



# The Influence of Biofuel Production on Concentrated Animal Feeding In the US



**Dr. John Comerford**  
**Associate Professor**



**The Pennsylvania State University**



# Statement of the Issue

- The US government has decreed that 30 billion gallons of “renewable” fuels be used to replace existing fossil fuels by 2020.
- The current production capacity is 8 billion gallons from 124 refineries.
- 139 million tons of corn now in use for ethanol production; 40 billion tons will be needed in 2020.
- The entire US corn crop used for ethanol production would replace only 12.3% of the current US fossil fuel demand; current feedstocks for biodiesel production can replace 5% of highway diesel use.
- Sixty percent of total corn is used in livestock production, with 31% used in beef production, 27% in poultry, 24% in pork, and 15% in dairy.
- The price of corn has risen from \$2.77 per bu to \$5.27 per bu.
- The increased cost to the food industry will reach \$100 billion by 2010.
- The current cost of unleaded gas is \$3.29/gal (£1.74/l); the current price of E-85 fuel with the 20% reduction in mileage is \$3.55/gal (£1.87/l)

**The government mandate of 30 bil gallons by 2020 includes 10.5 bil gallons from cellulosic fermentation that is not yet even available:**

**“Once again our country's leaders have jumped on a train without knowing where it was going. “**





*"In terms of renewable fuels, ethanol is the worst solution because it has the highest energy cost with the least benefit."*

*Patzek, Univ. of CA (2007).*

**Taking into account the energy required to grow the corn and convert it into ethanol, they determined that burning the biofuel as a gasoline additive actually results in a net energy loss of 65 percent.**

- ✓ Energy needed to produce seed corn
- ✓ Energy needed to produce nitrogen fertilizer
- ✓ Energy needed to transport feedstock to refinery
- ✓ Energy needed to ferment the feedstock
- ✓ Energy needed to cool the product
- ✓ Energy needed to transport the product
- ✓ Energy needed to dry co-products
- ✓ Energy needed to transport co-products



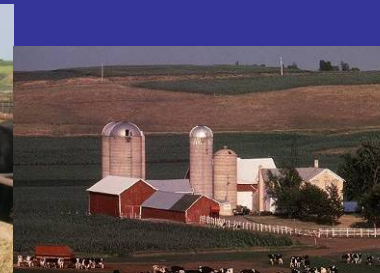
**This 50,000-head feedyard uses 425 tons of corn PER DAY. The change in the price of corn from \$2.77/bu to \$5.27/bu means there is an increased cost of feeding the cattle at this yard of**

**\$38,000.00 per day**



# It is estimated for 2008:

- The increased cost to the broiler industry is **\$3.4 billion**
- The increased cost to the turkey industry is **\$646 million**
- The increased cost to the beef industry is **\$2.24 billion**
- The increased cost to the dairy industry is **\$2.7 billion**
- The increased cost to the swine industry is **\$2.9 billion**



**SINCE January 1, 2008:**

*“Cargill announces it's scrapping plans for a \$200 million ethanol plant near Topeka, Kan. A judge approves the bankruptcy sale of an unfinished ethanol plant in Canton, Ill.. And that was just Tuesday.”*



