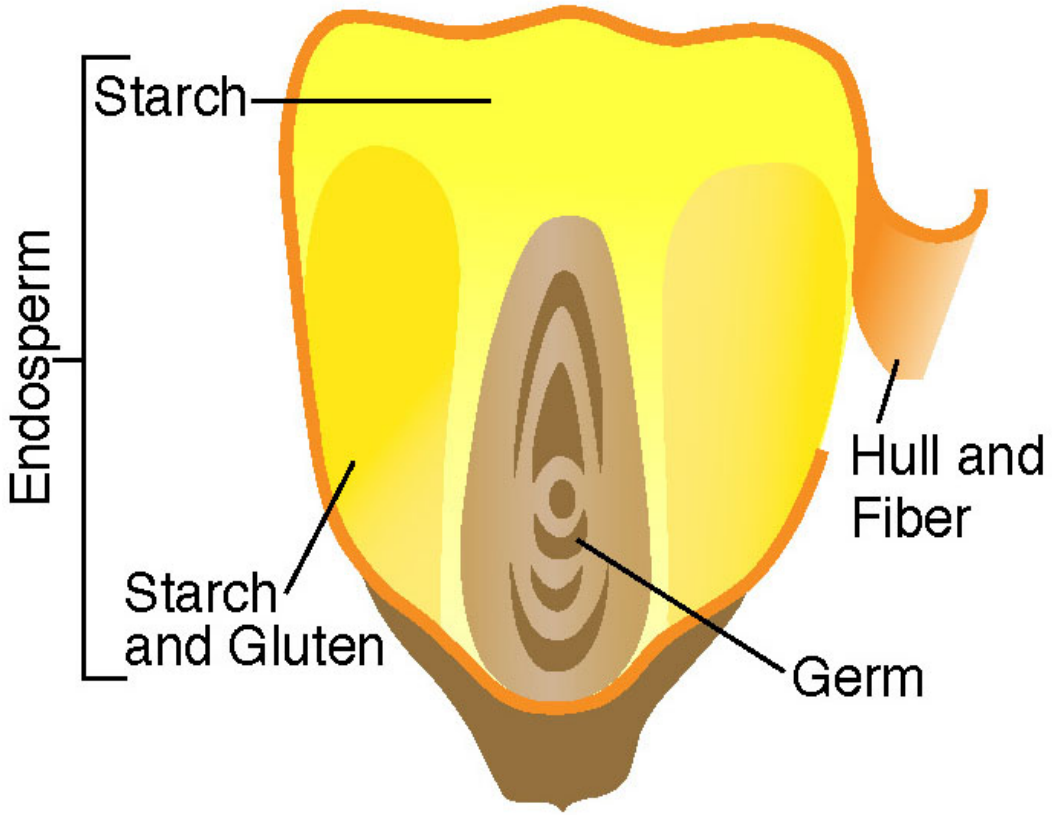


The Evolution of Biorefining

BFRAC™ and BPX™

- **These two revolutionary technologies demonstrate our commitment to the biorefining industry.**
  - **Increasing the availability of ethanol**
  - **Lowering the cost to process**
  - **Producing a higher value animal feed product**

