Prospects for the Commercialization of Cellulosic Ethanol

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State Agriculture and Rural Leaders
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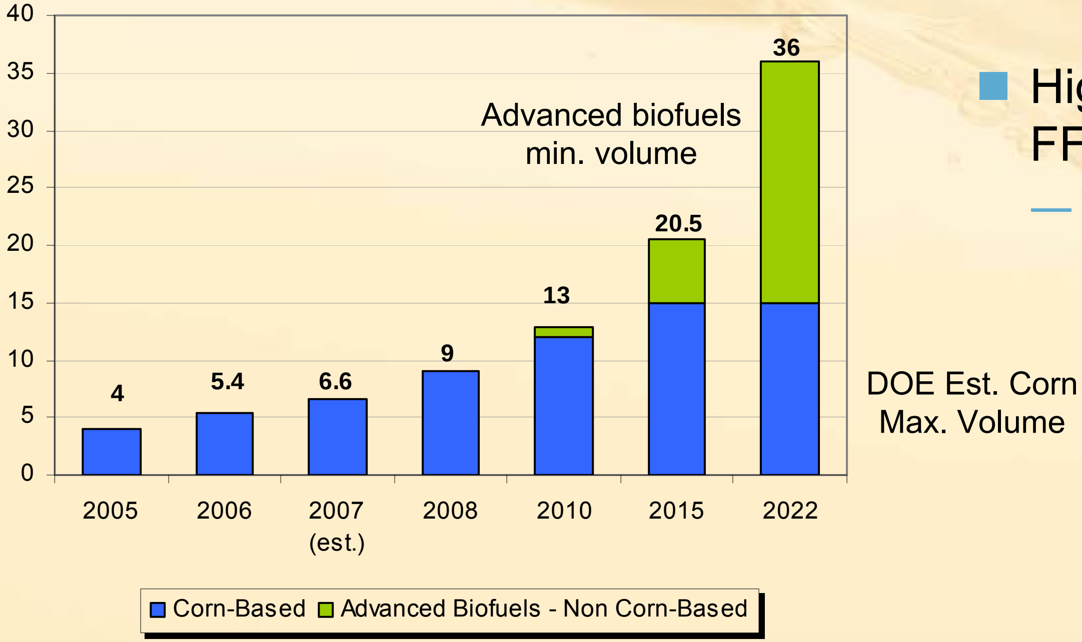
Range Fuels Overview

- Formed in July 2006 by Khosla Ventures to commercialize cellulosic ethanol
  - Multi-sourced technology
- Supported by substantive federal, state and local incentives
  - DOE: $76MM in a competitive evaluation
  - Other state and local incentives
- Development Center and K2A Pilot Plant complete
- Broke ground in Soperton, GA, for first U.S. commercial-scale cellulosic ethanol plant
- Additional sites and partnerships secured

Range Fuels

Increasing Ethanol Demand and Support

- 60% growth in demand from 4 Bn GPY in 2005 to 6.6 Bn GPY in 2007
- Strong, bipartisan support for cellulosic biofuels
  - Recent passage of "Energy Independence and Security Act of 2007"
    - 36 Bn GPY by 2022 includes 21 Bn GPY of Advanced Biofuels
    - Increased cellulosic credits likely in new Farm Bill in 2008 ($0.64/gal)



Source: Renewable Fuels Association

- Higher demand for E85 fuel as FFVs are more widely adopted
  - By 2012 U.S. automakers have commited to% of production to FFVs

U.S. Cellulosic Ethanol Potential

- 140 Bn GPY – 2005 U.S. DOE/USDA Study
  - Agricultural 100 Bn gpy
    - Crop residues, perennial crops, animal manure, process residues and grains used for biofuels
  - Forestlands 40 Bn gpy
    - Wood and paper & pulp processing residues, logging and site clearing residues, fuel treatment thinnings
- Total U.S. Gasoline Consumption
  - 140 Bn gpy
  - President's goal - 35 Bn gpy alternative fuels by 2017

