PROFILE: OPPORTUNITIES FOR WOODY BIOMASS-BASED DEVELOPMENT

Woody biomass is increasingly being considered as a source for renewable heat, transportation fuel, and energy. This new demand for woody biomass is driven by the high cost of fossil fuels combined with concerns about climate change and carbon emissions. New state and regional policies such as state renewable energy portfolios, climate action plans, and the Regional Greenhouse Gas Initiative by Northeastern and Mid-Atlantic states are further catalysts. Technological developments continue to improve the competitive position of cogeneration, synthetic gas and bio-fuels from wood, and other biomass materials. Wood pellet manufacturers are springing up throughout the Northeast like mushrooms after a rainstorm.

Typically, as demand increases for a scarce resource, large well-financed businesses move in to control the resource, capture value-adding opportunities, and reap the profits. If this happens with biomass, communities stand to lose control over resources that could contribute substantially to their economic vitality, to their role in regional energy security, and to enhanced environmental stewardship. New structures are needed to allow rural communities to secure the biomass resources needed to meet local needs and develop the capacity and infrastructure to meet growing regional demands in an environmentally-sound manner.

What are the Opportunities for Communities?

Historically, woody biomass has been classified as pulpwood or firewood and has been harvested as a byproduct of timber harvests or as part of a thinning (pretreatment) program to improve the value and health of a timber stand. Pulpwood is a commodity for which the main markets have been paper mills. With increased demand for woody biomass, markets are shifting from a commodity structure in which all pulpwood is comparable to a differentiated market in which the specific characteristics of biomass (size, species, part of tree, dryness, preprocessing, etc.) determine the uses for which it is best suited. Demand is coming from different types of users, driving up prices and raising questions about the sustainability of supply. Environmental concerns about nutrient depletion in the forested landscapes are inherent in these questions.

At the same time, forested communities are beginning to recognize the potential for local energy cost savings, economic development, and environmental protection through the use of woody biomass. Based on the response to our survey, there is considerable interest in many aspects of woody biomass energy as a component of community-based forestry (CBF). CBF practitioners see woody biomass as having potential to:

- Promote and assist ecological restoration and reduce fire risks;
- Create new value streams for forests;
- Deliver cost-effective energy systems for low-income and rural communities; and,
- Create new sources of jobs and economic benefits for rural communities.

What do Communities Need to Capture the Opportunities from Woody Biomass?

The following issues and activities are important to forested communities in order to recognize, protect, and maintain access to woody biomass for community use.

1. Educate communities about the potential beneficial uses of woody biomass as a source of renewable heat using existing technologies and emerging transportation fuel and energy technologies for adaptation by communities once they are reliable and available at appropriate scales.
2. Develop training, facilitation, and pilot projects for creating community-based woody biomass value chains that serve local and regional markets.
3. Develop training programs for educators and youth in conducting woody biomass inventories that incorporate principles of sustainable forestry and recognize ecosystem function and services.
4. Provide technical assistance and facilitation services to communities to plan for the use of woody biomass as a heating and cooling resource in schools, housing developments, public buildings, etc. where appropriate.

Educate Communities about the Potential Beneficial Uses of Woody Biomass as a Source of Renewable Heat.

Some communities have already discovered the value of heating with modern wood appliances and many more are poised to do so. Woody biomass heating systems reduce dependence on fossil fuels, keep dollars in the local economy, create local jobs, cut fuel bills, reduce greenhouse gases and acid rain, and help keep forests strong and safe by removing excess low-grade cull wood.

Over the last 15 years, 31 schools in Vermont have installed woodchip-heating systems. Currently, 20% of all

public school students in Vermont attend schools heated with wood. The Biomass Energy Resource Center in Vermont receives inquiries from all around the country regarding wood-based heating systems for schools and other public facilities.[1] Bristol, Vermont, has produced a community resource guide called "Harnessing the Power of Local Wood Energy."[2]

There are many emerging technologies in the cogeneration of heat and power and the transformation of woody biomass into liquid fuel. It seems likely these technologies will become feasible at a variety of scales. Communities need a place to turn for unbiased advice on the suitability, reliability, and cost-effectiveness of emerging technologies to make good investments (and avoid bad investments) in new technologies. Many feasibility studies are underway in the U.S. and elsewhere. A compendium of findings, updated on a regular basis, could save small communities time and resources in identifying viable solutions.

Many communities need assistance from qualified consultants in estimating demand, selecting appropriate technologies, securing supply, and developing standards for procurement that protect the forest resource. The kinds of questions that arise at the local level include:

- Is there a sufficient supply of biomass in the region to fuel a combined heat and power plant over the life of the investment?
- What mechanisms need to be in place to ensure that the biomass is harvested sustainably?
- What are the critical logistical and infrastructure requirements to make these projects successful?
- How should the harvesting of biomass be managed?
- What are the economic benefits to landowners of selling biomass to this initiative?[3]

In addition to meeting local demand, forested communities have the potential to organize businesses, landowners, foresters, and loggers to meet regional demand in a manner that enhances local resources while securing local jobs (see below).

