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## Biodiesel Industry – A Statewide Assessment

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## Nebraska Biodiesel Industry Development Seminar

August 31, 2006 - Lincoln, NE

### Biodiesel Industry – A Statewide Assessment

**Presented by: Loren Isom**  
**Industrial Agricultural Products Center**  
**University of Nebraska – Lincoln**  
**Lisom@unl.edu or 402-472-8187**

## Nebraska Soybean Association

USDA – Rural Development Value Added Producer Grant  
"Strategically Locating Soybean and Biodiesel  
Processing Facilities in Nebraska"

- **Outline**
  - Overview of the Study
  - Summary of the Findings
  - Biofuel Industry Trends
  - The Role of Incentives
  - Questions and Comments

## Overview – Introduction of the Project Development Team

- **Nebraska Soybean Association**, Lori Luebbe, Executive Director
- **University of Nebraska – Industrial Agricultural Products Center**, Dr. Milford Hanna, Director, Loren Isom, Technical Assistance Coordinator, Robert Weber, Research Coordinator
- **Nebraska Department of Economic Development**, Zach Schroeder, Development Consultant
- **Nebraska Department of Agriculture**, Richard Sanne, Ag Promotion and Development
- **USDA – Nebraska Agricultural Statistics Service**, Mark Harris, Director
- **Nebraska Soybean Board**, Victor Bohuslavsky, Executive Director
- **Nebraska Ethanol Board**, Todd Sneller, Executive Director
- **Nebraska Public Power District**, Brian Wilcox, Industrial & Business Account Consultant

## Overview - Objectives

- to conduct a **third party feasibility study** and market analysis to evaluate the potential success and risk of investment associated with soybean processing and biodiesel production facilities located in Nebraska;
- to identify key site selection criteria for soybean processing and biodiesel production facilities and **conducting a statewide assessment** of the criteria (feedstocks, markets, and infrastructure) to identify the best location(s); and
- to identify and **evaluate multiple business structures** to position Nebraska soybean producers to capture the greatest value from soybean processing and biodiesel production.

## Overview – Supporting Events

- the **Mobile Biodiesel Workshop** to West Central Cooperative's soybean processing and biodiesel production facilities in Ralston, IA; January 2005;
- the **IBFG – Feasibility Report presentation** to the NSA and NSB board of directors; July 2005;
- the **Biodiesel Plant Development Seminar** presented by IBFG and other state resource providers; August 2005;
- the **National Biodiesel Board presentation** to the NSA, NSB, and state legislators regarding federal and state regulatory issues and opportunities for Nebraska legislation; December 2005;
- the **Biodiesel Plant Development Workshop** presented by the IAPC and the Iowa State University Center for Industrial Research and Service; March 2006; and
- numerous **community and individual based presentations**

## Summary of the findings

- Biodiesel demand
- Biodiesel market price
- Estimated biodiesel production cost
- Competition in the biodiesel industry
- Availability of biodiesel feedstock resources
- Government incentives and public policy

## Biodiesel Demand

- IBFG study projected
  - 8 MGPY for NE, and
  - 24 MGPY for NE and surrounding states
- If biodiesel can compete \$ for \$ w/ #2 diesel
  - Fuel concentration limits (B5 to B20) and feedstock availability are the only limits.

## Biodiesel Demand

- Nebraska diesel sales: 730 MGPY
  - 204 MGPY on-farm and
  - 403 MGPY on-highway
- Biodiesel demand: on-farm market
  - assuming a 50% market penetration
  - 6 MGPY if B5 or 24 MGPY if B20 blends
- Biodiesel demand: on-highway market
  - assuming a 50% market penetration
  - 4 MGPY if B2 or 10 MGPY if B5 blends
- Estimated biodiesel demand in NE: 10–34 MGPY

## Biodiesel Market Price

- Revised DOE-EIA forecasts, May 2006
  - \$1.50/gallon for wholesale, pre-tax diesel in 2010
    - based on \$48 per barrel crude oil
    - 33 cents higher than the forecast used in the IBFG study
- Is a biodiesel premium realistic?
  - If not, reduce 37.5 cents
    - the premium is based on a ¾ cent premium for B2 blends
- Is the biodiesel tax credit fully available to producers?
  - If not, reduce from \$1.00 to \$0.85-95 per gallon
- Passage of the small producer tax credit
  - add \$0.10 per gal. for first 15 MGPY under 60 MGPY

## Biodiesel Market Price

- **Depends on the forecast for petroleum diesel?**
- Nebraska Jan. – June 2006 average: \$2.70/gallon
  - less state & federal taxes (24.6 and 24.4 cents/gallon)
  - Net: \$2.21 per gallon pre-tax
- Forecasts:
  - going higher & higher or peaking and dropping back?

