

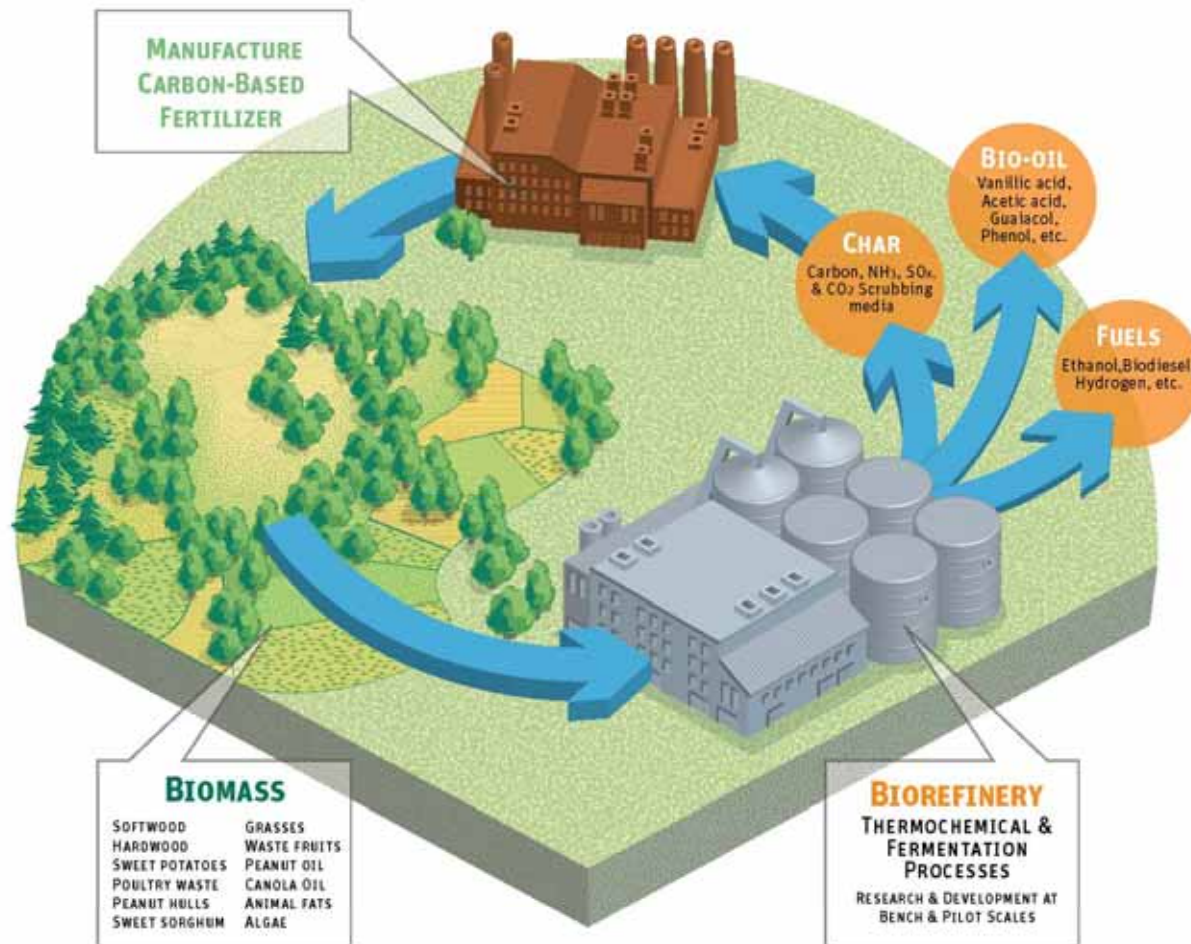


Energy, Fuels and Chemicals from Agriculture

FERTILIZER
OUTLOOK AND TECHNOLOGY
CONFERENCE

NOVEMBER 2008 • CHARLESTON, SC

THE INTEGRATED BIOREFINERY



Renewable Energy Options

- Wind Energy
- Solar Energy
- Geothermal Energy
- Hydroelectric Energy
- Biomass Energy

Renewable Energy Options

- Wind Energy
- Solar Energy
- Geothermal Energy
- Hydroelectric Energy
- **Biomass Energy**

Energy and Agriculture

U.S. energy independence and security lie squarely at the intersection of U.S. Agriculture and Energy Industries.

