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Report Out I: Oils Utilization – 2012 Target

Oils Utilization: Cost Target

- What is the cost target (or range) to be cost-competitive with petroleum diesel by 2012?
 - » \$0.20 to \$0.25 per pound bio-oil production
 - » Processing costs about \$.40 per gallon
 - » \$2 to \$2.25 per gallon biodiesel
 - » Produce 5.5 billion gallons of biodiesel and 80 billion pounds of protein, sugar, and cellulose feedstocks for fuels and chemicals
 - » Competitive with \$40 to \$45/barrel petroleum crude
 - » One-to-one equivalent price with rack price of petroleum diesel

Oils Utilization: Pathway Route

- What is the most likely strategy for successfully producing cost competitive biofuels?
 - » Biodiesel
 - » Soybean, corn, canola oils, and animal fats
 - » Transesterification/Esterification
 - » Cost target achieved by 2012

Oils Utilization: Barriers (plant oils)

- Too much oil seed meal
 - » Find industrial use for protein, sugars, and cellulose co-products of oil production
 - » Focus on co-products that displace crude oil feedstocks
 - » Concentrate protein
 - » Separate cellulose from protein in high-yield crops
 - » Remove oil from corn prior to making ethanol in dry mills
- Too little oil & starch
 - » Not all animals can easily digest cellulose
 - » Increased oil content in oil seeds
- **Infrastructure**
- Low priority placed on biodiesel in biofuel goals
- **Capturing glycerol and soap stock products from biodiesel refining**

Oils Utilization: Barriers (animal fats)

- Animal fats high in saturates, harder to convert
- Collection, infrastructure, contaminant elimination for waste greases
- Sulfur from hair in animal fats costly to remove

- Infrastructure
- Capturing glycerol and soap stock products from biodiesel refining

Oils Utilization: Research and Development Needs

- Develop and demonstrate meal fractionation technologies
- Develop corn oil fractionation in dry mills
- New chemical transformation technologies
- Improve cellulose digestability in animals
- Research glycerine utilization
- Research hydrocracking technologies

Oils Utilization: Policy

- Extend subsidies beyond biofuels
- Develop mandate for biodiesel
- Provide incentives for infrastructure, including rail and port
- Provide loan guarantee programs to farmers to mitigate investment risk for new market development
- Loan guarantees for germ fractionation of corn oil in dry mills
- Provide incentives to improve fuel efficiency, including raised CAFE standards and increased use of diesel engines

Oils Utilization: Federal Role

- Support research for utilization of glycerine and protein
- Develop interagency protein platform for replacement of petrochemicals
- ID infrastructure needs and common elements across crops
- Reduce export barriers to increase the supply of animal fats
- Support streamlined permitting for biodiesel production facilities

Report Out II: Oils Utilization – 2030 Target

Oils Utilization: Role of Oils in 2030

- Conventional bio-oil sources (Corn, Soy, Canola, and Animal fats) could contribute 7 to 15 billion gallons* volume by 2030:
 - » Corn - 1.4 to 2.8 billion gallons
 - » Soy - 3.2 to 6 billion gallons
 - » Canola - 1.5 billion gallons
 - » Animal fats - 1 to 4 billion gallons
- *Biodiesel and/or green diesel
- Additionally, carbohydrate co-products from conventional bio-oil sources could contribute 5 billion gallons of ethanol and other carbohydrate fuels.
- Other oils which may enter or increase their market share by 2030:
 - » Cottonseed, sunflower, peanut, safflower - 2006
 - » Algae - extensive development required
 - » Jatropha and other new oilseed crops - extensive development and infrastructure required at all stages
 - » Tall oils from wood production -
- These other bio-oils could contribute 100 million gallons by 2030

Oils Utilization: Barriers

- 2012 barriers
 - » Plant oils

- ♦ Too much oil seed meal
 - ♦ Too little oil & starch
- » Animal fats
 - ♦ Animal fats high in saturates, harder to convert
 - ♦ Collection, infrastructure, contaminant elimination for waste greases
 - ♦ Sulfur from hair in animal fats costly to remove
- » **Infrastructure**
- » Low priority placed on biodiesel in biofuel goals
- » Capturing value from glycerol and soap stock co-products
- **2030 considerations**
 - » **Land availability**
 - » **Sustaining high yields while containing pests**
 - » **Nitrogen cost & availability (canola and corn crops)**

Oils Utilization: Research & Development Needs

- 2012 R&D Needs:
 - » Develop and demonstrate meal fractionation technologies
 - » Develop corn oil fractionation in dry mills
 - » New chemical transformation technologies
 - » Improve cellulose digestability in animals
 - » Research glycerine utilization
 - » Research hydrocracking technologies
- **Additional 2030 R&D Needs:**
 - » **Develop high-oil perennial crop for growth on marginal lands**
 - » **Genetic engineering for fungus, pest, and disease-resistant crops**
 - » **Develop herbicides, pesticides, and fungicides**
 - » **Develop efficient Nitrogen uses**
 - » **Process intensification for green diesel**
- 2020 Technical Targets
 - » Demonstrate doubling of rate of historical yield gain for conventional crops
 - » Demonstrate uses for sugars, proteins, glycerols, soap stock, hulls, and lecithin, with new markets to absorb increasing supply
 - » Develop markets for oil-extracted DDGs
 - » Demonstrate first intensified green diesel process
 - » Increased oil level in conventional bio-oil sources (demonstrate economics)

Oils Utilization: Policy

- 2012 policy priorities
 - » Extend subsidies beyond biofuels
 - » Develop mandate for biodiesel
 - » Provide incentives for infrastructure throughout value chain
 - » Provide loan guarantee programs to farmers to mitigate investment risk for new oilseed market development
 - » Loan guarantees for germ fractionation of corn oil in dry mills
 - » Provide incentives to improve fuel efficiency, including raised CAFE standards and increased use of diesel engines
- **2030 policy priorities**
 - » **Implement policies for the production and use of biofuels and bioproducts to ensure a domestic supply of fuels and chemicals to meet U.S. strategic needs**

Oils Utilization: Federal Role

Federal Role

- » Support research for utilization of protein, glycerine and soap stocks
- » Develop interagency protein platform for replacement of petrochemicals
- » ID infrastructure needs and common elements across crops
- » Reduce export barriers to increase the supply of animal fats
- » Support streamlined permitting for biodiesel production facilities
- » **Assess the role of the oilseeds pathway and biomass in ensuring a domestic supply of fuels and chemicals to meet U.S. strategic needs (in both public and private markets)**
- » **Continued support of land grant universities**

Oils Utilization: Synergies and Conflicts

- Develop agriculture worldwide to meet both food and fuel production and distribution needs.