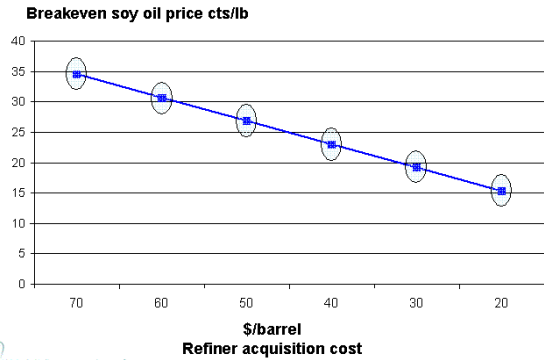
### B100 profitability (\$50/barrel crude)?

Crude oil	US refiners cost	\$50/barrel
<b>Petro-diesel</b>	Cost to terminal	\$1.70/gallon
<b>Biodiesel</b>	Non-SBO costs to terminal	\$0.63/gallon
	B100 profitability @:	
	SBO oil price	
	40 cts/lb	-\$1.01/gallon
	35 cts/lb	-\$0.63/gallon
	30 cts/lb	-\$0.24/gallon
	25 cts/lb	\$0.15/gallon
	20 cts/lb	\$0.53/gallon

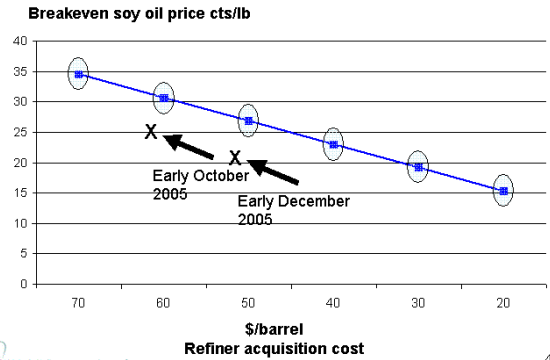
### Breakeven at different crude oil/SBO prices?

- Very volatile market situation
- We estimate:
  - If **crude oil** \$70/barrel biodiesel profitable up to 35cts/lb
  - If \$60 .....31cts/lb
  - If \$50 .....26 cts/lb
  - If \$40 .....23 cts/lb
  - If \$30 .....19 cts/lb
- NB Critical factors:**
- Future energy prices?
- Technology?
- Change in subsidies?

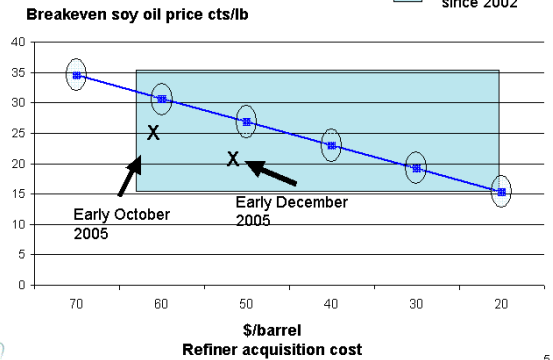
### Breakeven profitability at different world crude oil prices



### Breakeven profitability at different world crude oil prices



### Breakeven profitability at different world crude oil prices



### Estimated Biodiesel Production Costs

Source: Rudy Pruszko, Iowa State – prices as of Oct. 2004

Cost of Biodiesel Production (3 MGPY vs. 30 MGPY)	3 MGPY		30 MGPY		Difference
	soybean oil, \$0.22/lbs.		soybean oil, \$0.22/lbs.		
	\$ per Gallon	% of total	\$ per Gallon	% of total	
Cost of Feedstock	\$1.71	71.5%	\$1.61	83.9%	\$0.10
Cost of Chemicals	0.24	10.0%	0.18	9.4%	0.06
Cost of Energy	0.04	1.7%	0.02	1.0%	0.02
Cost of Labor	0.14	5.9%	0.02	1.0%	0.12
Depreciation and Maintenance	0.2	8.4%	0.08	4.2%	0.12
Administration and Overhead	0.06	2.5%	0.01	0.5%	0.05
<b>Biodiesel Cost per Gallon</b>	<b>\$2.39</b>	<b>100.0%</b>	<b>\$1.92</b>	<b>100.0%</b>	<b>\$0.47</b>

