

# Emerging Trends in Biomass Energy Production and Co-Product Utilization

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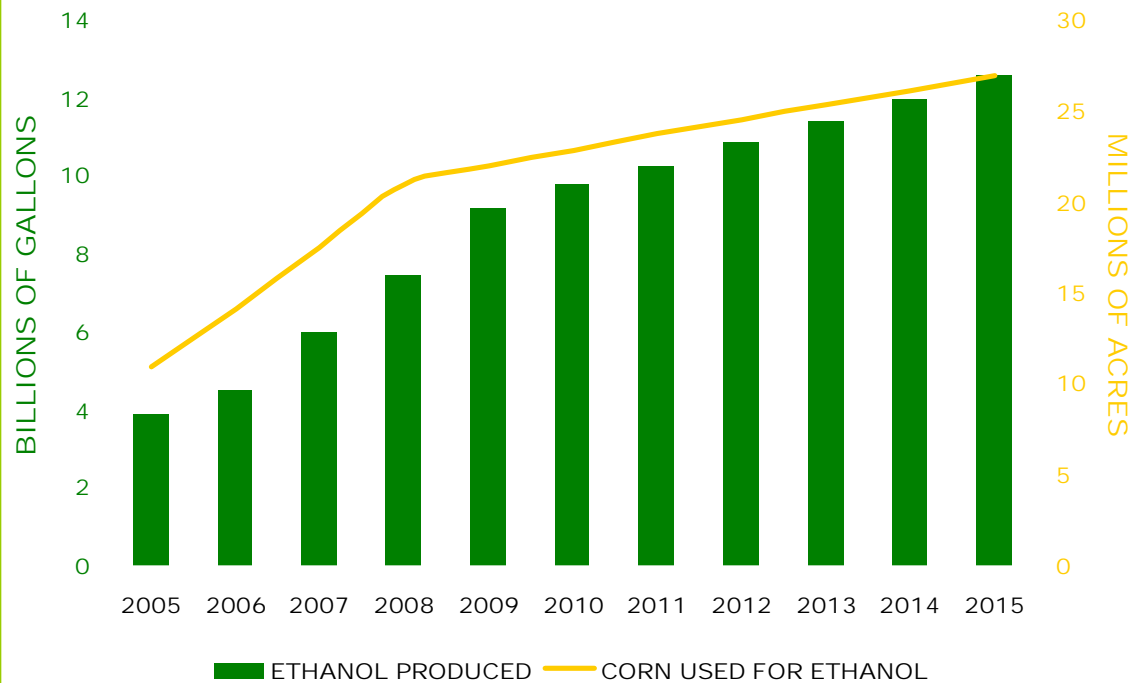
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# Increased Ethanol Demand Will Set Stage for Domestic Competition Between Feed And Fuel

