Woody Biomass Economic Study

Department of Agriculture and Consumer Services, Division of Forestry
&
Department of Environmental Protection

Tallahassee, FL
March 01, 2010
Context

- 15.9 million acres of timberland in Florida, with 10.1 million acres in private ownership.

- Wood and wood waste currently contributes 0.6% of the total capacity for electricity generation.
Mandate

• Laws of Florida, Chapter 2008-227, Section 113, pages 125-126 reads: “Woody biomass economic study. – The Department of Agriculture and Consumer Services, in conjunction with the Department of Environmental Protection, shall conduct an economic impact analysis on the effects of granting financial incentives to energy producers who use woody biomass as fuel, including an analysis of effects on wood supply and prices and impacts on current markets and forest sustainability...”
Approach

• The University of Florida’s School of Forest Resources and Conservation (SFRC), and Food and Resource Economics Department (FRED) were contracted to complete the needed analysis and prepare two detailed technical reports. These two studies focused on the use of woody biomass fuels for electrical generation and evaluated the potential for Florida’s private timberland contributions to supplying biomass feedstocks under varying scenarios. Renewable electricity generation was used as an example of energy production referenced in the legislation because it is a mature technology with a potential for expansion under enabling legislation.
Definitions (1)

- **Base ORES** – other renewable energy sources (solar, wind, hydropower, and biogenic waste) deployed in Florida to produce electricity at levels currently thought possible by the U.S. Department of Energy, in our reporting 13.5 TWh/yr between 2013 to 2040.

- **High ORES** – other renewable energy sources (solar, wind, hydropower, and biogenic waste) deployed in Florida to produce electricity at 2.5 times the levels of base ORES, equal to 33.7 TWh/yr beginning in 2016 until 2040.
Definitions (2)

• **Low SREC** – short rotation energy crops (e.g., cottonwood, eucalyptus) planted, by 2033, on 0.6 million acres of non-forested lands in Florida and producing biomass at a rate of 20 green tons per acre per year.

• **High SREC** – short rotation energy crops (e.g., cottonwood, eucalyptus) planted, by 2020, on 1.4 million acres of non-forested lands in Florida and producing biomass at a rate of 32 green tons per acre per year.
Woody biomass and base other renewable energy sources (ORES) contributions to electricity production in Florida, in the year 2025

<table>
<thead>
<tr>
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<th>7% RPS</th>
<th>12% RPS</th>
<th>20% RPS</th>
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</thead>
<tbody>
<tr>
<td>Woody Biomass</td>
<td>6.3 TWh 2%</td>
<td>20.4 TWh 7%</td>
<td>43.0 TWh 15%</td>
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<tr>
<td>Base other renewable energy sources (ORES)</td>
<td>13.5 TWh 5%</td>
<td>13.5 TWh 5%</td>
<td>13.5 TWh 5%</td>
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<tr>
<td>Total Renewable Electricity</td>
<td>19.8 TWh 7%</td>
<td>33.9 TWh 12%</td>
<td>56.5 TWh 20%</td>
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<tr>
<td>Total Electricity Production</td>
<td>282.5 TWh 100%</td>
<td>282.5 TWh 100%</td>
<td>282.5 TWh 100%</td>
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Projected change in demand for woody biomass (merchantable timber, urban wood waste, logging residue, short rotation energy crops) for renewable electricity generation in Florida between 2010 and 2040 under base ORES assumptions. Amounts shown do not include the 20 million tons harvested annually for forest products industry use.
The timber model-generated combined pine and hardwood merchantable timber inventory under varied RPS mandates and base ORES assumptions, 2010 – 2040.
Results (1)

• The economic impact study concluded that tax credits for renewable electricity production, and subsidies for forestry biomass producers would increase the state Gross Domestic Product (GDP), employment and forest sector output while reducing fossil fuel imports, provided feedstock availability can be secured.
Results (2)

• For a renewable portfolio standard (RPS) greater than 7%, competition for raw material would increase; driving prices up with private timberland owners benefiting.
Effect of short rotation energy crops (SREC) planting on pine roundwood inventory, removals and stumpage prices

0.6 million acres new plantings
Yielding 20 green tons/ac/yr

1.4 million acres new plantings
Yielding 32 green tons/ac/yr

Timber model output for pine roundwood at 20% RPS, base ORES assumptions.
Effects of high acreage, high-yielding plantings on the right compared with effects of low acreage, lower yielding plantings on the left.
Results (3)

• The study concluded that a 7% RPS (equivalent of 1% to 3% electricity production from wood sources over time) would have little impact to the existing forest products industry and Florida’s forest would remain sustainable, provided merchantable timber (MT), logging residues (LR) and urban wood waste (UWW) were utilized for electricity production, and a strong reforestation program was in place.
Results (4)

• For an RPS greater than 7%, increased reforestation, afforestation and planting of high-yielding short rotation woody crops would be needed to prevent a depletion of forest resources and significant impacts to the existing forest products industry.
Summary

• Currently, harvesting approximately 20 million green tons annually

• 7% RPS would need additional 10 million green tons in 2025, sustainable if MT, UWW, and LR are utilized with a base ORES

• 12% RPS would need an additional 30 million green tons in 2025, sustainable with high SREC and base ORES

• 20% RPS would need an additional 60 million green tons in 2025, to approach sustainability if MT, UWW and LR are utilized with high SREC and base ORES. Alternatively, sustainability can be achieved with 33 million green tons in 2025 if MT, UWW, and LR are utilized with high SREC and high ORES