

# Forest Biomass Supply for Bio-production in the Southeastern United States

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## Outline

- Introduction
- Objectives
- Methods
- Acknowledgement

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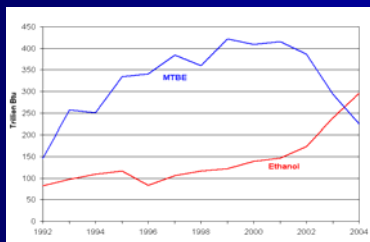
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## Introduction

- Biofuel consumption trend



Source: EIA

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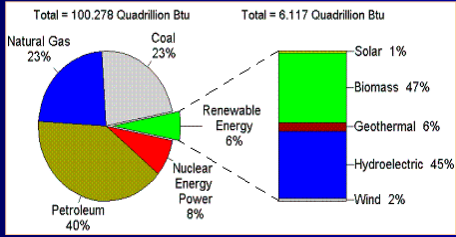
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## Introduction

### ➤ Renewable Energy consumption, 2004



Source: EIA

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## Introduction

### ➤ Bio-production and biomass utilizations

#### ▪ Forest biomass:

Industrial sector: for *heat and steam*

Utility sector: for *electricity*



#### ▪ Agricultural biomass:

Transportation sector: for *biofuels (ethanol, biodiesel)*

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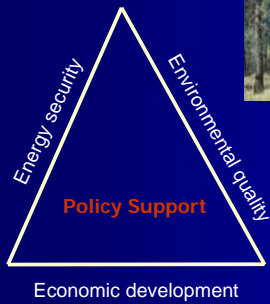
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## Introduction

### ➤ Benefits:



This ?

OR

This?



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## Introduction



➤ Technologies and bioproducts

Woody Biomass	➔	<b>Combustion</b>	➔ Heat, steam, electricity
	➔	<b>Fermentation</b>	➔ Ethanol
	➔	<b>Gasification</b>	➔ Methanol, ethanol, diesel, syngas, chemicals
	➔	<b>Pyrolysis</b>	➔ Biooil

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## Introduction

➤ Early federal incentives

- Energy Tax Act of 1978: **excise tax exemption** of 4¢ per gallon on gasoline blended with at least 10% ethanol
- Crude Oil Windfall Profits Tax Act of 1980: **tax credits** for biofuel producers and retailers
- Energy Security Act of 1980: insured **loans** to small ethanol plants; price guarantees and purchase agreements
- Alternative Motor Fuels Act of 1988: **credits** for automakers
- Energy Conservation Reauthorization Act of 1998: **AFV credit** to fleet operators for using biodiesel

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## Introduction

➤ Recent federal incentives (woody biomass)

- Biomass Research and Development Act of 2000: financial assistance to research projects on bio-products; grants for improving **cellulosic biomass conversion technologies**
- Farm Bill of 2002: provided funds to **biobased industrial production** using trees, wood waste and residues; projects to stimulate biomass production and **biorefinery technology** improvements, including lingo-cellulosic biomass

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### Introduction

- Recent federal incentives (woody biomass)
  - MOU on Policy Principles for Woody Biomass Utilization for Restoration and Fuel Treatment on Forests, Woodlands, and Rangelands: reduce hazardous fuels; **sustainable development** and **stabilization** of woody biomass utilization **markets**
  - Healthy Forests Restoration Act of 2003: grants for research on **thinning, harvesting, transportation, processing and economic valuation**; grant programs for adoption of **technologies** and reducing **costs**

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### Objectives

- Calculate supply curves of forest biomass for bio-production industry;
- Develop a market model to identify how the forest biomass supply for bio-production will affect the traditional wood markets;
- Examine how governmental incentives will influence the biomass and solid wood supply in regional markets.

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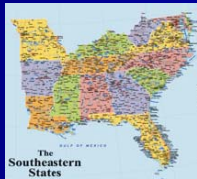
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### Methods

- FIA data
  - ✓ Forest areas
  - ✓ Inventory
  - ✓ Growth
  - ✓ Removals
- Supply curve:
  - ✓ Stumpage Price      ✓ Logging cost
  - ✓ transportation cost



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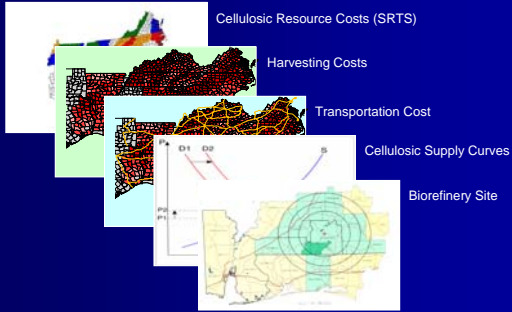
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## Methods



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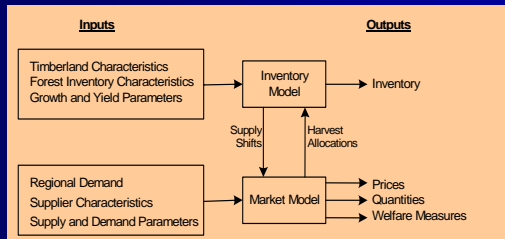
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## Methods

Flow chart of Sub-Regional Timber Supply model



(Source: Abt 2000)

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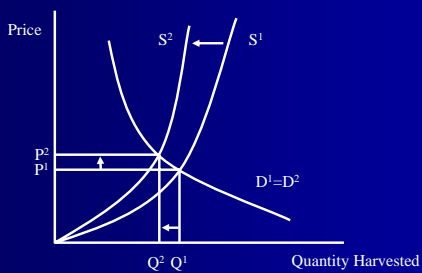
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## Methods

Sub-Regional Timber Supply model



(Source: Abt 2000)

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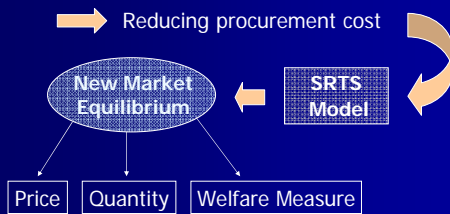
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## Methods

- Impacts of governmental incentives

Financial incentives to producers



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## Results

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## Acknowledgement

- Southeastern SunGrant Center, US Department of Energy, USDA Forest Service
- Advisor: Dr. Don Hodges
- Fellow graduate students

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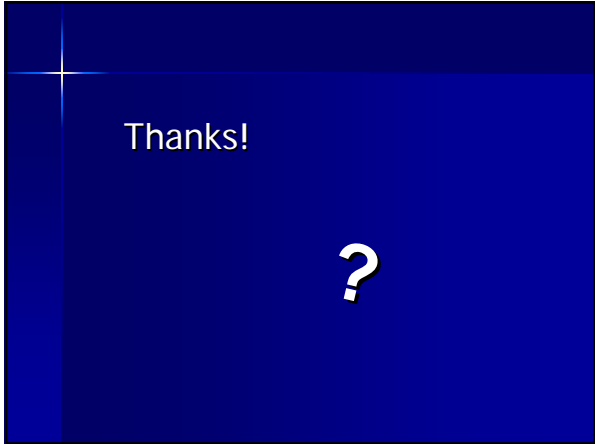
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