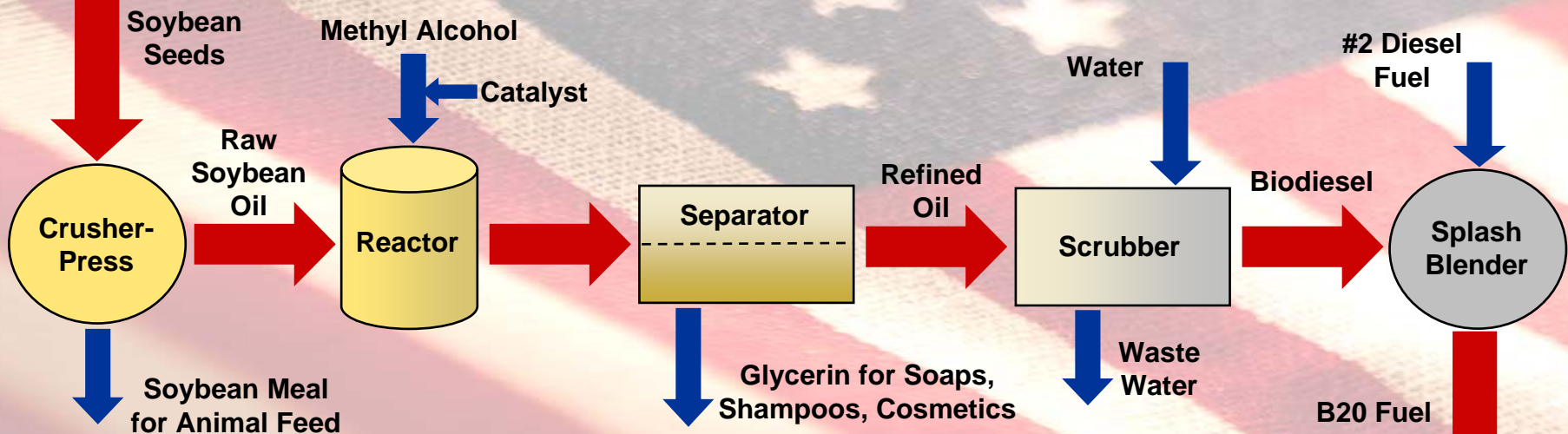
**VeraSun on a proposed PA 50,000 gal ethanol plant located in an area that does not produce corn- “We have held up construction because of escalating corn and building costs.”**



*Indeed, plans for as many as 50 new ethanol plants have been shelved in recent months, as Wall Street pulls back from the sector, says Paul Ho, a Credit Suisse investment banker specializing in alternative energy. Financing for new ethanol plants, Ho says, "has been shut down."*



