Project-Based Overview of Woody Biomass Initiatives in the Generation of Thermal Energy, Electricity, and Transportation Fuels in the Eastern Hardwood Region of the United States

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Executive Summary:

The project team identified 330 current and future wood-based energy facilities for the northeastern United States that potentially consume 46.9 million tons of wood per year, calculated at 50% moisture content. Forest resource concentration and level of industrialization suggest that future woody biomass demand data collection be focused on five key states: Maine, New Hampshire, Vermont, New York, and Pennsylvania. Small-scale bioenergy projects pose no real threat of significantly reducing the general supply of woody biomass in the Northeast, but areas of heavily-concentrated projects could experience local demand pressure. The ongoing decline in pulp and paper production in the Northeast, together with the apparent decline in other traditional woody biomass-using industries, will work to relieve the pressure on the region's woody biomass resource. Assuming a normal and expected evolution of events, woody biomass consumption in the Northeastern United States will increase by roughly 25% over the next decade. The variable with by far the highest potential impact on the woody biomass resource is the future direction of electricity production from wood and co-firing of wood in coal power plants, especially in Pennsylvania, West Virginia, and Ohio.

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CONCLUSIONS

Conclusion 1 – Forest resource concentration and level of industrialization suggest that future woody biomass demand data collection be focused on five key states: Maine, New Hampshire, Vermont, New York, and Pennsylvania.

In addition, Massachusetts should be included in any planning of elevated data collection and monitoring, since much of the political discussion and potential conversion of traditional power generation lies in Massachusetts, a state that will necessarily pull much of its wood resource from the surrounding wood baskets. While there will undoubtedly be some increase of woody biomass projects in the other seven states of the northeast, the relatively small size and concentration of any projects in these other states should not significantly impact the overall availability of forest biomass in the region. In all states, however, mid- to large projects could create local impact on the availability and price of the supply of woody biomass, and all new projects should be closely evaluated in this regard.

Conclusion 2 – Small-scale bioenergy projects pose no real threat of significantly reducing the general supply of woody biomass in the Northeast, but areas of heavily-concentrated projects could experience local demand pressure.

Fuels for Schools projects, hospitals, industrial and district heating, and drying operations all convert wood to energy at a high efficiency. Additionally, if power generation is added to these projects as combined heat and power (CHP), small amounts of green electricity can be added to the grid. These "small" projects are more sustainable than larger projects (e.g., > 30 megawatt) from a forest resource standpoint for several reasons:

1. Demand for the woody biomass resource is more diffuse than for large-scale operations.
2. These projects can be managed with certifiable sustainability criteria as a primary objective.
3. Landowners may be more motivated to execute timber stand improvement and biomass harvests for the benefit of local projects than for large-scale commercial energy projects several counties away.
4. Wood demand will be constrained naturally by market forces as the number of small projects increases; large-scale projects tend to overwhelm the market and the resource before natural constraints are recognized.
5. Local investment in these projects results in money being returned to the local economy; pride of ownership and "green enterprise" results in more sustainable actions over time.

Conclusion 3 – The ongoing decline in pulp and paper production in the Northeast, together with the apparent decline in other traditional woody biomass-using industries, will work to relieve the pressure on the region's woody biomass resource.

Pulp and paper operations, as well as OSB, MDF, and particleboard plants are large-scale biomass-using facilities. They currently account for roughly 60% of the woody biomass consumption in the Northeastern United States. There appears to be the strong possibility that future consumption of woody biomass by bioenergy facilities can be supplied by biomass that will become available as a result of the declining consumption of these traditional facilities. Unfortunately, in some regions it may be that upward price pressure on the woody biomass market owing to increases in the needs of the bioenergy industry could hasten the decline of the traditional wood industries.

However, if the sawmill industry does not rebound from current suppressed market conditions, or rebounds as a smaller industry, wood by-production of chips, sawdust, and shavings, critical to most of the bioenergy industries, will be severely constrained. This will force woody biomass to be harvested and processed specifically for the bioenergy market, without the complementary lumber profitability that acts as a buffer on wood residual costs and prices. Should this occur, bioenergy capacity will grow more slowly than forecasted, unless substantial government policies and/or incentives force energy prices in general to a much higher level.

Conclusion 4 – Assuming a normal and expected evolution of events, woody biomass consumption in the northeastern United States will increase by roughly 25% over the next decade.

However, this conclusion is subject to a wide range of confidence, as the uncertainty of so many critical components is high.

Conclusion 5 – The variable with by far the highest potential impact on Conclusion 4 is the future direction of electricity production from wood and co-firing of wood in coal power plants.

Government policies and/or incentives that encourage use of woody biomass by large electricity producers, either through dedicated Ruse of wood or through co-firing of coal power plants at a 10% or higher level of co-firing, will result in high electricity rates, extreme pressure on local and regional wood biomass markets, and suppression of other, more sustainable woody biomass-based bioenergy alternatives. **Based on wood demand data as understood through this research, government policies and incentives should be targeted at smaller and more energy-efficient industries, such as district heating, combined heat and power, and wood pellet production…and at the complementary sawmill, pulp and paper, and logging industries that will support those ventures.**