The Northeast Forest Bio-products Puzzle

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Forest products industry, landowners, universities, equipment manufacturers and governments share an interest in the emerging bio-products market. New and advanced uses of wood from the forests of the Northeast United States were discussed both formally and informally October 18-19, 2007 in Bangor, Maine. The conference, organized as a workshop to discuss the Strengths, Weaknesses, Opportunities and Threats facing the forest bio-products industry, was hosted by the Forest Products Society – Northeast Section. The event was jointly sponsored by FPS-NE and by the Forest Bio-products Research Initiative Program at the University of Maine. Over 60 attendees representing a broad range of researchers, industry, NGOs, government and education took part in both formal presentations and the frequent opportunities for additional discussion.

Jeff Benjamin, University of Maine, and FPS-NE section chair gave opening remarks at the beginning of the first day's session, which was devoted to the economics of forest bio-products and case studies of bio-products facilities. Eric Kingsley, Innovative Natural Resources Solutions, began with an overview of the elements needed to build the new forest bio-products industry. A key driver for the growth of the forest bio-products industry stems from US dependence on foreign oil. Dr. Kingsley outlined the role of the wood supply, public policy, access to markets, workforce, energy costs and permitting speed will play in the industries growth.

Dr. Lloyd Irland, Irland Group, addressed the topic of community and economic development impacts as they relate specifically to wood based energy generation, one of many forest bio-products uses. From the perspective of forest communities where bio-energy businesses operate benefits include: tax revenue, direct jobs, indirect jobs, and potential for both improved silviculture and solid waste management. These benefits are weighed against costs including high levels of truck traffic, resistance to siting, and a surprising lack of support for community economic development.

Recent developments in the technology of biomass gasification were presented by Lloyd Weaver, LEW Holdings. The benefits of an updraft blower with convection technology were described in systems at multiple scales. The technology is reportedly scalable from smaller 5 MW capacity heat and fuel systems to large scale synfuels production facilities.

The first day's technical presentations concluded with two case studies of bio-products enterprises planned or operating in Maine. The first, Maine Bio-products, was described by developer Paul Nace. This proposed industrial scale facility is still in the permitting and finance phase and will utilize an hydrolysis

process to manufacture Levulinic Acid (LA). LA can then be used as a "building block" for bio-diesel, polymers, plastics and other niche products. The process also yields a high energy content "char" that can be used for heat and energy production. The proposed industrial scale facility will be co-located at an existing former papermill facility. This siting provides a number of benefits over a green field facility including; existing large scale infrastructure, access to wood supply, wastewater treatment facilities and permitting. The production capacity will call for 1,000 dry tons per day of input feedstock. The technology has been proven with a pilot facility located in Gorham, Maine and a commercial scale unit with a 50 ton per day throughput located in Caserto, Italy. Mr. Nace emphasized the importance of patience in navigating the extensive timelines involved in developing large scale facilities.

Dick Arnold, Red Shield Environmental (RSE), presented the second case study, which has already begun its first phase of operations in Old Town, Maine. Located on the 88 acre site of the former Georgia Pacific (GP) pulp and paper mill, the unit currently produces both electricity (using a 16 MW turbine) and pulp using 600,000 tons of hardwood pulp chips annually. Since the closure of the GP facility RSE has been able to hire back 180 former mill employees. The ultimate goal is for the facility to become and integrated bio-products energy campus. RSE expects to receive chain-of-custody green certification from both the Forest Stewardship Council and the Sustainable Forestry Initiative in 2008. This certification will allow them to process green certified input material to serve emerging green markets. Using technology being developed at the University of Maine, they plan to produce pulp and ethanol in a combined process.

