Forest Biomass in Georgia

- A New Look for Forest-Based Industries

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Georgia Forestry Commission
Forests Dominate Georgia’s Land Use

U.S. Geological Survey
National Land Cover Dataset, 1992
Classification of Thematic Mapper
Based on 30 meter resolution

Compiled by Joe McCollum, Richard A. Harper
Georgia’s 24 Mil. Acres of Forest

Source: Forest Inventory and Analysis data, USFS Southern Research Station
Growth exceeded removals by an annual average of 22% from 1997-2005.

Total Volume Has Increased 160%!
Georgia’s Forest Industry  $27.7 Billion Economic Impact

12 Pulp mills
4 OSB Mills
170 Other Forest Product Mills

Source: Georgia Forestry Commission Forest Products Marketing Directory, 2006; Georgia Inst. Of Technology, 2007
Georgia’s Existing Forest Industry

- Forest Landowners
- Timber Purchasing/Harvesting
- LARGE ROUNDWOOD
- SMALL ROUNDWOOD AND CLEAN CHIPS
- CLEAN CHIPS
- Sawmills/Plywood Mills
- RESIDUES
  - Mulch/Brick Panel Products
  - Livestock Bedding
- Pulp Mills/OSB Mills
Forest Landowners

Timber Purchasing/Harvesting

LARGE ROUNDWOOD

SMALL ROUNDWOOD AND CLEAN CHIPS

CLEAN CHIPS

Sawmills/Plywood Mills

Range Fuels

Gasification
Catalytic conversion Refinery

Wood Pellet Mill

Fram Fuels

RESIDUES

Mulch/Brick
Panel Products
Livestock Bedding

C2 Biofuels

Ethanol Refinery
(fermentation process)

Biorefinery

Pulp Mills/OSB Mills

Industrial Energy
Including Electricity Production

Industrial Energy
Including Electric Production

LOGGING RESIDUES

Forest Landowners

Gasification
Catalytic conversion Refinery

Catalytic conversion
Refinery
Forestry Biomass

• Forest
  – Harvesting residues
  – “Non-merchantable” timber
  – Low-value timber

• Forestry manufacturing residues

• Urban wood waste
Biomass From the Forest
Forest Product Manufacturing Residues
Georgia Biomass from Forestry Sources – 2005 Statewide Report

Table 1. Wood Resources Generated and Amount Unutilized

<table>
<thead>
<tr>
<th>Wood Resources</th>
<th>Units</th>
<th>Amount Generated</th>
<th>% Unutilized</th>
<th>Amount Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unmerchantable Timber (20 year Growth Cycle)</td>
<td>dry tons</td>
<td>13,260,175</td>
<td>100%</td>
<td>13,260,175</td>
</tr>
<tr>
<td>Harvesting Residues</td>
<td>dry tons</td>
<td>5,314,287</td>
<td>95%</td>
<td>5,048,572</td>
</tr>
<tr>
<td>Mill Residues</td>
<td>dry tons</td>
<td>7,970,276</td>
<td>1%</td>
<td>79,703</td>
</tr>
<tr>
<td>Urban Wood Waste @ $12.50/dt</td>
<td>dry tons</td>
<td>86,209</td>
<td>100%</td>
<td>86,209</td>
</tr>
<tr>
<td>Pecan Shells</td>
<td>dry tons</td>
<td>22,297</td>
<td>95%</td>
<td>21,182</td>
</tr>
<tr>
<td>Paper Mill Sludge</td>
<td>dry tons</td>
<td>395,210</td>
<td>95%</td>
<td>375,449</td>
</tr>
<tr>
<td>Black Liquor Production</td>
<td>dry tons</td>
<td>12,066,840</td>
<td>0%</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>39,115,295</td>
<td></td>
<td>18,871,292</td>
</tr>
</tbody>
</table>

Source: General Bioenergy, Inc. 2005
# Sustainable Biomass Recovery Levels

<table>
<thead>
<tr>
<th>Biomass Resource</th>
<th>odt</th>
<th>Recovery Rate</th>
<th>Total</th>
<th>Additive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logging Residues</td>
<td>6,426,079</td>
<td>67%</td>
<td>4,305,473</td>
<td>4,305,473</td>
</tr>
<tr>
<td>“Non-merchantable” Timber</td>
<td>8,380,173</td>
<td>3% Inventory</td>
<td>8,380,173</td>
<td>12,685,646</td>
</tr>
<tr>
<td>Urban Wood Waste</td>
<td>1,436,823</td>
<td>100%</td>
<td>1,436,823</td>
<td>14,122,469</td>
</tr>
<tr>
<td>Forest Product Mill Residues</td>
<td>7,305,000</td>
<td>0%</td>
<td>0</td>
<td>14,122,469</td>
</tr>
<tr>
<td>Excess Timber Growth 1989-2004</td>
<td>3,651,172</td>
<td>100%</td>
<td>3,651,172</td>
<td>17,773,641</td>
</tr>
<tr>
<td>Pulpwood Currently Used for Paper</td>
<td>9,135,620</td>
<td>20%</td>
<td>1,827,124</td>
<td>19,600,765</td>
</tr>
<tr>
<td>Residue Chips Currently Used for Paper</td>
<td>2,307,126</td>
<td>20%</td>
<td>461,425</td>
<td>20,062,190</td>
</tr>
</tbody>
</table>

Sources: Timber Product Output reports, 2005; FIA database, 2004; SRS US Forest Service; General Bioenergy, 2005