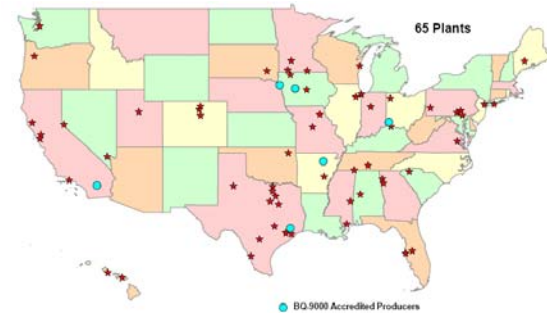
## Estimated Biodiesel Production Costs

Source: Building a Successful Biodiesel Business - prices as of Oct. 2004

Cost of Biodiesel Production (soybean oil vs. animal fat)	10 MGPY		10 MGPY		Difference
	soybean oil, \$0.22/lbs.		animal fat, \$0.14/lbs.		
	\$ per Gallon	% of total	\$ per Gallon	% of total	
Cost of Feedstock	\$1.61	80.9%	\$1.02	70.3%	\$0.59
Cost of Chemicals	0.18	9.0%	0.18	12.4%	0
Cost of Energy	0.02	1.0%	0.04	2.8%	-0.02
Cost of Labor	0.04	2.0%	0.04	2.8%	0
Depreciation and Maintenance	0.12	6.0%	0.15	10.3%	-0.03
Administration and Overhead	0.02	1.0%	0.02	1.4%	0
<b>Biodiesel Cost per Gallon</b>	<b>\$1.99</b>	<b>100.0%</b>	<b>\$1.45</b>	<b>100.0%</b>	<b>\$0.54</b>

## Competition in the Biodiesel Industry

- Commercial Biodiesel Production Plants, NBB April 2006



## Competition in the Biodiesel Industry

Source: Leland Tong, IBFG  
as of January 2006

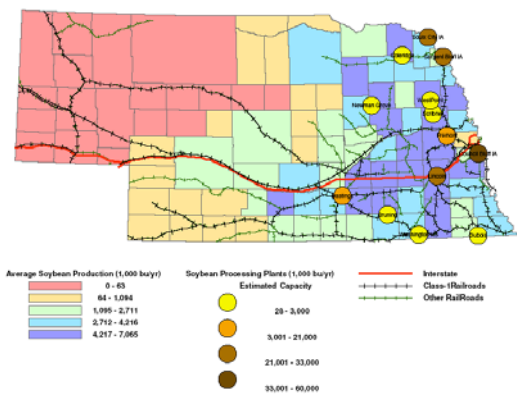
Plant Size (gallons per year)	Existing Plants (53 total)	Plants Under Construction (42 total)	Plants in Pre-construction (22 total)
< 1,000,001	12	12	1
1,000,001 – 5,000,000	26	15	3
5,000,001 – 10,000,000	3	8	5
10,000,001 – 15,000,000	6	1	3
15,000,001 – 20,000,000	1	1	1
>20,000,000	5	5	9

## Biodiesel Feedstock Resources

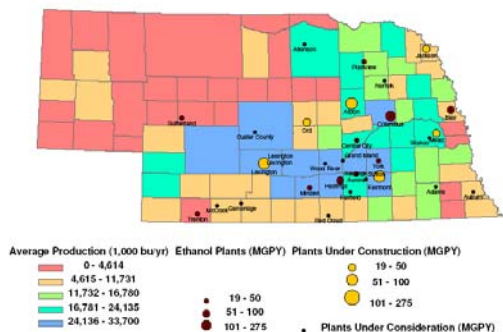
- Buy feedstock or crush soybeans?
- Estimated soybean meal production in NE:
  - 2.0 million tons, source: ProExporter Network, 04-05
- Estimated soybean meal fed in NE:
  - 1.5 million tons, source: ProExporter Network, 04-05
- Competition from current and expanding distillers grains
  - 4.8 million tons

Nebraska Ethanol Production	Ethanol MGPY	Annual Grind (million bu/year)	DDGS (tons/yr)
Current Production	560	303	2,272,500
Expansion and Development	884	340	2,550,000
<b>Total</b>	<b>1,444</b>	<b>643</b>	<b>4,822,500</b>