Develop Training, Facilitation, Structures, and Pilot Projects

It isn't just forested rural communities that stand to benefit from the use of woody biomass; suburban and urban places do as well. The interest in woody biomass opens up new opportunities for rural communities to organize themselves to meet regional demand while protecting local resources and building the local economy. Value chains are one framework through which this may be achieved.

In this context, a value chain refers to a set of intentional relationships between landowners, foresters, loggers, agglomerators, distributors, and buyers that creates communication, risk sharing, and contractual relationships. These relationships result in mutual benefit to all participants and facilitate rapid responses to changing market conditions. Value chains operate at many scales from local to international. As demand for woody biomass grows, issues of scarcity will develop. Buyers are concerned about the ability to secure a reliable supply of woody biomass at a competitive price. Some are also concerned about the environmental impacts associated with biomass supply. To the extent that large buyers can be drawn into conversations about the impact of their practices on producers and others along the value chain, new practices can be developed that benefit all parties, including the resource base itself. Value chains represent a new way of thinking about how to structure relationships between producers and buyers. Work on forestry value chains could open up new opportunities for forested communities to benefit from increased demand for woody biomass.

In the Northeast, where forested land is largely in private hands, one of the challenges of building a woody biomass-based economy is gaining supply from many different landowners with different values and motivations. The value proposition for landowners who will contribute supply to build the local economy could include:

- The prospect of good stewardship by becoming a local supplier (We'll help you take care of your land.);
- Stable flow of income;
- Forest stand improvement and adding value to remaining trees;
- Making a contribution to the local economy;
- Contributing to energy independence – getting beyond fossil fuels;
- Carbon sequestration;
- Access to a risk-sharing pool;
- Local job creation; and,
- A customized inventory for the landowner.

Communities are likely to need help in learning how to talk with and engage private and public landowners in supporting community-based woody-biomass enterprises, as well as in approaching and negotiating with private investors and project developers.

Structures analogous to land trusts may have a role in helping communities capture value from biomass-based development. At a local level, a community might offer private forestland owners the option of donating biomass management rights to the community in exchange for a modest local tax credit. Alternatively, state policies could be changed to require a contribution of biomass management rights in exchange for enrollment in state tax abatement programs such as Vermont's Current Use program. A biomass management right would specify sustainable best

[1] http://www.biomasscenter.org/pdfs/vffsVTmap.pdf
[2] http://www.familyforests.org/public-education/documents/Harnessing_Local_Wood_Energy-CCusack-sm.pdf
[3] Meeting the Needs of Communities and Forests: The Development of a Biomass Energy System in Richford, Vermont, http://www.ncfcnfr.net/pubs.html#richford

forest management practices, use of licensed foresters and loggers, and preferences for use of local labor and sales to local markets. Merchantable timber could be excluded from biomass harvest with revenues from timber harvest available for landowners up to a certain volume per acre. Revenue for the biomass trust would come from long-term supply contracts, possibly offset by federal or state tax or renewable energy credits. The private sector could bid on biomass management and harvesting jobs. A biomass processing facility could be established as the property of the trust with any profits over and above the cost of resource management and operations returned to community members as dividends.

At a regional level, biomass utilization could occur through decentralized facilities or, if appropriate, at larger scales. In either case, the biomass users could require or give preference to supplies from biomass trust lands. Biomass users could make tax privileged investments in the trust to facilitate development of infrastructure and training of local biomass managers, harvesters, and distributors.

Develop Training Programs for Educators and Youth in Conducting Woody Biomass Inventories

Accurate inventory data as well as information on recovery rates is essential to determine the amount of woody biomass that can be harvested from any given parcel or landscape without doing damage to forest health. Unfortunately, many communities lack detailed inventory data for biomass. The focus of national inventories has traditionally been on timber for saw logs. This national data is too coarse to be useful at the local level. One of the challenges in meeting demand for woody biomass is how to do so while still promoting the highest and best use of timber.

Biomass inventories could become a way to introduce youth to sustainable forestry practices while providing communities, businesses and landowners with the information they need to make informed decisions about woody-biomass development. Local organizations can take the lead, in partnership with local school districts, in the development of biomass inventory programs. To facilitate this effort, it would be useful to develop an inventory protocol, and then train regional and local educators in methodology and data storage system. Nationally, consideration could be given to establishing a youth conservation corps or Rural Entrepreneurship through Action Learning (REAL) program that helps people discover the economic opportunities in small communities and teaches them how to turn those opportunities into money-making ventures.