

BIOMASS GREEN ENERGY

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Biomass Fuels

- Energy from Plants/Animals
 - Organic
 - Renewable
 - Stored Energy from Sun
- Types of Fuel
 - Wood
 - Crops
 - Manure
 - Garbage

Biomass Energy Process

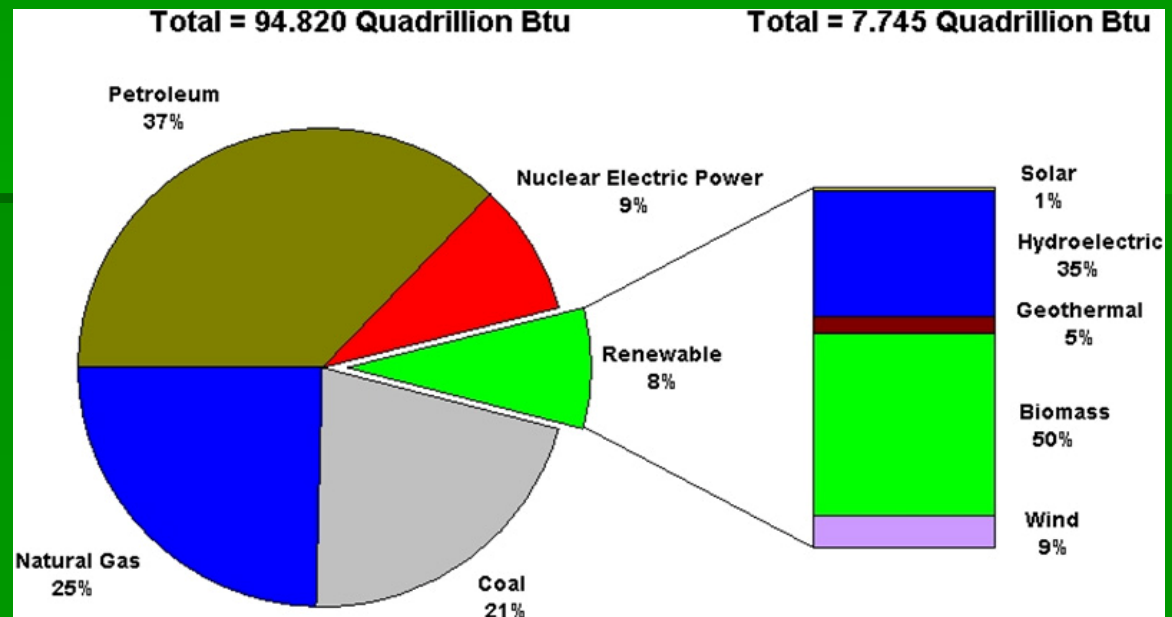
- Burning Generates Heat
- Conversion
 - Methane Gas
 - Ethanol or Biodiesel

Biomass Power Plants

- Approximately 90 Waste-to-Energy plants
- Generate ~ 14.5 Million kW-hours of Electricity

