



Forest biomass in southern US: the future of wood fibre supply and demand

Pete Stewart from international forest industry analyst group, Forest2Market, believes the increasingly hungry bioenergy sector in the US South could be fed largely by underutilised biomass resources, however, there are several supply hurdles to overcome to make this possibility a reality

Like much of the rest of the world, North America has turned its attention to biomass-based energy as a way to reduce its energy costs and emissions and to diversify its energy supply. The number of announced bioenergy facilities in the US South alone had almost doubled in three months at the time of writing.

Cellulosic ethanol companies, wood pellet plants, independent power companies, public utilities, corn ethanol producers, universities and paper companies are all sourcing wood fibre for energy production. Whether in the form of heat, electricity, and/or transportation fuel, these companies are using, or will use, wood either to create a primary energy product or to power their operations. If we consider just wood pellet manufacturers, power producers and cellulosic ethanol plants, the announced capacity

and wood fibre use by these facilities in 2015 will total 30 million additional tonnes of wood fibre demand (see Table 1).

Not all of this capacity will come to fruition. With the state of the US economy, the regulatory environment, changes in legislation and public policy, funding restraints, construction costs, and supply restrictions, it stands to reason that some of this capacity – perhaps as much as 50% – will evaporate. On the other hand, with the current economy and concerns over job creation, the next US administration may focus on the creation of ‘green collar’ jobs, which could mean the demand for wood fibre exceeds the 30 Mt mark by 2015. In a recent study, ‘Quantifying Forest Biomass Resources in the U.S. South’, Forest2Market (F2M) conservatively estimated that 8 Mt of additional wood fibre will be needed in 2010 to fuel wood-to-

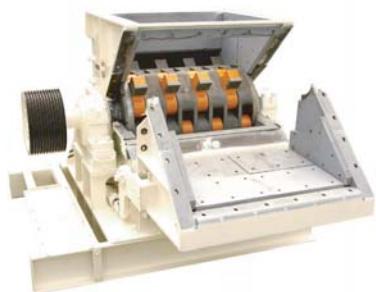
energy concerns. We predict this figure will rise to an additional 14 Mt in 2015 and 19 Mt in 2020. Whether the actual figure is at the top or the bottom of this range, or somewhere in between, the new energy markets will have a significant impact on the wood fibre supply chain.

The conventional perception is that increased biomass harvesting will generate sufficient supplies of wood fibre to fuel the emerging bioenergy industries. While virtually none of this material is used in the US South currently – it represents less than 1% of the market – 300 Mt of wood fibre is being removed from forests in the eastern half of the US every year. We estimate that 10% of that total, or approximately 30 Mt of biomass, could potentially be available for harvest, enough to meet the additional demand presented by bioenergy facilities.

Potentially is the key word here.

In the US South, the barriers to accessing this material are significant. In general, biomass is costly to collect and deliver. Because the material is not widely marketable, the harvesting sector does not currently have the equipment needed to remove and deliver this material. In order to significantly increase the removal rate, loggers will need to make large investments in chippers and chip vans. The timing, however, couldn't be worse. Loggers in the US South are struggling; caught between historically high diesel prices, plummeting demand from the depressed housing market and tight credit markets, loggers will need to see a proven, sustainable market opportunity for biomass before they dedicate financial capital to bio-harvesting equipment. Loggers are also paid by weight, and they will not be easily convinced to gather biomass since the material is

Biomass Processing from WSM



Hogs

Vertical and Horizontal feed.
Standard and High Inertia rotors.
Pivot case for easy access



Screens

Disc Screens, Trommel Screens,
Oscillating Screens,
Vibrating Screens



Fuel Processing Systems

Complete systems incorporate
Pre-shredding, Screening, and
Secondary Grinding



West Salem Machinery

Browse online westsalem.com

(800) 722-3530 (503) 364-2213 665 Murlark Ave NW
P.O. Box 5288 Salem, OR USA 97304



TABLE 1: Bioenergy Facilities in the U.S. South – 2015, Projected (Plant Capacity and Wood Fibre Demand)

	PLANT CAPACITY	WOOD FIBRE (million tons)
Wood Pellets*	3,151,000 tons	5
Power Producers**	2,246 MW	23
Cellulosic Ethanol***	152,000,000 gallons	2
	TOTAL	30

*All facilities will be operational by 2009 no future announcements at this time. Reports indicate that between 1-2 tons of wood fibre are needed to produce 1 ton of pellets. This estimate is based on 1.5 tons.

**Announced capacity all facilities are scheduled to be operational by 2015. Includes independent power producers, utility companies converting plants to wood, and self-powered commercial and institutional entities. Reports indicate that between 10,000-10,500 tons of wood fibre are needed to create 1 MW of electricity, although this figure varies depending on how much, if any, heat is being produced as well. This estimate is based on 10,250 tons.

***Announced capacity all facilities are scheduled to be operational by 2015. Reports indicate that anywhere from 55 to 215 gallons of ethanol can be produced from 1 ton of wood fibre. This estimate is based on 75 gallons/ton.