## U.S. ETHANOL MARKET OUTLOOK

## ESTIMATED MARKET DEMAND FOR U.S. CORN

DEMAND FOR CORN USED IN ETHANOL IN THE NEXT 10 YEARS WILL SQUEEZE CURRENT CORN SUPPLIES

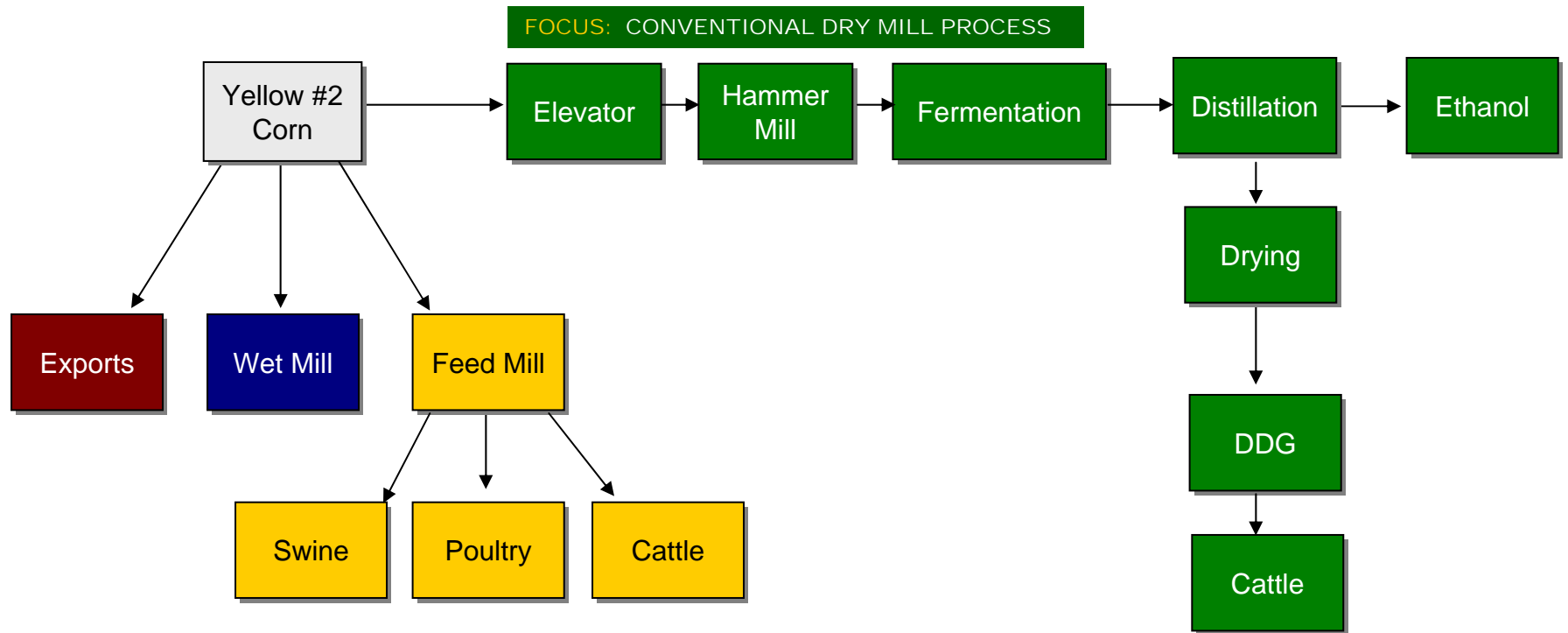


	2005	2015
FEED	▶ 44%	▶ 28%
FUEL ALCOHOL	▶ 15%	▶ 35%
EXPORTS	▶ 18%	▶ 18%
OTHER, INCLUDING FOOD	▶ 23%	▶ 19%

SOURCE: PROEXPORTER NETWORK, MONSANTO AND RENESSEN ESTIMATES

# Proliferation Of Dry Mill Ethanol Facilities Will Alter The Balance Of Corn Going Into Ruminant vs. Monogastric Animal Feeds

## CORN DISTRIBUTION BY MAJOR MARKET



DDG = DISTILLERS DRIED GRAIN

# Market Discontinuities Create The Need For Improving The Flexibility And Value Of Co-Products For Inclusion In Animal Feed Rations

