Statement of Problem

Design an efficient and economically feasible process to produce biodiesel from waste oil

Objectives

- Design reactor & separator
- Design a methanol recovery system
- Perform cost and market analysis
- Investigate related issues
Overall Process

Oil in Methanol in Reactor → Biodiesel, Methanol, Catalyst, Glycerol

Methanol, Catalyst → Biodiesel, glycerol

Glycerol $ → Biodiesel $$$
**Design**

- Base – catalyzed reaction
- Feed – assumed soybean oil
- Model (Matlab)
- Scale – fuel for 20 trucks
  - 300,000 gal/year
  - Continuous
  - Scalable

**Economics**

Feed Oil = -$665,180  
Methanol = -$35,903  
Biodiesel = +$807,000  
Glycerol = +$7,800  
Net = +$113,717
Related Issues

Food vs Fuel

• Soybean oil will take away from livestock feed
• Increase of edible crop price
• Starvation in 3rd world countries

Government Regulations

• Biodiesel tax
• Needs to be 1.10% renewable

U.S. Corn Prices

http://www.organicfuels.com/library/art/20080708-emissions.png
Environmental Effects

• 75%-85% less poisonous compounds
• 8% lower SO\textsubscript{x} emissions
• Degrades 4x faster

• 78% lower CO\textsubscript{2} emissions
• 79% less waste water
Obstacles

Team Leadership/Team Ethics

Sub-team communication

Finding data for design team

Time management
To Do List

- Construct a robust model for each unit
- Separation train design
- Develop a logistical plan
- Contact equipment manufacturers
- Determine the best market for biodiesel
Questions