Farm-Level Incentives and Policy for Growing Alternative Energy Feedstocks

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Changing Crop Patterns

- Expected crop returns drive crop patterns
  - Corn and soybeans dominate in Iowa due to their returns over variable costs

- New energy crops will have to compete for acreage
  - Need returns above variable costs and annualized establishment costs, on par with existing crops
Projected Returns

- For the next five years, returns from corn and soybeans are projected to average $250/acre

- New energy crops will need returns at or above $250/acre to pull acreage away from corn and soybeans
Switchgrass Costs

• Estimated annual cost of producing switchgrass
  – $187/acre with a 4 ton/acre yield
  – $241/acre with a 6 ton/acre yield
  – Includes baling, but not transporting the bales off-farm
Moving to Switchgrass

- Given costs and average returns for corn, farmers would consider shifting at a price of:
  - $110/ton with yield = 4 tons/acre
  - $82/ton with yield = 6 tons/acre
Ethanol Producer’s Perspective

• Feedstock bids depend on three factors
  – Ethanol price
  – Cost of converting biomass to ethanol
  – Cost of transporting biomass to plant
Transportation and Conversion Costs

- **Transportation costs**
  - Rough estimate ~ $8/ton

- **Conversion costs**
  - English et al. (2006)
    - $1.40/gallon in 2006
    - $0.73/gallon in 2015
  - Average 2008-2012 = $1.10/gallon
Switchgrass to Ethanol Costs and Returns

- At 70 gallons of ethanol/ton of switchgrass, ethanol production costs are $85/ton
  - $77/ton for conversion
  - $8/ton for transportation

- Revenues depend on ethanol price
  - At $1.75/gallon, revenue increases to $122.50/ton

- Maximum bid = the difference between revenue and cost per ton
  - Ethanol price $1.75, max. bid = $37.50/ton
Switchgrass Subsidies

- Based on these numbers, Iowa land would not move to switchgrass without additional support
  - Subsidies from $44 to $107/ton

- Other areas of the country would not require such high subsidies to switch
  - Lower returns to traditional crops
Policy Options

• Biomass Reserve Program
  – Payments in exchange for dedicated biomass production
  – Allow returns to determine if biomass is harvested
  – Additional payments for field trials of alternative crops and cropping systems
Two-Pronged Approach

• Biomass Reserve
  – Provides feedstock for cellulosic ethanol

• Biomass Innovation Program
  – Develops cropping alternatives to improve cellulosic ethanol’s bottom line
Program Parallels

• Biomass Reserve similar to Conservation Reserve Program
  – Major difference: option to sell biomass

• Biomass Innovation Program similar to Conservation Innovation Grants
  – Could be integrated into Conservation Security Program