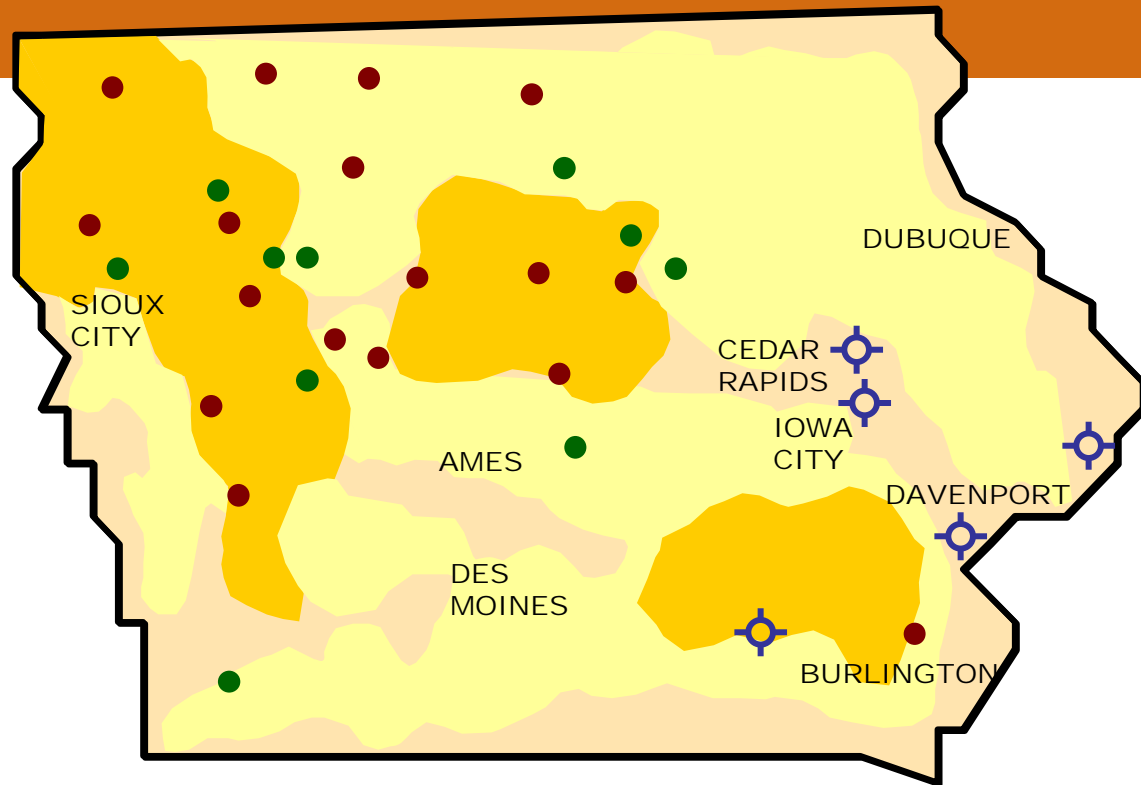
FOCUS: IOWA

## OVERVIEW

- ▶ ETHANOL PLANTS ARE BEGINNING TO BE PLACED IN AREAS WHERE CORN PRODUCTION HAS TRADITIONALLY BEEN USED AS FEED IN HOG PRODUCTION
- ▶ THE DRAW ON CORN FROM THE ETHANOL-ANIMAL FEED DYNAMIC WILL CREATE "MICRO COMPETITIVE MARKETS" DRIVING COMPETITION FOR LOCAL CORN

## OPPORTUNITY

- ▶ ETHANOL PRODUCTION THAT ALSO CREATES A VALUABLE FEED STREAM FOR HOGS CAN BRIDGE THE LOCALIZED DEMAND SHORTAGES FOR CORN AND CREATE NEW VALUE



● ETHANOL PLANTS IN PRODUCTION

● ETHANOL PLANTS UNDER CONSTRUCTION

⊕ WET MILL

INTENSITY OF HOG PRODUCTION:    LEAST INTENSE    MOST INTENSE

Source: USDA and Renessen Estimates

# Our View Of The Future: Breakthroughs Will Occur At The Interface Of Biotechnology And Process Technology

This will create...

## Tremendous Value

- Enhanced nutrition and functionality of food & feed
- Improved economics
- Environmental benefits
- More choices for farmers
- Renewable resources

## Tremendous Change

- New industry structure
- Differentiated products replace commodities
- Discontinuities in tradition markets

# Nutrient Rich Corn Developed Through Biotechnology Is The Precursor To Integrated Systems That Will Help Change Biofuel And Co-Product Values