Worldwide Cellulosic Ethanol Potential

- Total Worldwide Gasoline Consumption
  - 300 Bn gpy vs. 140 Bn gpy from U.S.
- Assessments Underway Globally

Range Fuels' Business

- Focus
  - Green energy
  - Cellulosic ethanol
- Business Model
  - Design
  - Build
  - Own
  - Operate
- Global Presence

Key Highlights

- Thermo-chemical based technology with a developmental headstart
  - Economically competitive without subsidies from inception
- Low marginal cost of production
- Feedstock flexibility
  - Feedstock advantage of woody biomass
- Highly scalable business model; replicable plant modules
- Environmentally friendly production process
- Access to economic development funds and additional legislative measures that support development of cellulosic ethanol technologies
- Experienced management team and strategic investors and partners

Operational Facilities

- 4 generations of biomass conversion testing environments
- Catalyst testing facilities
  - CC10's
  - CC100
  - CC400
  - CC1000
- Pilot-scale
  - K2A Optimization Plant

K2A Optimization Plant

Management Team

- Proven Leadership from High Tech, Renewable Energy Industries and Tech-Intensive Coal, Coal Gasification, and Gas-to-Liquids Industries
  - Mitch Mandich, CEO – Apple Computer
  - Rick Winsor, President & COO – Horizon Wind Energy
  - Kevin Biehle, V.P. Production – VeraSun; BASF
  - Mike Cate, V.P. Procurement & Fabrication – Washington Group
  - Arie Geertsema, Sr. V.P. Technology – CAER; Sasol
  - Dan Hannon, CFO – Reliant Energy, Exxon
  - Bud Klepper, Chief Technical Specialist – Inventor
  - Larry Robinson, V.P. Projects - Bechtel
  - Bill Schafer, Sr. V.P. Business Development – NexGen

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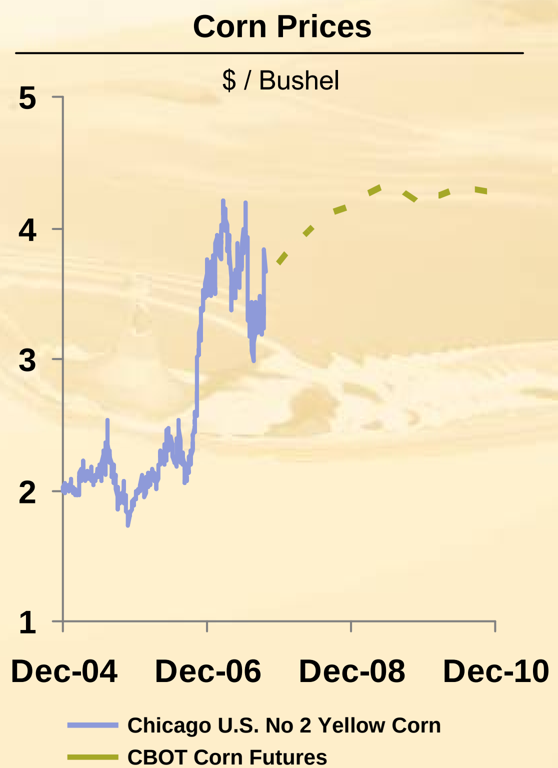
Limitations of Current Technology

- Current production technologies use corn or sugarcane
  - Limited max. capacity (corn 15 BGY); high cost
  - Import tax of $0.54/gallon

- Food versus fuel
  - Low land efficiency for fuel production
  - Sharp increase in feedstock prices
  - Depleting water tables
  - Wide price fluctuations due to weather
  - Resistance from animal feed lobby

- Low fossil energy ratios
  - Corn at 1 to 1.4 input to output
  - Sugarcane ethanol at 1 to 8
  - Cellulosic ethanol at 1 to 10

