



Benefits to Landowners from Forest Biomass/Bioenergy Production

FACT SHEET 6.5

INTRODUCTION

Private forest landowners represent the first step in the forest bioenergy supply chain. Their production of a cellulosic feedstock is central to the emerging bioenergy industry and is equally important to their own forest-based economic and ecological revenue streams. This fact sheet describes the forest biomass/bioenergy production benefits relevant to private forest landowners in the South.

In general, the potential benefits to forest landowners include:

- Revenue from biomass sales
- Savings on site preparation costs in forest stand regeneration
- Potential carbon credits
- Low to no cost stand improvement
- Increased forest health

REVENUE FROM BIOMASS SALES

One benefit to private forest landowners from the sale of forest biomass for bioenergy or bio-products is additional income. Currently across the South, quite a few mills are purchasing wood chips for various operations, mostly to

produce traditional fiber and wood products¹ (*Figure 1*). Several biodiesel and ethanol plants are also in operation, and more ethanol (*Figure 2*) and biodiesel (*Figure 3*) plants are under construction throughout the South. Currently, many of these mills and plants are not using woody biomass for energy production. Yet as the bioenergy industry develops, the demand for cellulosic material will increase and more opportunities will be available for private landowners to sell their forest biomass. For the latest information on biomass markets in your area, please refer to Southern Regional Extension Forestry (<http://sref.info/>), your state forestry Cooperative Extension program, or state forestry agency.



Source: www.srs.fs.usda.gov/econ/data/mills/chip2000.htm

Figure 1. Locations of Southern Wood Chip Mills for 2000

Gan, J.; C. Mayfield. 2007. Benefits to Landowners from Forest Biomass/Bioenergy Production. Pages 225–228.

In: Hubbard, W.; L. Biles; C. Mayfield; S. Ashton (Eds.). 2007. Sustainable Forestry for Bioenergy and Bio-based Products: Trainers Curriculum Notebook. Athens, GA: Southern Forest Research Partnership, Inc.



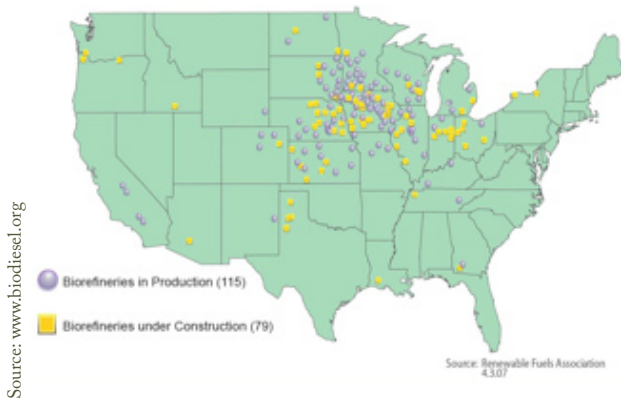


Figure 2. U.S. Ethanol Biorefinery Locations

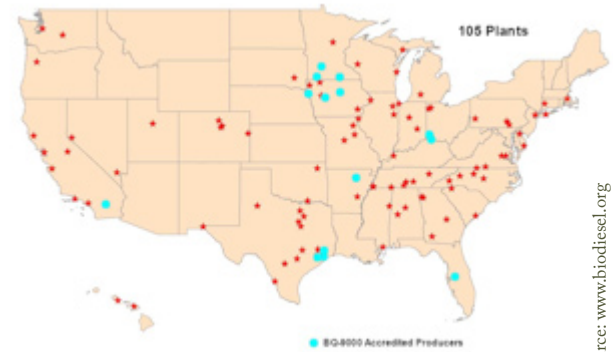


Figure 3. Commercial Biodiesel Production Plants as of January 31, 2007

SAVINGS ON SITE PREPARATION COSTS IN FOREST STAND REGENERATION

Site preparation costs are a major component of forest stand regeneration costs. According to a south-wide survey in 2004², the cost to shear-rake-and pile, a common site preparation activity in the South, averaged \$186/acre. Landowners can save as much as \$80 to \$100/acre in site preparation costs when logging residues are recovered for bioenergy and bio-products markets³. Technical and terrain constraints limit the amount of logging residues that can be collected from harvesting sites to about two-thirds of the actual material left on-site. The periodic removal of logging residues does not have significant negative impacts on the long-run productivity of most sites because timber harvesting tends to be an infrequent event on individual sites.

