

Report Out II: Short Rotation Woody Crops– 2030 Target

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

Biomass

Short Rotation Woody Crops : Cost Target

- Feedstock to cellulosic ethanol from dedicated crop for \$35-\$80 /dry ton.
- Short rotation woody crop net cost:
\$0.50 to \$0.90 per gallon
- Ethanol from woody crops target cost:
\$1.50 to \$1.75 per gallon
** It does not include other bi-products*

Short Rotation Woody Crops : Production Target

- 18-50 billion gallons of ethanol from perennial crops by 2030

**This is a conservative estimate. It includes woody crops and herbaceous perennial crops.*

- Short-term goal of 125 million gallons by 2012.

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Short Rotation Woody Crops : R&D Priorities

- Optimizing Production System/Production Cost
 - » Yield Improvement
 - » Harvest and Handling
 - » Conversion technologies

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Short Rotation Woody Crops : R&D Solutions for the Identified Barriers

- Yield Improvement
 - » Silviculture/Agronomy
 - ♦ Effects of soils and climate on yield
 - ♦ Integrated silvicultural regime
 - » Crop Genetic Productivity Enhancement
 - ♦ Breeding and Selection
 - ♦ Application of genomics tools
 - ♦ Field trials testing
 - ♦ Eco-physiology of forest growth
 - » Sustainability
 - ♦ Soil, air, and water

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Short Rotation Woody Crops : R&D Solutions for the Identified Barriers

- Harvest and Handling
 - » Feedstock mix consistently available
 - » Low cost transport system
 - » Improved logistics
 - » Improved infrastructure

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Short Rotation Woody Crops : R&D Solutions for the Identified Barriers

- Conversion technologies
 - » Biochemical Conversion of Cellulose and Hemi-cellulose
 - » Gasification to Fischer-Tropsch Catalysis or Syngas Fermentation
 - » Fast Pyrolysis

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Short Rotation Woody Crops : Policy by 2012

- I. Demand policy
 - Establish consistent market for product
 - Establish national and international policies for biofuel production (e.g. carbon credits)
 - Renewable Fuel Standards (RFS)

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Short Rotation Woody Crops : Policy by 2012 (Cont.)

II. Supply policy

- Landowner assistance
- Financial incentives for land owners (e.g., cost share, Commodity price support and crop insurance)
- Legislation that encourages short rotation woody crops for bio-refineries
- Restart BFDP (Biofuel Development Program)
- Land use incentives (CRP land to biofuel production)

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Short Rotation Woody Crops : Federal and Other Role

- Financial support for long-term, sustained feedstock R&D for all regions in the country
- Support structure for large-scale woody crops development
 - » Information and education for technology transfer-interdepartmental
 - » Technical assistance to land owners and fuel production facilities
 - » Sponsor national, state, regional, and local conferences to share multi-disciplinary prospective
 - » Develop academic programs/curriculum modification

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Short Rotation Woody Crops : Federal and Other Role (Cont.)

- Support regional demonstration plants using woody biomass feedstock to provide fuel
- Risk management for scale-up operation through loan guarantees
- Tax incentives for feedstock production and biofuel production

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Short Rotation Woody Crops : Synergies

- Seasonal harvest compatibility with native forest products to ensure continuous supply
- Infrastructure compatibility with forest residue and forest feedstock
- Conversion technology can handle multiple feedstocks
- Scale-up complimentary with other feedstock
- Policy needs (e.g., tax incentives)
- Geographic compatibility

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Short Rotation Woody Crops : Conflicts

- Limited Farm Bill appropriation for woody crops
- Competition with other users (e.g., pulp and paper)
- Potential environmental opposition
- Equal cost comparisons across crops
- Land use allocation with other crops
- Competition with other energy usages
- Allocation of the 30 x 30 target
- Available R&D funds

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Short Rotation Woody Crops : Advantages

- I. Process Benefits
 - Adaptability of species to regional areas
 - Genetic resources available for manipulation and vegetative propagation
 - Lower ash content
 - Year-round availability
 - Easy to store
 - Stable, consistent feedstock supply
 - High density products
 - Mix with the other woody feedstock

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Short Rotation Woody Crops : Advantages

II. Environmental Benefits

- Lower inputs of fertilizer and pesticides—
lower carbon inputs
- Reduce soil erosion
- Protect water quality
- Protect air quality
- Sequester carbon
- Potentially improve wildlife habitat
- Fully sustainable production systems