CONNECTING INTEGRATED LANDSCAPE MANAGEMENT WITH BIOMASS FEEDSTOCK LOGISTICS

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Integrated Landscape Decision Making

- Low Diversity
- Large Volume per Area

Integrated Landscape Management

- High Diversity
- Multiple Feedstocks
- Low Volumes per Area

Logistical Complexity
Advanced Uniform Design incorporates many species and types of biomass that are formatted at specialized preprocessing facilities called “depots”.

Advanced Uniform Design

- Woody Residues
- Round Wood and Woody Energy Crops
- Municipal Solid Wastes
- Wet Herbaceous Residues, and Energy Crops
- Dry Herbaceous Residues, and Energy Crops

Preprocessing Depot

Conversion (Biochemical or Thermochemical)

Multiple Biorefineries

Rail, Truck, or Barge

Processing/Shipping Terminal

Preprocessing Depot

Deconstruction
Densification
Moisture Management
Role of Depots in Advanced Uniform Design

Depots place preprocessing operations early in the supply chain to engineer feedstocks to be compatible with downstream handling operations.
Other Advantages of Advanced Uniform Design and Depots

**Conventional Design Case**
- Accessible Resource: 114K DT
- Elevated Risk
  - Supply Risk
  - Material Quality and Spec Risk
  - Cost Risk

**Distributed Depot Design Case**
- Accessible Resource: 320K DT
- Stable System
  - Supply and Cost Risk Mirror the Grain System
  - Material Quality Standards
Blending/Formulation

Blending allows for cheaper, lower quality feedstocks to be used with more expensive high quality to meet specification for more product overall.
Biomass Logistics Model

- Allows for design development and evaluation of feedstock supply systems.

**Spatial Data System**
- State
- County
- Region (Fields)
- Area

**Production Data**
- Yield
- Harvest Days
- Harvest Weeks
- Feedstock Harvested
- Acres Planted

**Management Data**
- Crop(s)
- Rotations
- Tillage
- Fertilizer
- Operations
- Removal Rate

**Conversion Interface**
- Biopower
- Biochemical Conversion
- Gasification
- Pyrolysis

**Supply System Scenario Development**
- Grain Harvest with Platform Header
- Grain Harvest with Stripper / Picker Header
- Standing Grain Crop
- Corn Crop
- Windrow / Condition
- Square Bale Collection System
- Drop Bale Stack
- Square Bale Stack
- Fast Bale Stack
- Rebag
- Rebag
- Short
- Tarp

**Preprocessing**
- Moisture Adjustment
- Twine
- Broken / Off - Spec Bales
- Twine Disposal (Compost)

**Handling from Queuing**
- Unload & Stack
- Handling from Preprocessing
- Broken / Off - Spec Bales
- Twine Disposal

**Feed System**
- Even Flow
- High-Pressure Feed System
- Low-Pressure Feed System

**Conversion**
- Biochemical Conversion (Gasification)
- Thermochemical Conversion (Low Pressure)
- Thermochemical Conversion (High Pressure)