

Report Out I: Agricultural Residues— 2012 Target

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A Scenario for Supplying 30% of 2004
Motor Gasoline with Biofuels by 2030

Biomass

Agricultural Residues: Cost Target

General Consensus:

Cost range \$1.50-\$1.75/gallon

Competitive with Starch EtOH and/or
Petroleum at \$45/barrel (in 06 dollars)

Policy incentives and considerations are essential to ensure market growth.

Agricultural Residues: Pathway Route

- What is the most likely strategy for successfully producing cost competitive biofuels?
 - » Ethanol
 - » Near term: bagasse, wheat straw, fiber (corn wet/dry mill)
 - ♦ Some near term opportunities/low hanging fruit will be implemented prior to 2012
 - » Mid term: corn stover
 - » Biochemical route including: pretreatment, enzymatic hydrolysis and fermentation
 - » Cost competitive ethanol by 2012 (w/ expansion to immediately follow)

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Agricultural Residues: Barriers – Feedstocks

- Soil sustainability (erosion and carbon, moisture and nutrient retention)
- Availability
- Cost
- Logistics (storage, transportation, degradation)
- Feedstock flexibility
- Feedstock cleanliness

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Agricultural Residues: Barriers – Pretreatments

- Variability of feedstocks
- Storage effects on pretreatment
- Reduction of capital (bio and thermo chem)
- Predictability of performance and yield
- Energy requirements and capital costs
- Pretreatment catalyst

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Agricultural Residues: Barriers – Enzymatic Hydrolysis

- Integration of pretreatment and enzymatic hydrolysis
 - Further enzyme cost reduction (2x)
 - High enzyme usage (loading)
 - Catalytic activity
 - Enzyme production capital cost
- Long term
- Combined bioprocessing

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Agricultural Residues: Barriers – Fermentation

- Large scale performance of recombinant organisms
- Robustness of co fermentation organisms
- High solids fermentation
- Nutrients and raw material
- Ethanol tolerance

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Agricultural Residues: Barriers – Coproducts

- Co-production of heat and power through gasification
- R&D on protein, fertilizers and acetic acid

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Agricultural Residues: Topics for Day 2

- Necessary Policies
- Discussion on achieving 2030 goals