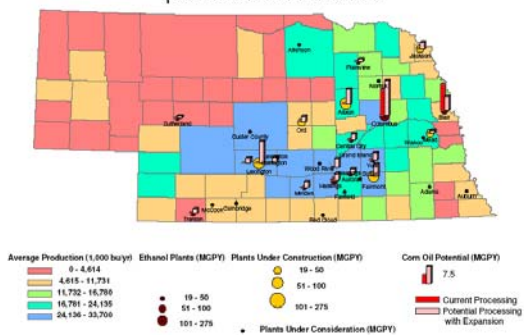
Average Soybean Production (1999-2005) and Processing



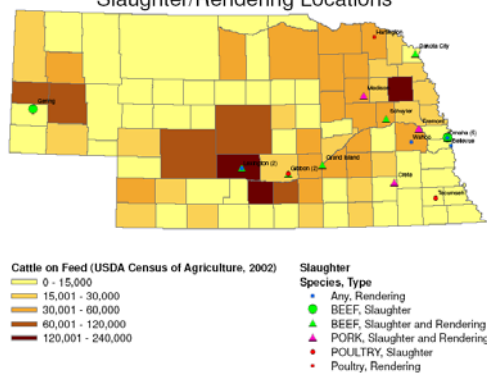
Average Corn Production (1999-2005) and Processing



Average Corn Production (1999-2005) and Processing plus Corn Oil Potential



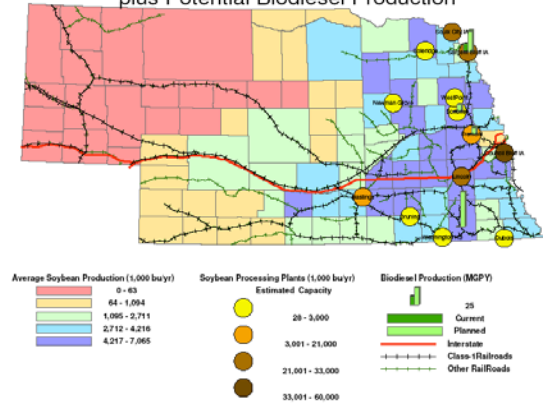
Nebraska- Cattle on Feed (2002) with Slaughter/Rendering Locations



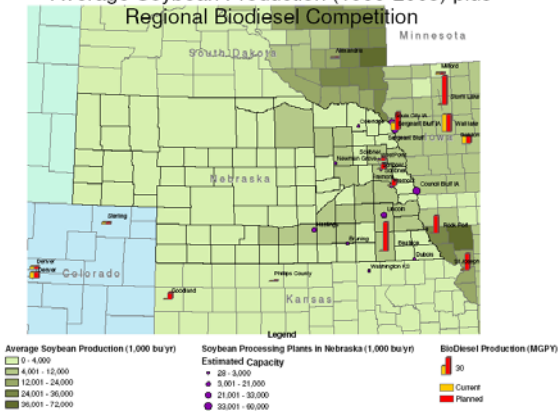
## Biodiesel Feedstock Resources

Potential biodiesel feedstock available in Nebraska	MGPY	Million pounds per year
<i>Note: major quantities will still go to traditional applications</i>		
crude soybean oil from extrusion expellers	5	40
crude degummed or refined soybean oil from solvent extractors	75	570
refined corn oil from wet mill ethanol plants	45	340
crude corn oil potential from current dry mill ethanol plants	22	169
crude corn oil potential from expanding or developing dry mill ethanol plants	95	720
animal fat from cattle slaughtering	119	908
animal fat from pork slaughtering	27	207
yellow grease from restaurants	1	10
<b>Total</b>	<b>390</b>	<b>2,964</b>

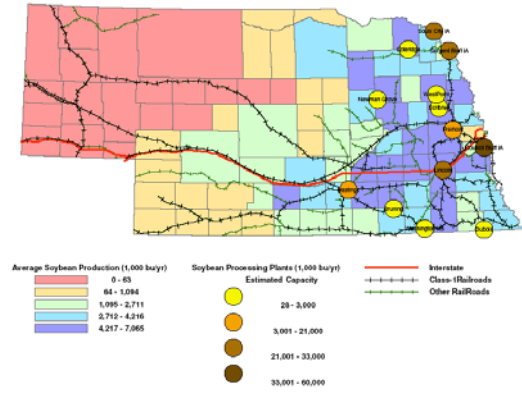
Average Soybean Production (1999-2005) and Processing plus Potential Biodiesel Production