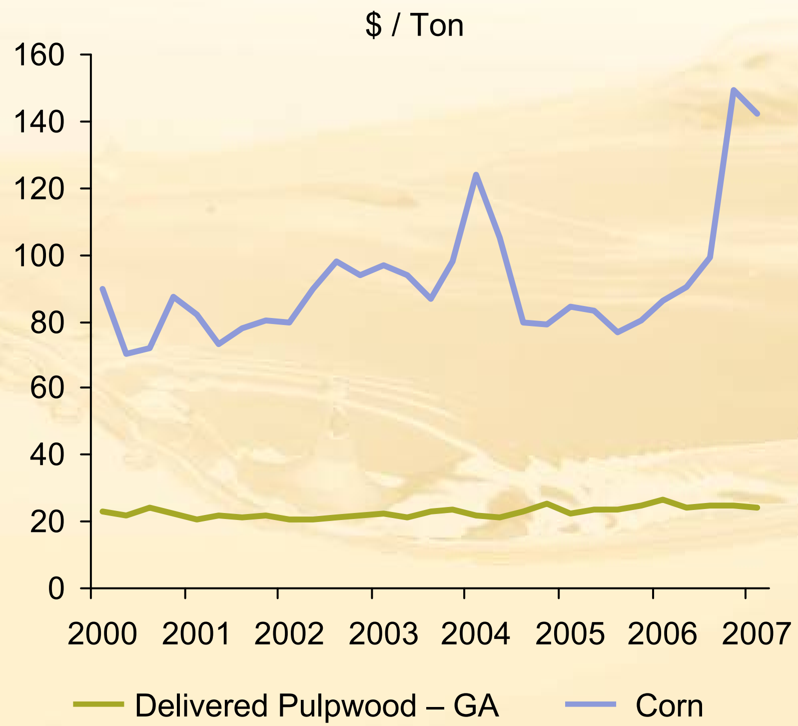


Source: Bloomberg

Range Fuels' Technology

- Cheaper than gasoline, unsubsidized
- Cheaper, less volatile feedstock
- Flexible "high volume" feedstock supply
  - Wood chips
  - Municipal waste
  - Industrial waste
  - Manure
  - Switchgrass
  - Corn stover
  - Olive pits
  - Coal
- Environmentally superior