The second day of the two day conference focused on the role of the supply chain, government and social acceptability factors on the developing forest bio-products industry. Bryce Stokes, USDA Forest Service, provided an overview of the forest biomass supply chain. Mr. Stokes helped co-author the report "Biomass as Feedstock for a Bioenergy and Bioproducts Industry: The Technical Feasibility of a Billion-Ton Annual Supply" (Perlack et. Al. 2005). One of the study's objectives was to investigate the feasibility of obtaining sufficient biomass feedstocks to produce 30 billion gallons of ethanol on an annual basis by 2030. For this goal to be met, forest resources across the United States were estimated to produce 370 million dry-tons of material annually on a sustainable basis. The 20 Northeast states were expected to contribute 34 million or 9.2% of the total. Mr. Stokes concluded with an overview of at least 9 pieces of federal legislation impacting the biomass industry.

Rory Eckardt, RE Consulting, next presented a practical look at the equipment and operations required for in-woods forest biomass harvest and processing operations. He has identified at least 101 combinations of equipment and techniques for biomass conversion systems suitable for Northeast forests. Some of the differences between handling forest biomass material and traditional roundwood products include: higher level of difficulty in handling, increased

brittleness of dry material, low density, and the need to chip the material prior to transportation. In-woods processing begins with the harvest stage in either a whole tree or cut-to-length method. Whole tree systems are inherently more efficient as the additional residue material is brought to the landing at the same time as the roundwood material. The second step in the process is chipping, by either a horizontal or tub grinder. The horizontal grinder system is more flexible, as the tub grinder may require an additional step of cutting material to length prior to grinding. Loggers and truckers thinking of entering the biomass market are advised to: develop a business plan, size their operations to balance production, (for example a commercial scale chipper has a throughput capacity of 35,000 tons per year), examine the fit of the new business with existing operations, consider the trade-offs between buying new equipment vs. used equipment, and consider risk management issues such as leasing vs. buying and length of supply contracts. Lastly, the potential for public sector intervention was discussed including; low-interest loan programs, cost-sharing for business planning, contract review and operator recruitment, and the need for knowledge transfer mechanisms such as workshops, demonstrations and written technical materials.

Government has played a key role in spurring the recent development of renewable biomass energy markets. Dwayne Breger, Massachusetts Division of Energy Resources, explained the role of state Renewable Portfolio Standards (RPSs) in spurring the development of forest biomass electricity generation. RPSs are government policies that have been enacted in at least 22 US states, as of 2007, which share the objective of stimulating a market demand for renewable energy. The Massachusetts RPS requires that energy providers procure an increasing percentage of energy sold from renewable energy producers that have been qualified by the state. Additional policy objectives of the Massachusetts RPS are to: decrease pollution from fossil fuels, reduce dependence on imported fuels, increase fuel diversity, hedge against volatile fossil fuel markets, and promote economic development. Qualified renewable energy producers are granted one Renewable Energy Certificate (REC) for each Megawatt-Hour of renewable energy that they produce. That REC can then be traded on an electronic trading system, the Northeast Generation Information System which covers the ISO-New England electricity grid. The Massachusetts RPS is expected to drive demand for renewable energy from 1,500 Giga-Watt-hours (2005) to 4,600 Giga-Watt-hours in 2009.

The conference's final speaker was Rob Lilieholm, University of Maine. Dr. Lilieholm presented a wide ranging analysis of the role of social acceptability and the future forest bio-products industry. Stakeholders in the industry include landowners, primary processors, secondary manufacturers, energy producers and others. These groups must be confident of biological, economic, and social acceptability if bio-product initiatives are to succeed. Preliminary results of landowner surveys indicate a general lack of knowledge of the biomass market. Surveys of both primary processors and secondary manufacturers show

reluctance to enter into forest bio-processing. Existing forest industry businesses tend to be focused on their existing businesses with little time or expertise in creating the new business models that characterize bio-products processing. Secondary manufacturers represent unique, individualized, cases that often involve large-scale capital investment. They are aware of the previous collapse of the early biomass markets of the 1980's and want proven markets for their products. Dr. Lilieholm concluded with the advice that players need to address three areas of sustainability; biophysical, economic and social, to maximize the likelihood of success in bio-processing ventures.

Electronic versions of the Northeast Forest Bio-products Puzzle Conference Proceedings are available, from editors Jeff Benjamin, Jeff_Benjamin@umenfa.maine.edu and David Damery, ddamery@nrc.umass.edu.

Reference:

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