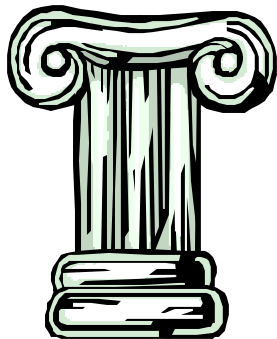
Agriculture is the best source of practical plentiful near-term renewable fuels and energy

Biomass is the only renewable source liquid transportation fuels

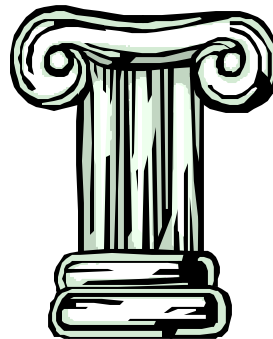
Renewable Biomass Energy

The Three Pillars

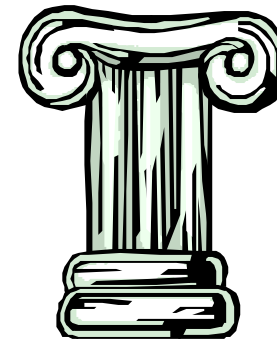
Economic
Development



Environment



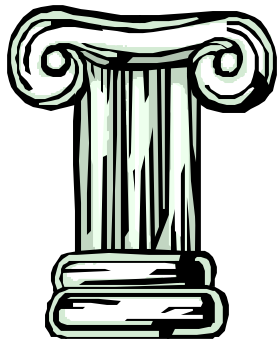
National Energy
Security



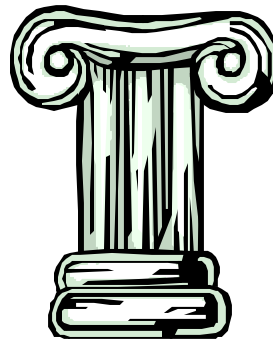
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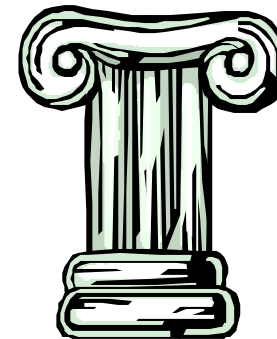
Economic
Development



Environment



National Energy
Security





Energy In Georgia

Georgia is an energy island!