Volatility: Corn vs. Pulpwood Prices

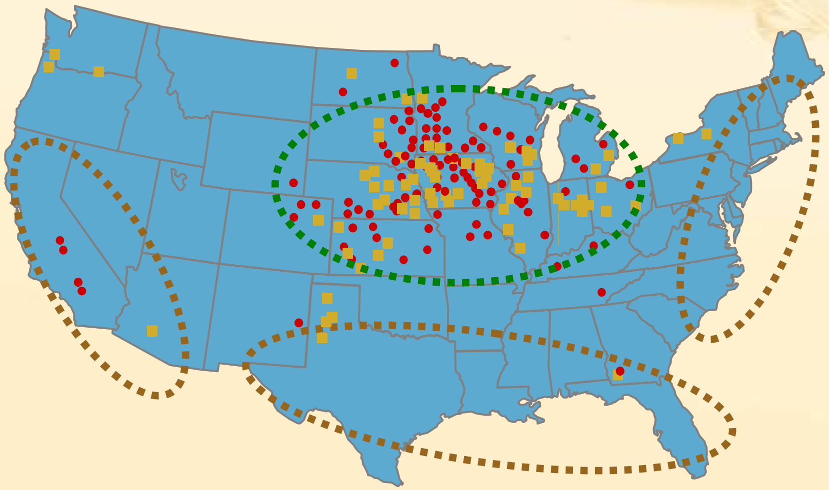


Sources: Bloomberg and Pöyry

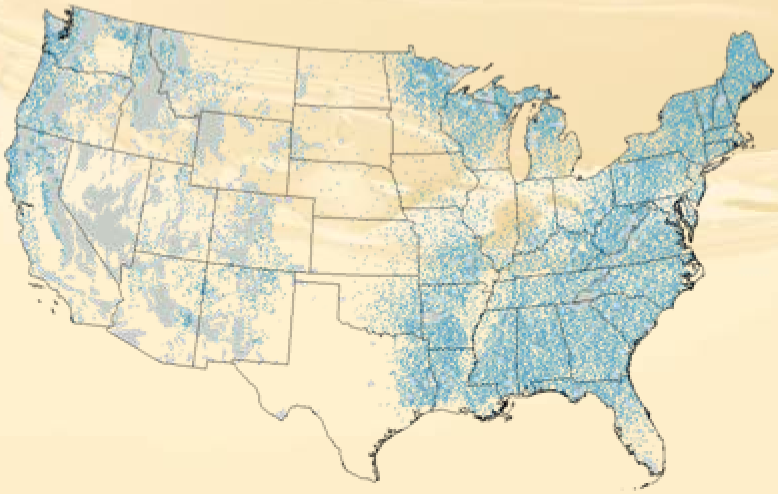
Stable Pricing, Large Availability Using Woody Biomass

- Over 400 MM tons of “low cost” woody biomass available annually
- High land efficiency for cellulosic crops; low water and fertilizer inputs
- Cellulosic availability fits demand; fewer transportation issues
- Little competition for feedstock as paper mills decline

U.S. Ethanol Biorefinery Locations



Non-Federal Forest Land Density, 1997



- Biorefineries in Production
- Biorefineries under Construction
- Corn-Ethanol Production
- Major Gasoline Consumption

- 25,000 acres of Forest Land per dot
- 95% or more Federal area

Source: Renewable Fuels Association

Source: U.S. Department of Agriculture

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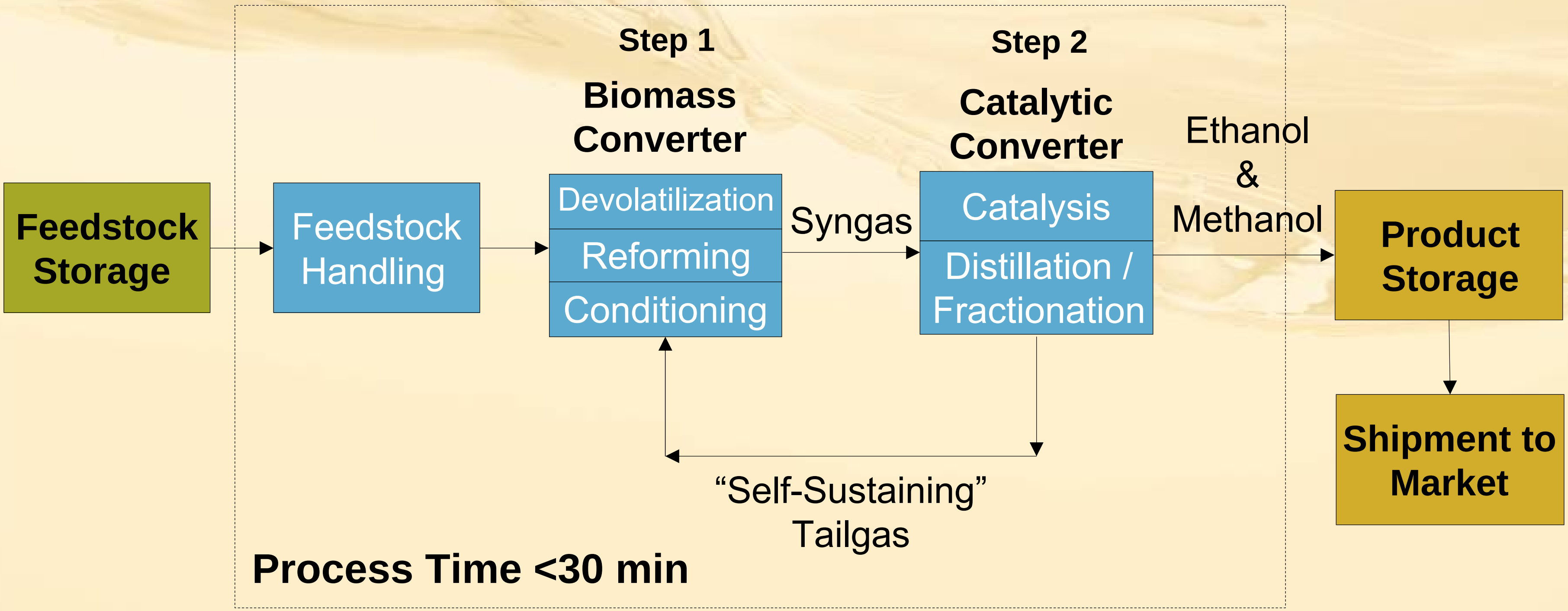
Differentiated Technology