Biomass Energy Supply

Biomass fuels provide
~ 3 to 4 percent
of energy in the US

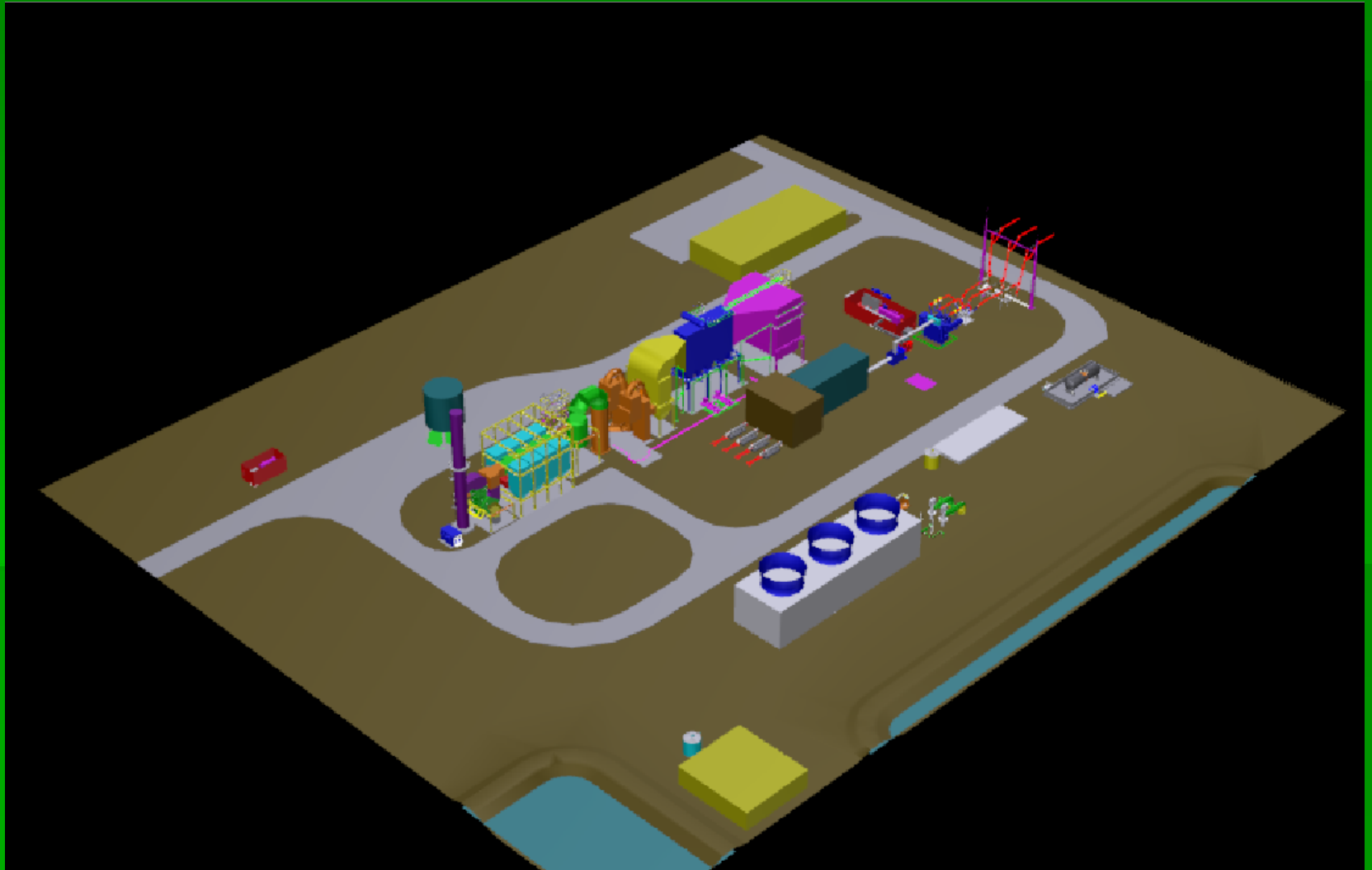


Source: Energy Info. Administration, August 2010

Piedmont Green Power Project

- EPC Project
- Located in Georgia
- Abundant Supply of Wood Waste

Piedmont Power Plant



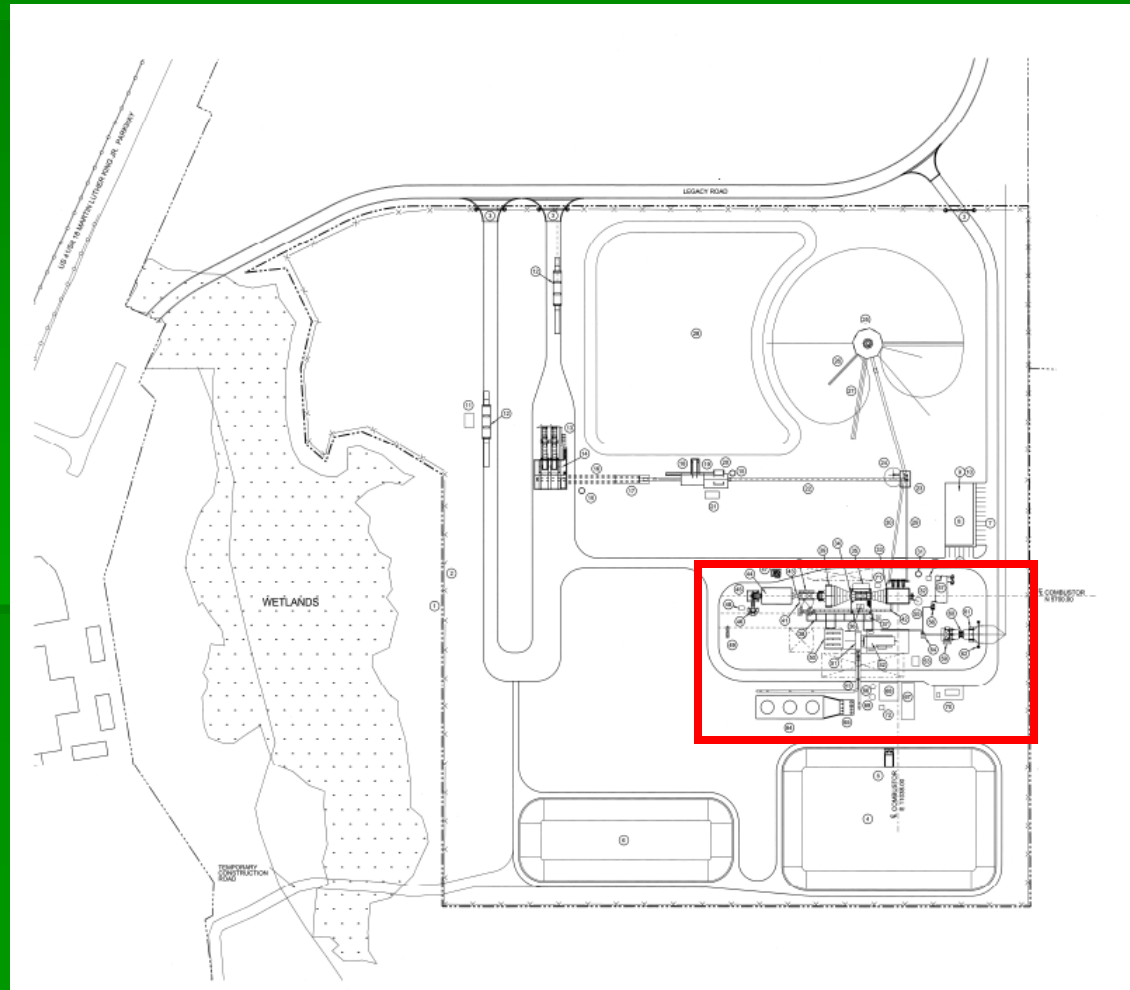
Piedmont Green Power Project

- Generates 60 MW of electricity
 - Burns wood-product waste
 - Uses Biodiesel fuel for startup & standby generator
-
- Total Biomass

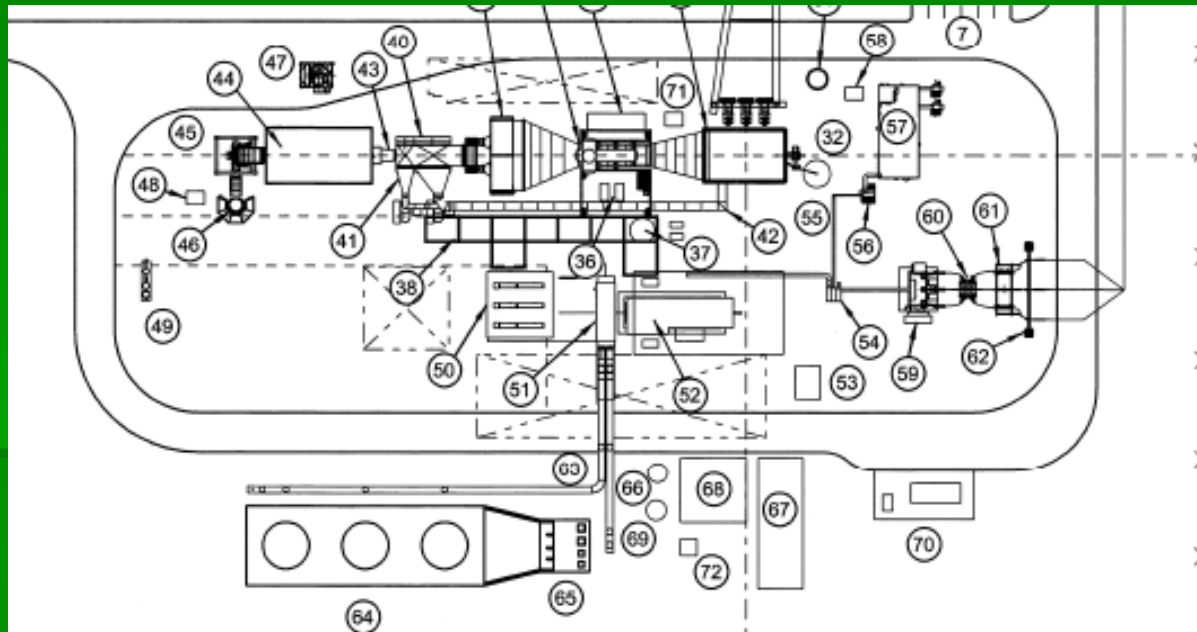
Piedmont Green Power Project

- Combustor
- Boiler
- Steam Turbine
- Air Pollution Control
- Fuel Handling

Site General Arrangement



Site General Arrangement



Biomass Energy Challenges

- Smaller capacity: usually ≤ 50 MW
- Need long-term fuel source
- Method of fuel delivery

Biomass Fuel Delivery

- Usually Trucks
- Trains not reliable / Lengthy delivery time
- Create traffic concerns
- Fuel used for delivery
- 60 to 80 Truck loads per day
 - 6 days per week

Biomass Emissions Control

- Similar to Coal Plants
 - NO_x control
 - Particulate control
 - SO₂ control

NOx Control

- Lower combustion temperatures
 - 1600 to 1800 °F
- Selective non-catalytic reduction system (SNCR)
- Injection of Aqueous Ammonia
- $\text{NO}_x + \text{NH}_3 \rightarrow \text{Nitrogen} + \text{H}_2\text{O Vapor}$

Particulate Control

- Baghouse Fabric Filter System
- Collects Particulate as Ash
- Disposed in Landfill
- Removes 99 percent

SO₂ Control

- Dry Absorbent Injection System
- Sodium Bicarbonate Reagent
- Removes 50 to 90 percent SO₂

QUESTIONS ??

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