Average Soybean Production (1999-2005) plus Regional Biodiesel Competition

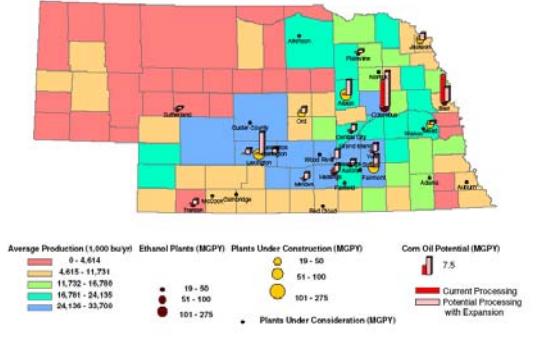


Average Soybean Production (1999-2005) and Processing

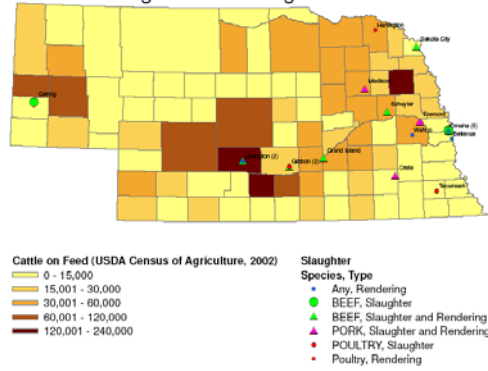




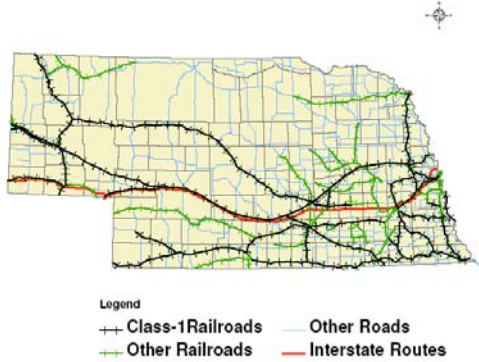
Average Corn Production (1999-2005) and Processing plus Corn Oil Potential



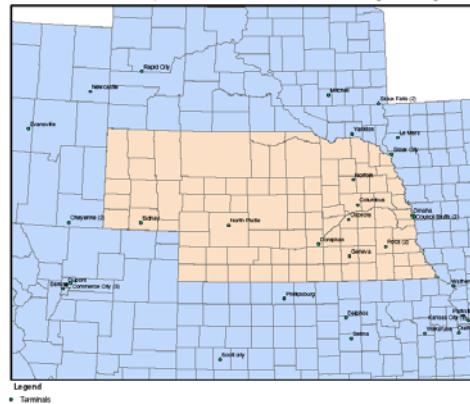
Nebraska- Cattle on Feed (2002) with Slaughter/Rendering Locations



Nebraska Roads and Railroads



Petroleum Terminal Operators in Nebraska and Neighboring States



### **Best Locations in Nebraska**

- Concentrations of feedstock resources
  - soybean processors
  - animal processors
  - ethanol producers
- Co-processing
- Supporting infrastructure for:
  - regional distribution terminals and
  - national marketing (railroads)
- **PROJECT SPECIFIC: size, feedstock preferences, joint venture opportunities with feedstock processors**

### **State Incentives and Public Policy**

- Minnesota biodiesel mandate
  - at least 2% biodiesel
- Illinois sales tax exemption
  - exempts 15 to 20 cents per gallon
- Missouri farmer owned reimbursement
  - reimburses development costs
- Iowa income tax credit
  - 3 cent per gallon credit to retailers of B2+
- Kansas biodiesel producer incentive
  - 30 cent per gallon incentive to producers

### **Biofuel Industry Trends**

Todd Sneller, Nebraska Ethanol Board

- Where is the money coming from?
- Who owns the plants? How are they structured?
- Who is selling the products?
  - Fuel
  - Co-products
- What is the petroleum industry doing?

### **The Role of Incentives**

Todd Sneller, Nebraska Ethanol Board

- Focus on the Goal: Production
- Competitive Position vs. Other States
- The Function of a Production Incentive
- The Advantage of a Performance Based Production Incentive
- Justifying Support for a Production Incentive: Rationale
- Process, Opportunity and Timing