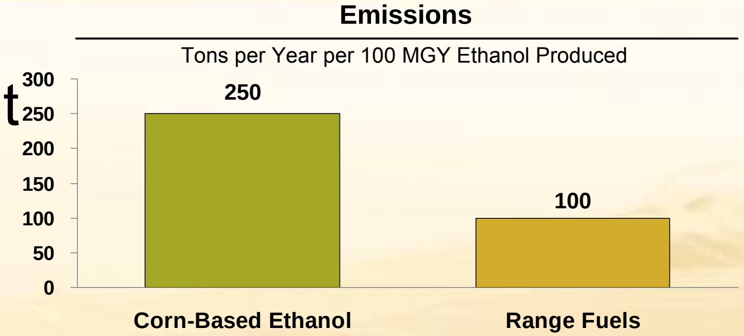
- Proven two-step thermo-chemical process
- Highest yield of ethanol per ton of feedstock

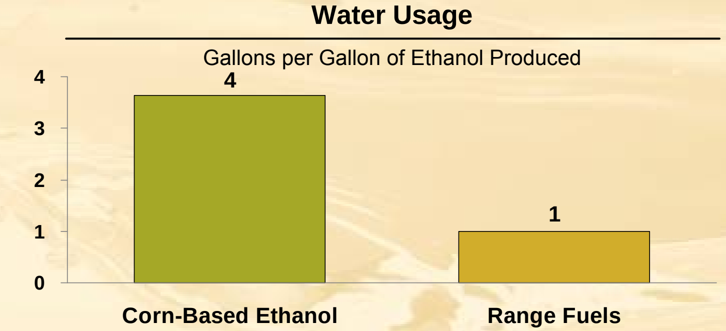
K2 System Configuration

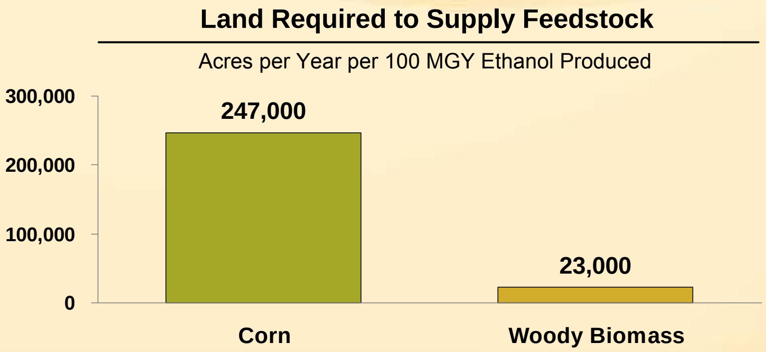


Environmentally Friendly Production Process

- Soperton: minor emissions source permit
  - Only one waste stream: saleable char
- Lower water use
  - 25% of typical corn-ethanol plant
  - Reduces purification costs and impact
- Material land use benefits
  - Polyculture “compatible”
  - Better yields, biodiversity, low inputs







