

Report Out II: Agricultural Residues– 2030 Target

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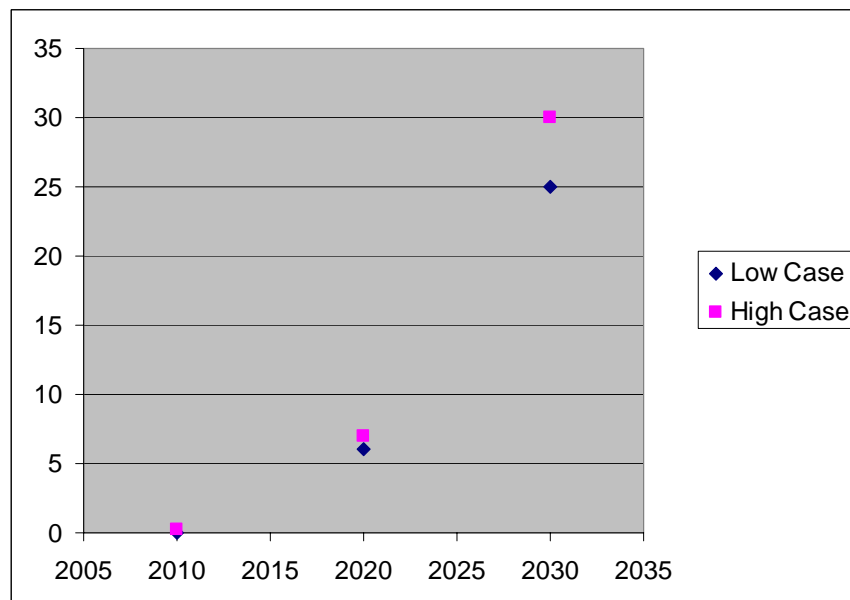
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A Scenario for Supplying 30% of 2004
Motor Gasoline with Biofuels by 2030

Biomass

Agricultural Residues: Role of Agricultural Residues in 2030



Agricultural Residues: Barriers

- Feedstocks
 - » Farmer acceptance
 - » Confidence in markets
 - » Collection & harvest
 - » Biomass yield/acre
 - » Cost
 - » Farming practices
 - ♦ Soil sustainability
 - ♦ Land/Water Use
 - » Transportation Infrastructure

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Agricultural Residues: Barriers

- Pretreatment
 - » Knowledge/predictability of yield
 - » Capital costs
 - » Low yields from hemicellulose/cellulose
 - » Increase yields for pretreatment and enzymatic hydrolysis
 - » Biological pretreatment
 - » Rational design (pretreatment & saccharification)

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Agricultural Residues: Barriers

- Enzymatic Hydrolysis
 - » Cost reductions
 - » Capital cost for enzyme production
 - » High enzyme usage
- Fermentation
 - » Current yield of C5 sugars – ethanol
 - » Robust co fermentation organisms
 - » High solids fermentation

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Agricultural Residues: Barriers

- Gasification
 - » Understanding lignin gasification & implications
 - » Operational reliability (over the long-term)
 - » Optimize EtOH and co-product development from gasification of biomass
- Co-products
 - » Recovery
 - » Dewatering
 - » Selectivity from thermochemical processes
 - » Incorporation of products (integrated biorefinery)

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Agricultural Residues: Barriers

- Down-stream processing
 - » Energy intensity
 - » General recycle
 - ♦ Zero process discharge
- Cross-cutting
 - » Full-system integration
 - » Feedstock logistics
 - » Enzyme production in crops
 - » Improve facility efficiency
 - » Early deployment of energy crops
 - » PERSON POWER
 - » Process Complexity

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Agricultural Residues: Barriers

- Other
 - » DOE's message on production cost competitiveness
 - » Establishing markets for co-products
 - » Water for processing
 - » Biomass market not developed (like the commodity corn/grain market)
 - » Limits on facility construction

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Agricultural Residues: Policy

- Risk Mitigation
 - » 50/50 cost share for capital costs the first 5 facilities
 - » Producer credit to buy down capital cost (10 cents a gallon for first x gallons, over a set period)
- Carbon tax
 - » Tax gasoline industry and credit renewable fuels
- Encourage Market
 - » Increase current RFS (volume and time)
 - » Mandate fuel blend nationally (20-30%)
 - » Gov't usage (biofuels and bioproducts)
 - » Consumer Incentives

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Agricultural Residues: Policy

- Broaden 932 and Loan Guarantees
- Ag Policies
 - » Ag residues policy consistent with use/demand ag res (CRP)
 - » Incentives for growers
 - » Incentives with environmentally low impacts processes
 - » Selection criteria to encourage regional diversity
 - » Incentives for local ownership/equity

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Agricultural Residues: Policy

- Sliding tax credit
- Set Oil Floor at \$45/barrel
- Increased Funding
 - » Basic research
 - » Stable and reliable funding for the identified R&D
 - » Intradepartmental cooperation
 - » Incentives for the future work force
- Vehicles
 - » Tax credit for renewable and hybrids (including plug-in)
 - » Incentives for development of Btu neutral engines
 - » E85 infrastructure optimizations

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Agricultural Residues: Federal Role

- Implemented and fund EPA Act 05
- Federal utilization of Biofuels and bioproducts
- Increase funding for basic and applied research; emphasizing a larger
 - » At least \$5B/year

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Agricultural Residues: Synergies and Conflicts

- What are the synergies with other breakout session
 - » Herbaceous in all areas (i.e. feedstock supply, conversion, output, etc.)
 - » Early deployment of energy crops
 - » Corn Wet & Dry Mill in that fiber could be used in the mills