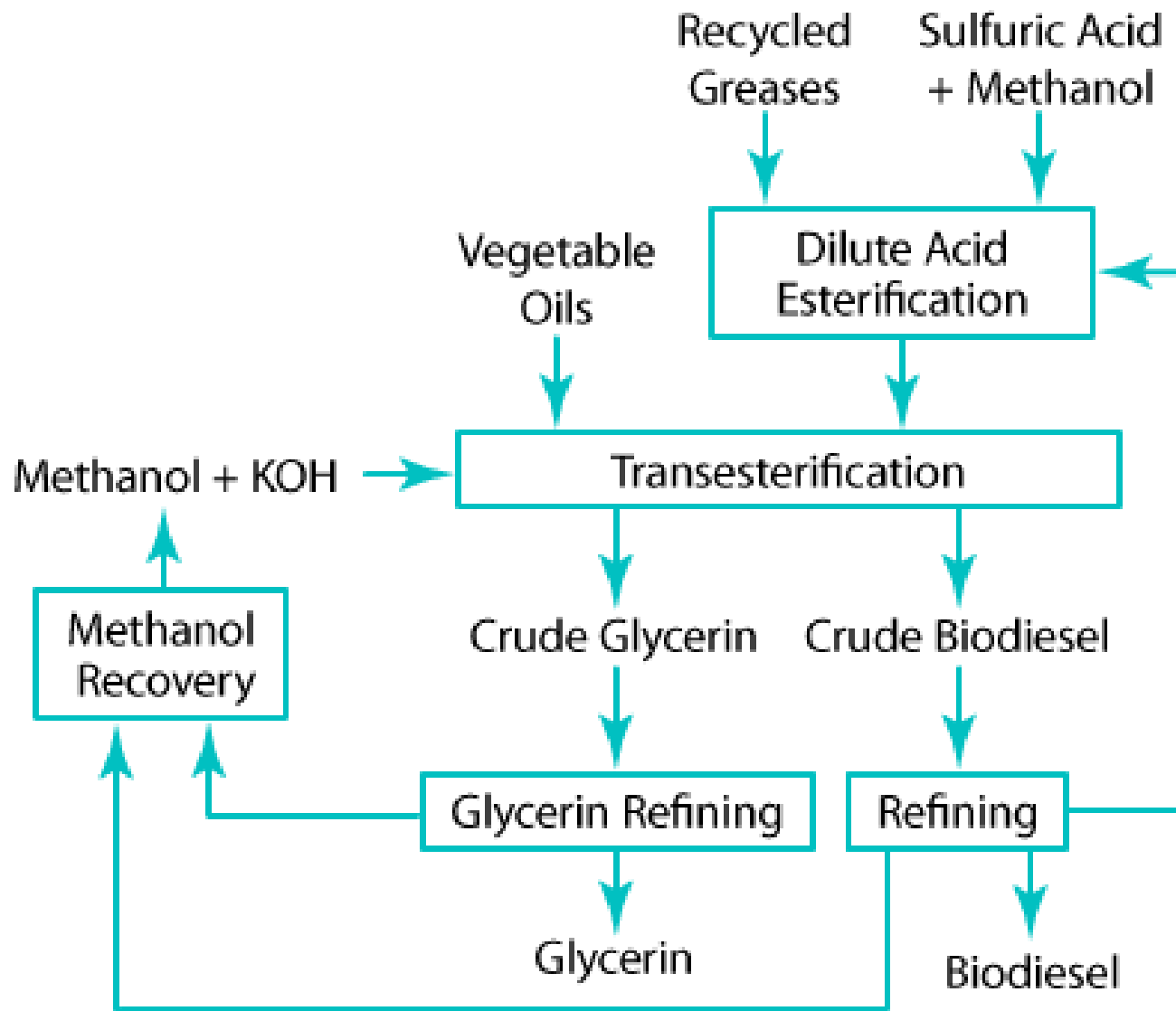
# Home-Grown Energy... Biodiesel



## Biodiesel Benefits:

- Reduce dependency on imported petroleum
- Improve the environment and public health
- Increase our domestic rural economy
- Increase lubricity for engine
- Promote homeland security
- Pay less for energy





**Schematic of biodiesel production path.**

# Biodiesel Yield

1.25 Gallons B100 per bushel

50 Bushels Soybeans per acre

62 Gallons B100

310 Gallons B20

1240 Gallons B5

1.1 tons of Soybean Meal

# Use of Co-Products

## Protein Cost



- \* SBM  $(\$215 / \text{ton DM delivered}) / 0.48 =$   
 **$\$448 / \text{ton CP DM delivered}$**
- \* DDGS  $(\$112 / \text{ton DM delivered}) / 0.28 =$   
 **$\$400 / \text{ton CP DM delivered}$**
- \* MWDGS  $(\$ 81 / \text{ton DM delivered}) / 0.28 =$   
 **$\$289 / \text{ton CP DM delivered}$**
- \* Corn Gluten feed  
 $(\$ 93 / \text{ton DM delivered}) / 0.21 =$   
 **$\$443 / \text{ton CP DM delivered}$**

# Use of Co-Products

- About 1/3 of the corn used for ethanol production is distillers grains on a dry matter basis



- Limitations for intake of distillers grains, distillers grains with solubles, and corn gluten feed of about 20% of the dry matter of the diet.
- High sulfur content will reduce the level of use

# Use of Co-Products

- Soybean meal from biodiesel has a wide use in livestock feeds.
- Glycerol can be used as :
  - 20% of the diet of dairy cattle
  - 10% of the diet for hogs and beef cattle
  - 5% of the diet for poultry