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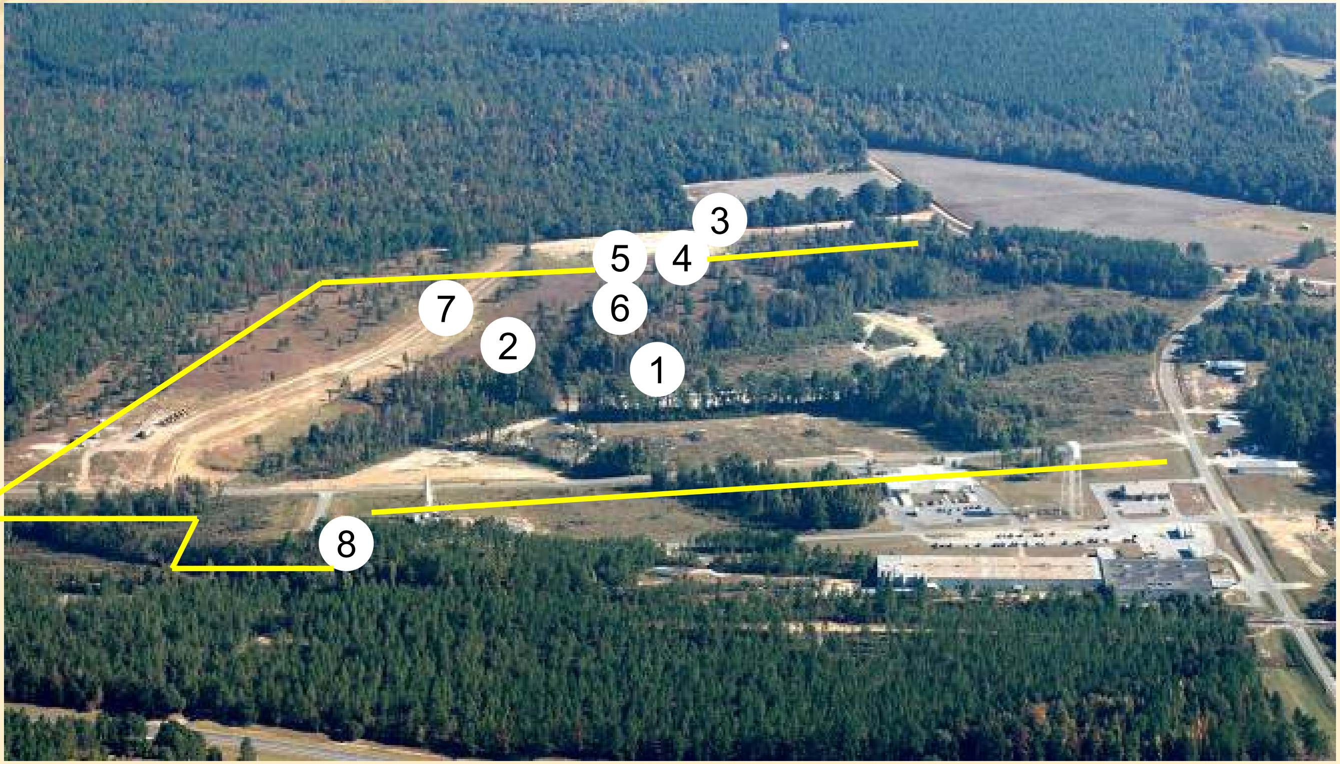
World's First Commercial Cellulosic Plant

Soperton, GA: World's First Commercial Cellulosic Plant



1. **Wetlands**:
   Will be protected and left undisturbed
2. **Range Fuels Drive**:
   Specially created road that separates plant operations from the wetlands
3. **Feedstock Receiving and Storage**:
   Receipt and storage of wood chips
4. **Conveyor System**:
   Moves feedstock from receiving and storage area to modular converters
5. **Biomass Converters**:
   Convert wood chips to syngas
6. **Catalytic Converters**:
   Transform the syngas into alcohols, which are then separated and processed
7. **Product Storage**:
   Collection and storage of liquids (ethanol and methanol)
8. **Loading and Delivery**:
   Transportation by either truck or rail

Soperton Plant – Site Work

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Soperton Plant – Artist's Rendering

Soperton Plant – Groundbreaking

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Soperton Plant – Groundbreaking

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Soperton Plant – Site Clearing

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Soperton Plant – Woody Biomass Feedstock