Biomass CHP Systems Short Course

Penn State Bioenergy Short Course Series 2010

Native Grasses as a Biomass Fuel

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Overview

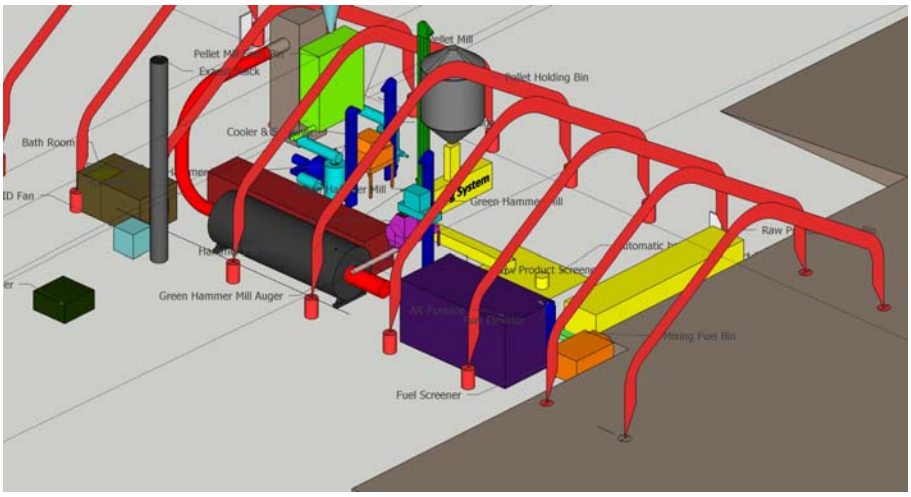
- Introduction – ECS and EB
- Growth and range
- Ecological value
- Various forms
- Supply

Ernst Conservation Seeds, Inc.

- Founded 1962
- Meadville, PA – Crawford County
- Native seed company
- 200+ species
- Applications include wetland mitigation, wildlife habitat, erosion control, land restoration, conservation
- 60+ full-time employees
- 8,000 acres
- Largest producer of switchgrass seed in the East

Ernst Biomass, LLC

- Founded 2008
- Dedicated to the production of solid fuel from native warm season grasses
- First of its kind
- Construction began September 2010
- Due to begin production 1st quarter 2011
- 24,000 tons/year
- Three markets: Residential, commercial, industrial



Switchgrass 101

- Switchgrass is often used for multiple native, warm season grass species, including:
  - Big Bluestem
  - Indiangrass
  - Prairie Cordgrass
  - Coastal Panic Grass

“Switchgrass” Positives

- Perennial
- Planted with seed
- Native
- Utilizes marginal ground
- Harvested with existing equipment
- Efficient use of water and nutrients

“Switchgrass” Negatives

- Establishment phase
  - First year is mostly root growth
- Herbicide
- Competition from weeds
- Minimal development
- Logistics
- Silica content

Range of Adaptation

Varieties

Ecological Value

- Native warm season grasses provide:
  - Wildlife habitat
    - Deer, pheasants, song birds
  - Improved soil conditions
    - Breaks through soil striations
  - Improved water quality
    - Provide nutrient capture eliminating from run-off
  - Carbon sink
    - Below-ground biomass

Various Forms

- Ground/Chopped
- Baled
- Briquettes
- Cubes
- Pellets
- Liquid

Ground/Chopped

- Least expensive process
- Extremely limited logistically
  - Transportation
  - Storage
- Material handling equipment must be large
- Trailers

Baled

- Marginally more expensive
- Easier to handle
- Incremental opportunity for existing equipment
- Stability
- Logistics

Briquettes

- Least expensive densification
- Forgiving process
- Increased bulk density
- Stability
- Robust material handling required

Pellets

- Most expensive densification
- Good material flow
- Below “best use”
- Processing can be challenging

Liquid

- Increased energy density
- Theoretical
- Existing infrastructure
- “Drop in” in certain applications with minimal processing
- Other applications require refining
- Lab-scale

Supply

- Independently Owned
  - LaFarge
- Contract-based
- Co-op
- Small vs. Large
  - Economies of scale vs. Management challenges
- The best fit will vary between regions

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