



# Biomass Power

*Utility R&D Program*

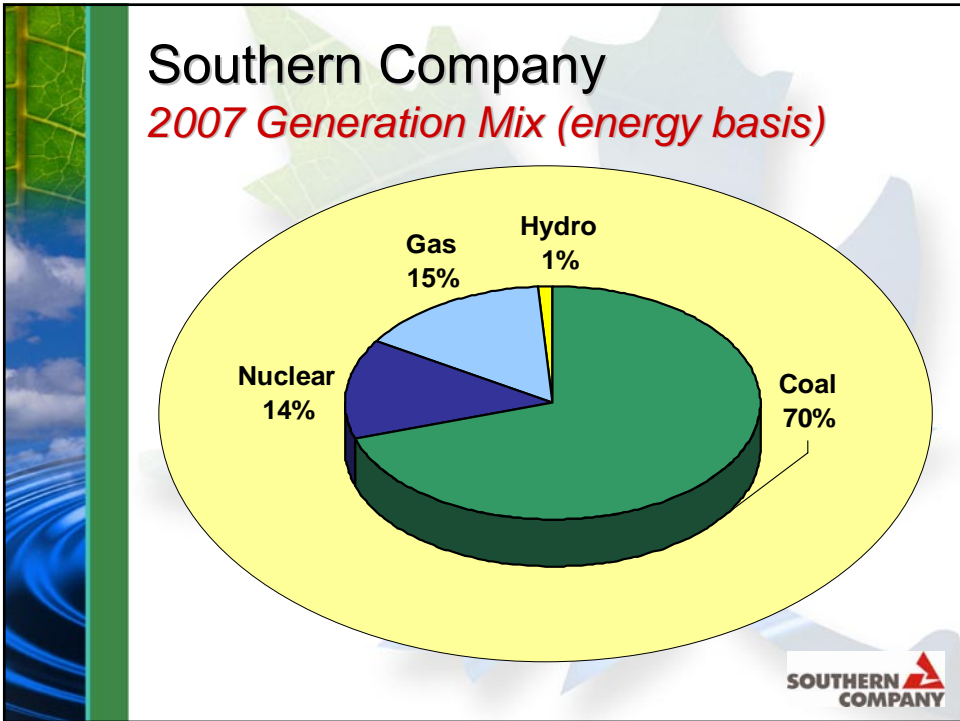
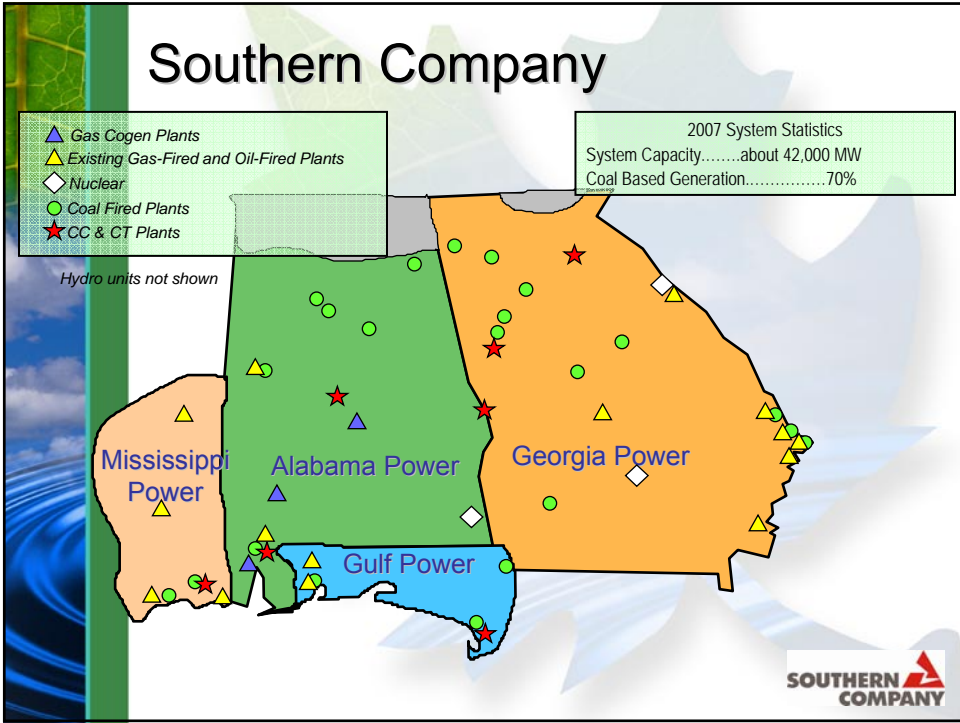
**Biomass South 2008  
Raleigh, NC  
September 23, 2008**