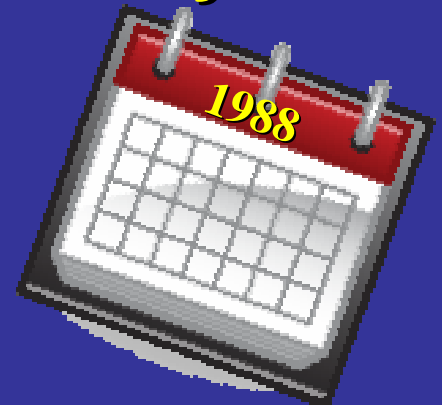


# Possible Outcomes

The price of fossil fuel will reduce to an economic advantage

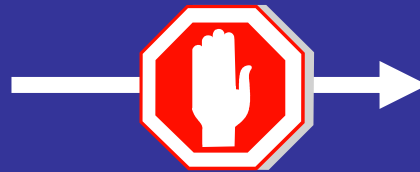


Unlike 1988, it is probably not likely.

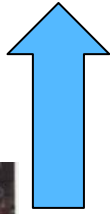


# Possible Outcomes

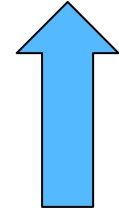
- The price of fossil fuel will reduce to an economic advantage
- **Reality will set in on the use of corn for ethanol production**



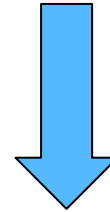
**Food prices**



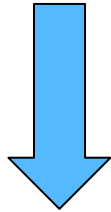
**Corn price**



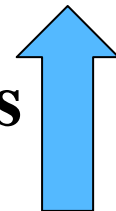
**Farm Income**



**Meat Production**



**Fuel Prices**



# Possible Outcomes

- The price of fossil fuel will reduce to an economic advantage
- Reality will set in on the use of corn for ethanol production
- **Alternative energy sources will be re-examined and put in place**