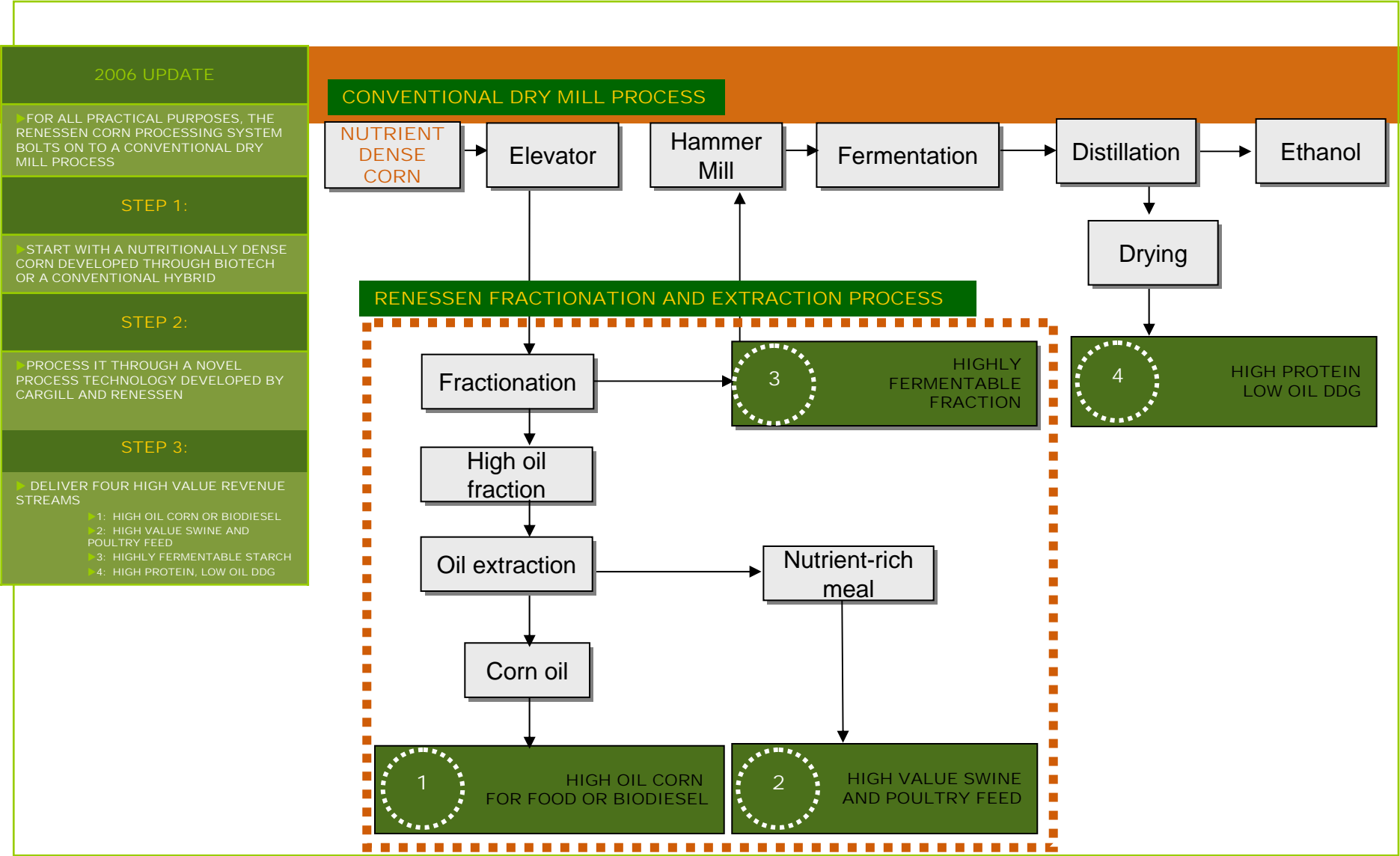
## NUTRIENT COMPOSITION OF MAVERA™ HIGH VALUE CORN WITH LYSINE

	Oil %Wt	Lysine % Wt	Protein % Wt
COMMODITY CORN	▶ 3.5	▶ .25	▶ 8.0
MAVERA™ HIGH VALUE CORN WITH LYSINE	▶ 6.5	▶ .40	▶ 8.5



- First crop-based biotech product for animal feed
- Recently deregulated in the U.S.
- Coupled with Renessen's Corn Processing System, brings unique value

# Renessen Is Developing A New Corn Processing System Increasing Refinery Yields And Co-Product Benefits



# New Value Streams And Diversified Products Are Now Accessible To An Ethanol Producer

- Capture corn oil on site.
  - Non trans-fat vegetable oil in high demand by food manufactures
  - Raw material for bio-diesel production.
- A nutrient rich meal product valued at a significant premium to corn
  - New feed product that targets the swine and poultry markets
  - Unique concentration of amino acids and energy availability from a biotech corn
- Create enhanced DDGS- protein greater than 40% and low oil
- Reduce the amount of DDGS by up to 40% resulting in significant savings in energy and dry costs.
- Potentially returns 30-40% of the corn inputs back to the local market as high value animal feed.