POTENTIAL CARBON CREDITS

Given increasing concerns about global climate change and air pollution, reductions in greenhouse gas emissions are desirable. In fact, sulfur markets to control SO_x emissions have existed for years. Carbon markets are just now emerging. Forest bioenergy is carbon neutral, meaning that producing energy from

forest biomass does not lead to net emissions of CO₂. This is the case because tree growth via photosynthesis absorbs carbon, which almost completely offsets the carbon emissions resulting from burning the tree for energy. Using forest biomass for bioenergy production can displace CO₂ emissions from combusting fossil fuels. In addition, biomass releases much less SO_x during combustion than coal.

In April 2007, CO₂ traded at about \$4/ton at Chicago Climate Exchange (<http://www.chicagoclimatex.com/>). In electric power generation, one ton (green) of forest biomass can displace almost one ton of CO₂ emissions from coal-fired power plants. This implies that one ton of forest biomass used for electricity production would be worth \$4 in terms of CO₂ emissions displaced at current carbon prices. Though the carbon value is not big at this point, the carbon price is likely to increase as markets are further developed and concerns about greenhouse gas emissions escalate.





LOW TO NO COST STAND IMPROVEMENT

In many areas, particularly hardwood dominant areas, high-grading and diameter-limit-cutting have resulted in low stocking, low value, and undesirable or non-merchantable species. These timber harvesting practices have undermined the long-run productivity of many forests. The impacted forests are not likely to recover without stand rehabilitation and improvement. The development of a bioenergy industry is a potential solution, as this industry should create biomass markets for low value species, and simultaneously stimulate timber stand improvement efforts. Additionally, the development of biomass/bioenergy markets should aid in a landowners' ability to carry out pre-commercial and commercial thinnings, and subsequently the production of high-quality timber. Landowners should make decisions regarding stand improvement and/or thinnings based on their ownership objectives, forest and market conditions, and financial parameters (e.g. the discount rate, etc.).

INCREASED FOREST HEALTH

Major threats to the health of southern forests include wildfire, disease/pest infestations, invasive species, and storms. In fact, it is estimated that 2.7 billion dry tons of forest biomass need to be removed through forest fuel reduction treatments in the South, about 20 million dry tons of which are collectable annually⁴. On average, the southern pine beetles killed 1.36 million dry tons of wood annually⁵. In addition, restoration of the stands damaged by storms and fire and the control of invasive species could generate significant additional volumes of biomass.

These mitigation or restoration activities, though improving forest health and long-run productivity, are often costly and discouraging to the landowner. The revenue from biomass can offset part of the mitigation/restoration costs.

CONCLUSIONS

Producing forest biomass for energy and other bio-products generates not only additional revenue from biomass sales but also a variety of other benefits to landowners. Depending upon the sources of forest biomass, additional benefits include savings on site preparation costs and improvements on forest health and productivity. In addition, carbon values/credits could also be realized by forest landowners as carbon markets and policies are further developed. The benefits from producing forest biomass can be significant and may become important factors influencing a landowner's decision to produce biomass for energy from conventional forests. Landowners should weigh all benefits against the cost of biomass production in their decision-making.

For more information refer to the Encyclopedia of Southern Bioenergy (<http://www.forestencyclopedia.com/Encyclopedia/bioenergy>) or Forest Bioenergy (<http://www.southernbioenergy.net/>).

ENDNOTES

- 1 Prestemon, J., Pye, J., Butry, D., and Stratton, D. 2007. Locations of Southern Wood Chip Mills for 2000. <http://www.srs.fs.usda.gov/econ/data/mills/chip2000.htm> [Date accessed: April 5, 2007.]
- 2 Smidt, M., Dubois, M., Folegatti, B. 2005. Cost and cost trends for forestry practices in the South. *Forest Landowner*. 64(2): 2530.



- 3 Gan, J. and C.T. Smith. 2007. Co-benefits of utilizing logging residues for bioenergy production: the case for East Texas, USA. *Biomass and Bioenergy*. (In press).
- 4 Schmidt, K.M.; Menakis, J.P.; Hardy, C.C.; Hann, W.J.; Bunnell, D.L. 2002. Development of coarse-scale spatial data for wildland fire and fuel management. Fort Collins, CO: 41. U. S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. Report number: RMRS-GTR-87.
- 5 Coulson, B.; Curry, G.; Tchakerian, M.; Gan, J.; Smith, C.T. 2005. Utilization of Plant Biomass Generated from Southern Pine Beetle Outbreaks. Paper presented at the IEA Bioenergy Tasks 30 "Short Rotation Woody Crops for Bioenergy Systems" and 31 "Biomass Production for Energy from Sustainable Forestry" Joint International Workshop "Multiple Benefits from Sustainable Bioenergy Systems." Perth, Western Australia. 1-5 August 2005.

