



BALANCED SOLUTION

Growing Biomass Energy: Part of the Balanced Solution

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Florida Biomass Projects
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Case for Biomass in Southeast

- | Limited hydro, geothermal, wind.
- | Solar has some potential
- | Tropical climates enable biomass
 - w 10,000,000 acres of crop land in Florida
 - w 50% dedicated to food crops
- | Recovered phosphate land (500,000 acres)
- | Technology development in crops and process



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Potential Energy Crop Types

Type	Key Points	Growing Needs	Potential Yields (Florida climate)
Pine Trees	Indigenous and plentiful	Natural rainfall	4 -5 tons / acre
Switch Grass	Easy to plant and grow	Needs water and fertilizer for high yields	6 - 8 tons / acre with ongoing harvesting
Energy Canes	Individual plantlets, higher planting costs	Requires limited fertilizer and less water	16 - 18 ton / acre with seasonal harvest
Arundo Donax	Individual plantlets, higher planting costs	Natural rainfall, no fertilizer	22 -25+ tons / acre

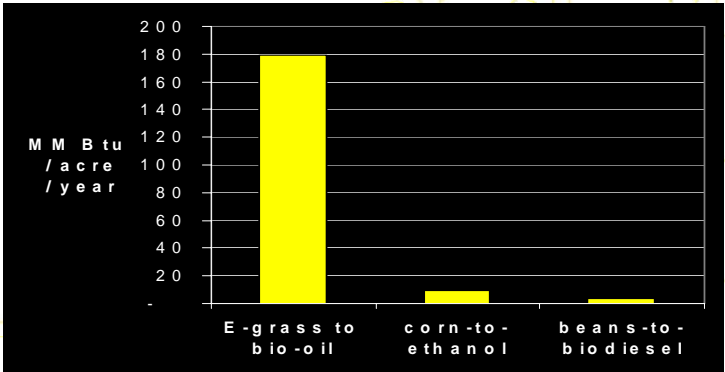
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 Progress Energy

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High energy content and attractive physiochemical properties



Process	Energy Content (M M Btu / acre / year)
E-grass to bio-oil	~180
corn-to-ethanol	~10
beans-to-biodiesel	~5

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Introduction to E-grass™

- | E-grass™ is the trade name for *Arundo donax*



E-grass™ Biomass Power Plant

- | 1st Stage of preparing E-grass™ crop





Mechanically harvestable



E-grass™ Biomass Power Plant

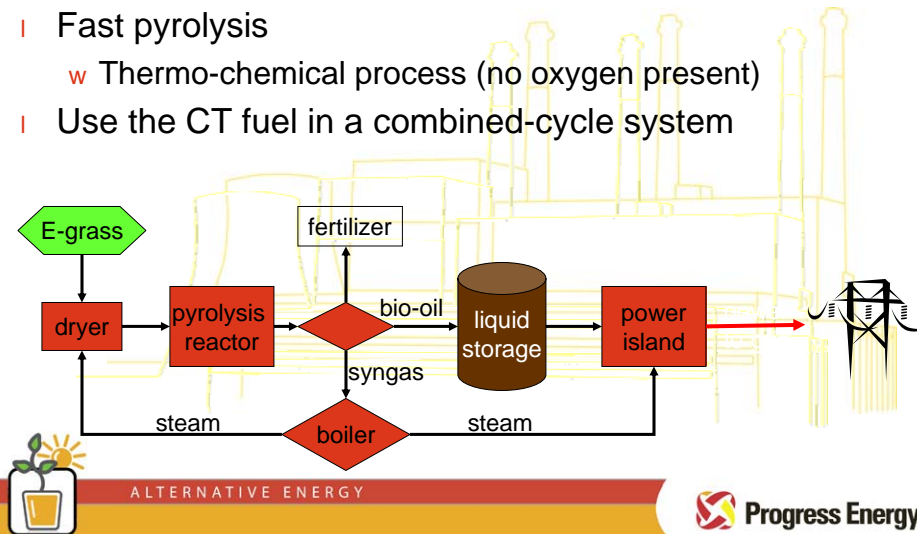
- | 130 MW Bio-Energy System
- | Uses E-grass™ for fuel that is grown in a closed loop on site
- | Will power approximately 83,000 homes
- | Will save 20 million tons of carbon emissions





E-Grass™ Conversion Process

- | Fast pyrolysis
 - w Thermo-chemical process (no oxygen present)
- | Use the CT fuel in a combined-cycle system



Other Biomass Opportunities

- | BG&E waste wood / energy crop facilities
- | Ridge Generating waste wood facility
- | Biofuel co firing in utility plants





Biomass Gas and Electric

- | Two 75 MW contracts for 20 years
- | Convert waste wood to gas and then to electricity
- | Potential for a dedicated energy crop



Ridge Generating Station

- | Fuel Sources
 - w Wood waste 66% or 30MW
 - u 250,000 tons a year
 - w Scrap tires 30% or 14MW
 - u 35,000 tons a year
 - w Landfill gas 4% or 2MW
- | Plant operation details
 - w Traveling grate stoker boiler
 - w Net generation: 200,000 MWH/yr



This plant processed wood debris from our 2004-2005 hurricanes from two counties.





Characteristics of biomass facilities

- | Cost competitive with natural gas
- | Land cost is key driver
- | Tropical climate increases yield
- | Operates like a utility power plant
 - w Firm capacity
 - w Dispatchable
 - w Fuel inventory for emergencies



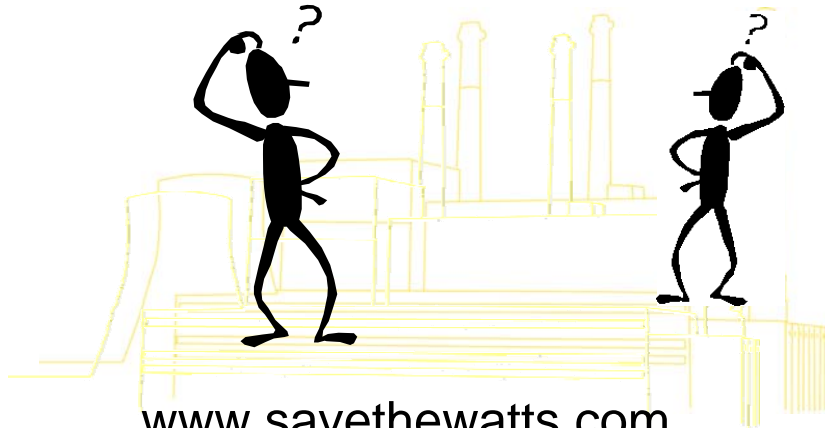
Key Issues

- | Market Acceptance: Only biomass projects have been able to meet avoided cost limits.
- | Type of RECs generated
- | Value of firm vs. non firm capacity
- | Environmental issues with high yield energy crops





Questions



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