# Alternative energy sources

## Windmills



# Alternative energy sources

Solar panels



# Alternative energy sources

## Tidal power stations



# Alternative energy sources

## Geothermal



# Alternative energy sources

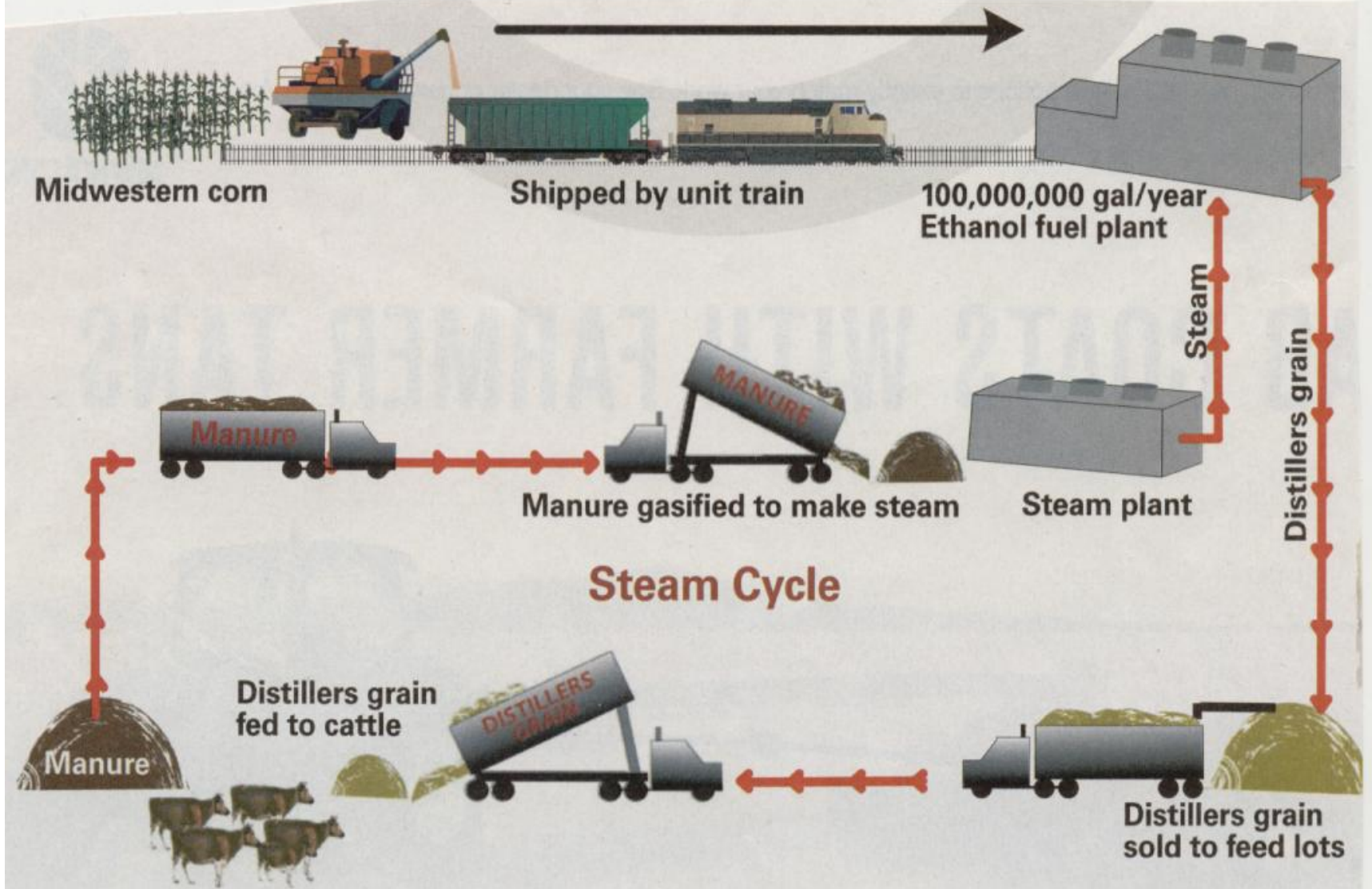
Hydroelectric



# Possible Outcomes

- The price of fossil fuel will reduce to an economic advantage
- Reality will set in on the use of corn for ethanol production
- Alternative energy sources will be re-examined and put in place
- **Bioenergy production is integrated with animal production.**





**An integrated ethanol and cattle feeding facility planned for Hereford, TX**

# Possible Outcomes

- The price of fossil fuel will reduce to an economic advantage
- Reality will set in on the use of corn for ethanol production
- Alternative energy sources will be re-examined and put in place
- Bioenergy production is integrated with animal production.
- **There will be more selective use of corn for animal production with huge implications for grain-fed beef production**



# Implications of Less Grain in Diets

- Lower quality grades
- Longer ownership and finishing periods
- Higher cost
- Less meat and milk supply
- Competition from imports



# Possible Outcomes

- The price of fossil fuel will reduce to an economic advantage
- Reality will set in on the use of corn for ethanol production
- Alternative energy sources will be re-examined and put in place
- Bioenergy production is integrated with animal production.
- There will be more selective use of corn for animal production with huge implications for grain-fed beef production
- **Beef production will become grass-fed or diets higher in forages.**



# Implications of Conversion to Grass-Fed Beef

- **Cost is greater**
- **Beef supply will be reduced by about 30%**
- **Only 1 in 4 consumers prefer grass-fed flavor**
- **More manure production**
- **More water use**
- **More greenhouse gasses produced**
- **Less land available for corn or biofuel**
- **The most important factor is:**



# Environments!

**They may be  
different!**



# Possible Outcomes

- The price of fossil fuel will reduce to an economic advantage
- Reality will set in on the use of corn for ethanol production
- Alternative energy sources will be re-examined and put in place
- Bioenergy production is integrated with animal production.
- There will be more selective use of corn for animal production with huge implications for grain-fed beef production
- Beef production will become grass-fed or diets higher in forages.
- **Americans will use less energy.**



**NOT!**





**Energy in  
Agriculture**