TABLE 2: U.S. South Feedstock Sourcing for the Emerging Bioenergy Industries (Million Tons)

	2010	2015	2020
TOTAL	7.95	13.85	18.58
Construction and Demolition (1)	0.77	1.59	2.47
Pulpwood - Softwood (2)	2.34	4.26	5.22
Pulpwood - Hardwood (2)	0.17	0.42	0.63
Chips - Softwood	3.41	4.88	6.03
Chips - Hardwood	0.47	0.49	0.48
Underutilized Woody Biomass (3)	0.10	0.73	1.68
Bark (4)	0.49	0.91	1.17
Other (5)	0.21	0.59	0.91

- (1) Primarily wood waste reclaimed from landfills
- (2) Net of bark
- (3) Includes tree tops, limbs, other forest residues and pre-commercial thinning material from intensively managed pine plantations
- (4) Includes free bark from onsite whole-tree chipping, and purchases from sawtimber and panel mills.
- (5) Includes yard trimmings, wood waste from land clearings, storm debris, pellets, wire spools, municipal tree waste, agriculture feedstock, and tire scraps.

bulky, light and difficult to manage when compared to whole tree logging.

Because of these issues, our projection is that only 5% of the bioenergy demand will be met with underutilised biomass in 2010 and 2015, approximately 100,000 t in 2010 and 730,000 t in 2015 (See Table 2). This number will grow to 9% by 2020 or approximately 1.7 Mt, largely due to the optimisation of harvest equipment and processes, the perfection of conversion processes, and the stabilisation of both the economy and the new markets.

The concentration of bioenergy facilities within a 160 km radius may be the best areas for the development of biomass procurement and transportation systems, as marketability improves and the economics of investing in new equipment begin to make sense. Equipment manufacturers who step up sales and marketing efforts in these areas during this transition period could see long-term benefits. Working as partners with loggers and end users, equipment vendors will find ample opportunities for innovation and problem solving in the biomass collection arena.

Bioenergy companies, in order to prepare for this competition, will need to fully understand the logistical realities surrounding the wood supply chain. A company that has a successful pellet plant in North Carolina, for instance, and then opens an identical plant in Louisiana will often find that the logging trucks used in Louisiana

require different loading dock requirements than those in North Carolina. Without an understanding of local equipment and processes, bioenergy companies could find themselves on the hook for large re-tooling bills. Wood fibre prices – because they are driven by local conditions like weather and terrain – also vary from market to market. Investigating supply and demand fundamentals in specific geographical locations is essential.

If the technology and processes for turning wood into energy can be made cost-effective without Government funding and incentives, traditional forest products companies will need to adjust to the fact that energy production is the highest value use of wood fibre (the cost per MMBtu of wood fuel, compared to

other energy sources, can be seen in Figure 1). These companies will need to leverage their current supply relationships by negotiating multi-year contracts with suppliers to purchase specific volumes at indexed prices. In addition, investing in satellite chipping operations may make sense for pulp mills, as would taking advantage of hardwood fibre availability where possible.

Because of the superior cost economics and the existence of viable infrastructure and supply chains, most new bioenergy capacity will be fueled by manufacturing residuals and pulpwood, at least through 2020. As Table 2 indicates, softwood (pine) pulpwood and chips will account for the largest source of

supply for bioenergy for the foreseeable future, and the competition for these materials between traditional and emerging industries will lead to increases in prices over time. Competition in locations such as East Texas will be especially intense, as dozens of forest products operations – OSB, veneer, pulp and chip mills – will compete for wood fibre with three pellet plants and two 100 MW power plants by 2012.

As announced facilities come online in the US South, the disruption to the supply chain could be significant, similar in nature to the one experienced with the introduction of OSB into the system. In the current global economy, only those prepared for the changes will survive. **FI**

\$/MM BTU FOR VARIOUS FUEL SOURCES Q2 2008

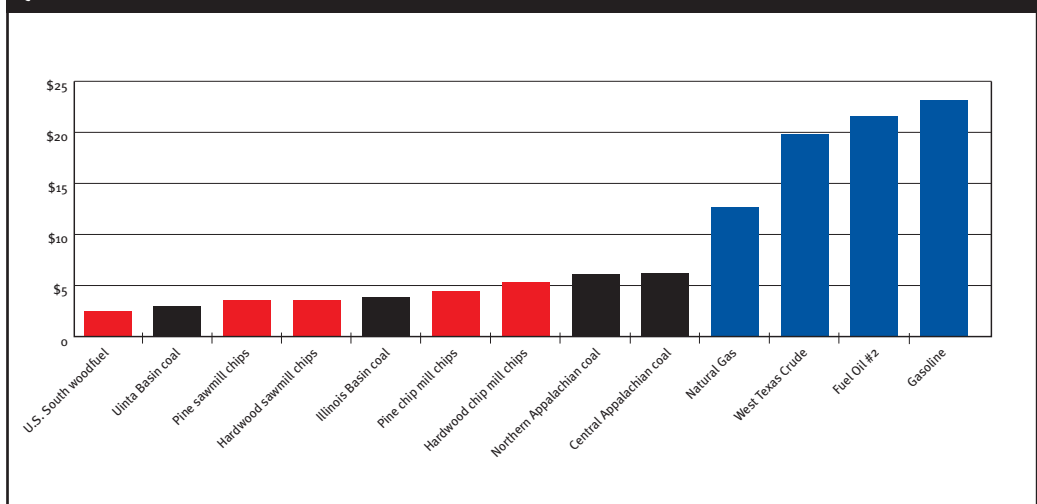


Figure 1