## Presentation Topics

1. Southern Company generation mix
2. Renewable power drivers
3. Renewable resources
4. Technology and resource issues
5. Biomass power options





# Renewable Power Drivers

- Renewable portfolio standards
- Renewable power sales
- Institutional customers
  - Federal
  - Military
  - State
- Large commercial
  - Wal-Mart
  - Target
  - The Home Depot

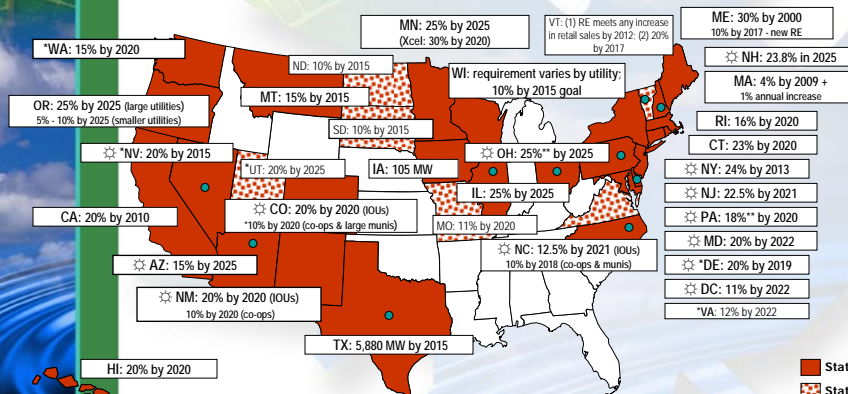


# Renewable Power Drivers

DSIRE: [www.dsireusa.org](http://www.dsireusa.org)

June 2008

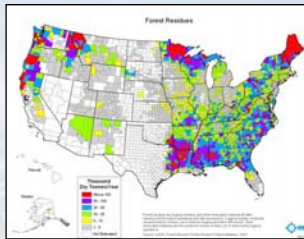
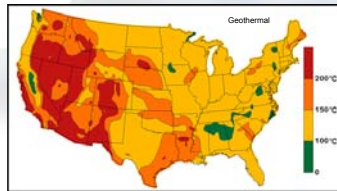
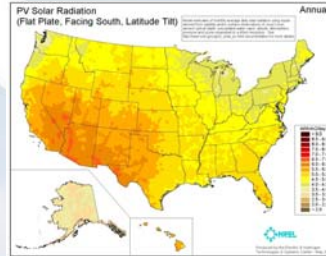
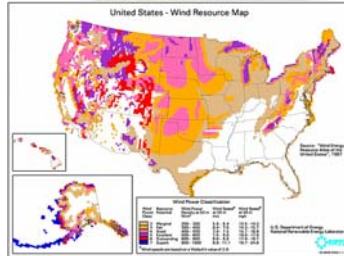
## Renewable Portfolio Standards



☀ Minimum solar or customer-sited RE requirement  
 \* Increased credit for solar or customer-sited RE  
 \*\* Includes separate tier of non-renewable "alternative" energy resources



## Renewable Power *Resource Potential*



Source: National Renewable Energy Laboratory



## Renewable Power *Technology and Resource Issues*

- High capital cost
- Lower capacity factors
- Lower energy density compared to fossil fuels
- Not dispatchable
- *Biomass is the most plentiful renewable resource in the southeast*





## **Biomass Power Technology Program**

### ***Objectives***

- Evaluate and demonstrate biomass power technologies
- Reduce the cost of biomass power for the southeast