Georgia uses approximately 3%
of the U.S. total energy consumption

Biomass is Georgia's only
significant home-grown
energy source

95% of Georgia's energy is imported

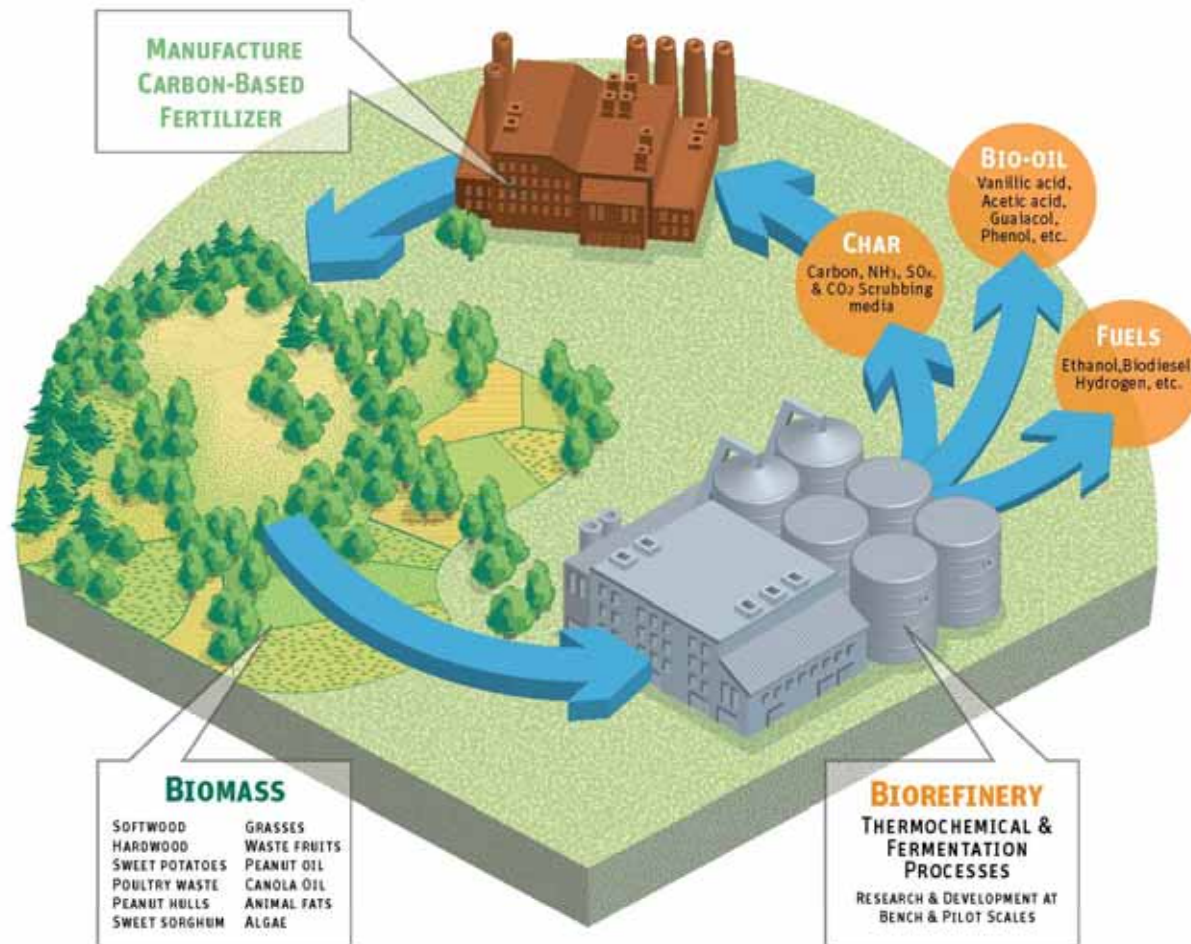
4% of Georgia's energy from biomass
feedstocks, mainly wood

Biomass is the only
renewable energy
feedstock for
production of liquid
transportation fuels

Source: EIA 2006 National Consumption Data

B3 Initiative: Biofuels, Biopower, and Biomaterials

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How do we get there from here?

- **Research**

- Basic and applied research in biomass conversion technologies
 - ✓ Thermochemical Processing
 - ✓ Biochemical Processing
 - ✓ Chemical Processing

- **Education**

- Training a new workforce for the “Bio-Based” industry

- **Public Education and Outreach**

- Educate current industry
 - ✓ Energy
 - ✓ Agriculture
- Educate general public

- **Public Policy**

Biomass Conversion Technologies

■ Research

- Basic and applied research in biomass conversion technologies from bench to pilot scale

✓ Thermochemical Processing

— Pyrolysis and Gasification

- » BioChar - Bio-Oil - SynGas - Liquid Fuels
- » Chemicals and Products



Biomass Conversion Technologies

- **Research**

- Basic and applied research in biomass conversion technologies from bench to pilot scale

- ✓ **Biochemical Processing**

- Fermentation

- » Fuel Alcohols (Ethanol - Butanol)
- » Specialty Chemicals



Biomass Conversion Technologies

- **Research**

- Basic and applied research in biomass conversion technologies

- ✓ **Chemical Processing**

- Transesterification

- » Biodiesel (Vegetable Oils, Waste Oils, Algal Oils)



Develop new Bio-Based Industry Workforce

■ Education

- Universities
 - ✓ Undergraduate and Graduate Programs
- Technical Schools
 - ✓ Degree programs
- Industry Continuing Education
 - ✓ Workshops



Public Education and Outreach

- **Public Education and Outreach**

- Educate current industry
 - ✓ Energy
 - ✓ Agriculture
- Educate general public



Public Policy Development

- **Create Sound Public Policy**
 - Educate Policy Makers

You can lead a man to Congress...
... But you cannot make him think!



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