A Kernel of Corn

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G - 1034

Dakota Gold HP Distillers Grains Nutrient Profile

Dakota Gold MARKETING

Enhanced Nutrition Distillers Products

www.dakotagoldmarketing.com

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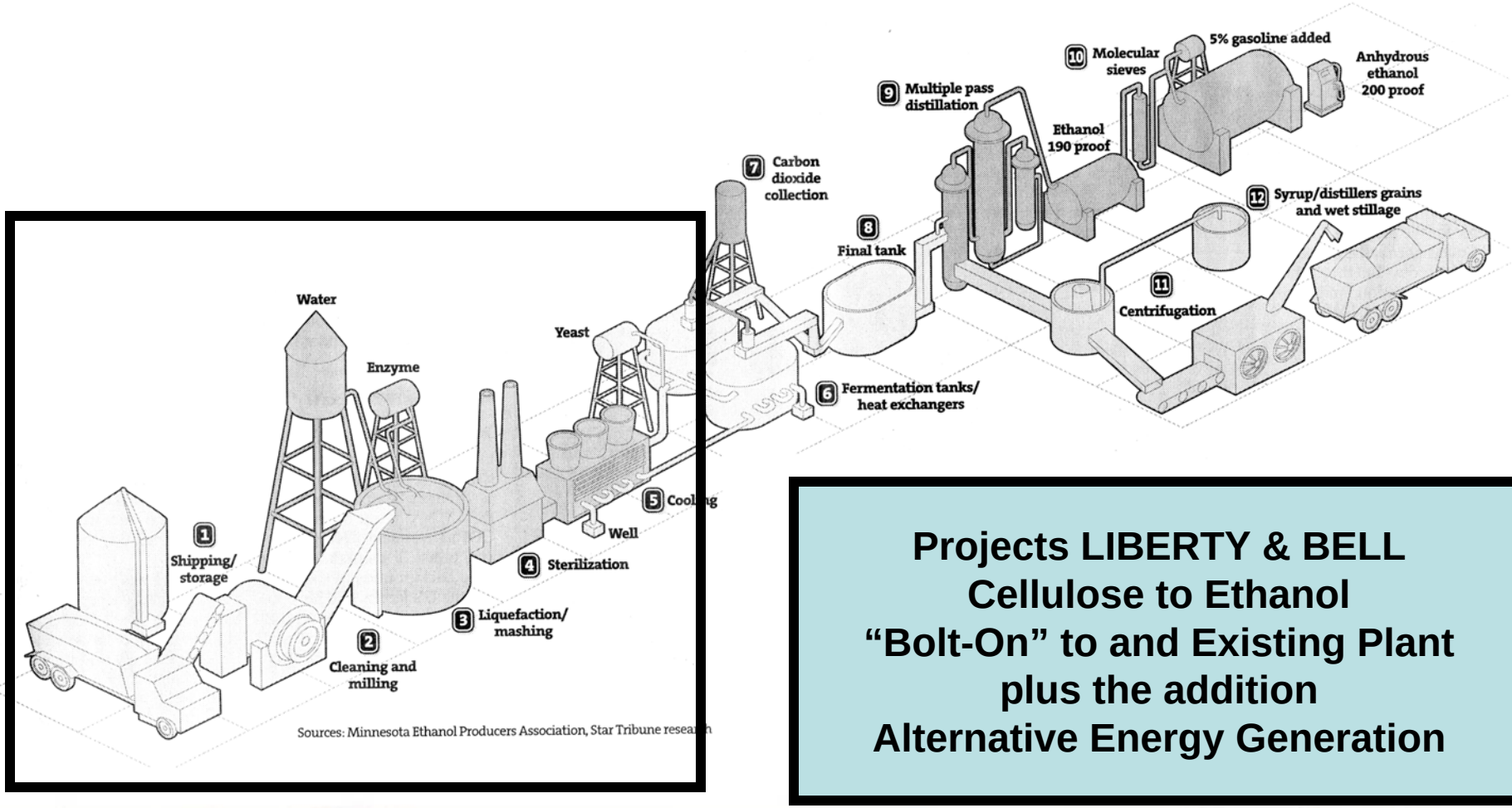
How Ethanol is Made



Projects LIBERTY & BELL
Cellulose to Ethanol
“Bolt-On” to and Existing Plant
plus the addition
Alternative Energy Generation

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World Class Partners

DUPONT The miracles of science®

Broin companies

novozymes®

SDSU

NREL

Broin's Projects LIBERTY & BELL

- What is Project LIBERTY?
  - Transformation of an existing conventional dry mill ethanol facility into a commercial scale biomass-to-ethanol facility
  - Additional value-added agricultural products for the U.S. farmer and greater economic impact to rural America
  - Project BELL is the test facility for scale up and validation.

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Scotland, SD

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Emmetsburg Site

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Broin Biorefinery

Grain Corn

BFRAC Plant

Endosperm

BPX Ferment

CO2

Ethanol

Distill

Centrifuge & Dry

DGHP

Industrial Products

Corn Germ

Bran

Corn Stover

Pre-treat

Hydrolysis & Ethanol Fermentation

Distill

Ethanol

Steam to Process

Biomass Boiler

Solid Fuel

Separator

Liquids

Anaerobic Digester

Biogas

Electric Generator

Boiler

DDG Dryers

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Project LIBERTY

- **Project LIBERTY deliverables:**
  - **11 percent more ethanol from a bushel of corn**
  - **27 percent more ethanol from an acre of corn**
  - **24 percent reduction in water usage**
  - **83 percent less fossil fuel consumption**
- **With LIBERTY we have a sustainable model to meet our renewable transportation fuel goals through ethanol.**

Thank you