## **Biomass Co-firing**



## Biomass Power Options

### *Biomass Co-firing Approaches*

1. **Direct injection** – Introduce ground biomass pneumatically into the boiler through dedicated burners (10% or more energy input basis)
2. **Co-milling** – Mix biomass with coal and introduce into the boiler through the coal handling system (3 to 5% energy input basis)



## Biomass Power Options

### *Switchgrass Direct Injection*



- Fuel conveyed by air to boiler combustion zone



## Biomass Power Options

### *Biomass Co-milling*

- Co-milling (Plant Gadsden Unit 1)
  - Sawdust
  - Wood chips



## Biomass Power Options

### *Biomass Co-firing Summary*

- Switchgrass direct injection successful
- Sawdust co-milling successful
- Wood chip co-milling plugged pulverizers
- “Small” wood chip co-milling successful

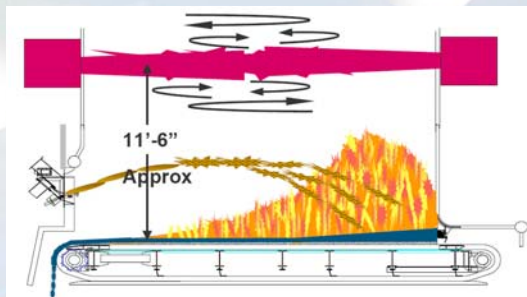
# Biomass Re-powering

*(100% Conversion to Biomass)*



## Biomass Power Options

*Proposed Mitchell Biomass Grate Retrofit*



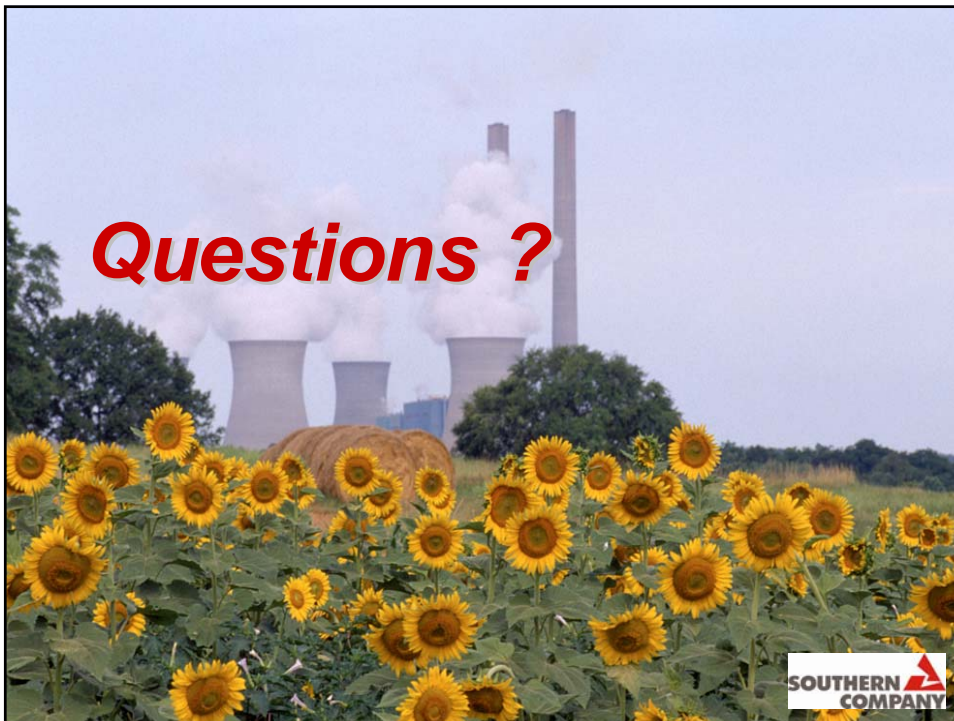
# Biomass Power Options

## *Proposed Mitchell Wood Yard*



**SOUTHERN  
COMPANY**

***Questions ?***



**SOUTHERN  
COMPANY**