Sustainable Northwest

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Community-based Perspectives on Biomass

Briefing Paper
Forest Restoration and the Problem of Biomass

Biomass refers to living, or recently living, woody material that cannot be economically processed through traditional means. Western forest restoration treatments often require the removal of large numbers of trees that are either too small, too decayed, or too misshapen to be used as sawlogs. Biomass removal is essential to the restoration of Western forests: small diameter wood accumulation is a major contributing factor to catastrophic wildfires, and thickets of small diameter trees often contribute to a general lack of forest health and resilience (including low growth rates, insufficient soil humidity, and outbreaks of disease).

Biomass can be marketed to create fiber products such as paper and cardboard, but weak prices or fire effects on the wood can eliminate this possibility. Even where there is pulpwood demand, harvest and transport costs (in addition to facility operation costs) tend to be too high to allow economic returns in an unsubsidized market. Economic returns for biomass are significantly affected by distance: with demand low to begin with, long hauling distances significantly diminish potential profits.

Most often, biomass is chipped, pile-burned on site, or buried in landfills, generating significant costs and providing nearly no social or ecological benefits. Due in part to the high cost of dealing with biomass, important restoration needs across the West have consistently gone unmet: ironically, the material that is often the most important to remove as part of restoration treatments is also the least commercially viable. Finding economic uses for biomass can significantly support the implementation of forest restoration activities, while providing much-needed economic benefits rural communities.

Biomass Utilization

Biomass utilization entails putting this material to some kind of commercial use. The term often is associated with energy generation facilities ("biomass energy generation"), but it refers to a whole host of uses for small diameter wood, such as roundwood building materials, posts and poles, forest products such as flooring and paneling, and other innovative uses such as erosion control structures. Adding value to small diameter material through processing and manufacturing – whether it be into forest products or energy – may create sufficient economic returns to overcome the costs of biomass removal in forest restoration activities.

In the past few years, ongoing population growth and increasing demand for electricity in Western states, along with recent swings in Western energy prices (e.g. California's electricity price fluctuations in 2001), has generated great interest among forest communities in linking forest restoration activities to biomass electricity generation. Biomass can be converted to consumable energy through several types of facilities. Qualifying Facilities ("QF's") convert biomass to electricity through a steam process similar to coal-based electrical generation (biomass used on its own or with other combustibles to fire a steam plant that in turn drives electrical generators). Co-generation facilities ("co-gens") produce electricity in addition to other outputs, the most common being heat or steam used in lumber kilns. Other classes of biomass facilities are capable of converting the material into fossil fuel substitutes such as ethanol or other transportable fuels. Biomass energy is an alternative to non-renewable energy sources, such as fossil and nuclear fuels, and is generally considered "green" energy (though there is some debate given that it can generate polluting by-products).

Recent legislation has authorized funds to help subsidize transportation and utilization of biomass, and to fund continuing research and development of biomass technologies:

- Biomass utilization is specifically encouraged by the *National Fire Plan*:
  "Because much of the hazardous fuels in forests are excessive levels of forest-based biomass -- dead, diseased and down trees -- and small diameter trees, there are several benefits of finding economical uses for this material, including helping offset forest restoration cost; providing economic opportunities for rural, forest-dependent communities; reducing the risks from catastrophic wildfires; protecting watersheds; helping restore forest resiliency, and protecting the environment." (p. 25)
- *The Biomass Research and Development Act of 2000 (Title 3 of the Agricultural Risk Protection Act of 2000, P.L. 106-224)* allows entities (including nonprofits) to compete for federal grants and contracts associated with biomass research.
- *Section 9006 of the 2002 Farm Bill (P.L. 107-171)* authorizes federal grants and loans to farmers, ranchers, and rural small businesses to purchase renewable energy systems, and section 9010 authorizes payments to producers of bioenergy (biodiesel or ethanol). The *FY2004 Farm Bill (P.L. 108-199)* appropriated $23 million to fund these provisions.
- *Section 201 of the Healthy Forests Restoration Act of 2003 (P.L. 108-148)* expands the scope of these grants to include research on thinning, harvesting, transportation, pricing, and curricula development. Section 203 of HFRA authorizes grants to owners and operators of biomass facilities, including wood-based product facilities, and authorizes funds to this end.

Scale and Adding Value

Biomass energy generation facilities can range from very small, generating enough power or heat for use in a single building (such as a school or mill) to generating enough electricity to power tens of thousands of homes. "Micro" facilities are those generating less than one megawatt of power; "small" facilities are those producing 1-10 MW. Establishing a biomass facility requires a dependable, sustainable supply of biomass within the nearby area (25 to 75 miles). When looking at the combined needs for forest restoration and rural economic development in general, maximum social and environmental benefits will likely result from many smaller units distributed among forest-based communities, rather than fewer, larger facilities.

Supporting and siting biomass utilization facilities must be done with consideration of many local factors. Even at smaller scales, building biomass generation facilities can raise concerns about developing unsustainable demands for biomass materials, creating pressure to "deliver material" rather than to restore forests. Biomass generation facilities must also be weighed carefully against other potential uses of biomass that can either complement, or surpass generation facilities in their ability to provide rural employment opportunities through value-added processing. Siting and planning of biomass utilization facilities must be closely coordinated with local forest restoration goals and a community's particular economic circumstances. Given that the focus on biomass utilization and forest restoration is a recent one, every effort should be made to promote diversity and experimentation as a short-term path to identifying successful long-term utilization solutions.

Key Points in Considering Biomass Utilization

- *Biomass utilization must facilitate and complement restoration activities*, not override restoration needs with high input demands. The scale of biomass plants needs to be consistent with ecosystem capacity and tailored to restoration objectives.
- Federal funds are coming online to develop and establish biomass utilization centers and subsidize transportation costs. This money should be used to *develop diversified forest products sectors* (including uses beyond energy generation) *at the community level* and not to subsidize large centralized plants with little stake in forest-dependent communities.
- *All economic opportunities for biomass utilization should be targets of government support, not just biomass energy generation*. Using biomass for power should complement and diversify the approaches to small diameter wood utilization. Stand-alone biomass energy generation, while allowing for the utilization of a large volume of material, entails the creation of the fewest jobs of all biomass utilization approaches.
- Biomass transportation subsidies will help to offset the most prohibitive costs involved, but may also act to increase the reach of large facilities. *Encouraging small and micro facilities will require more focused subsidies to create the greatest benefits for rural communities, and to encourage entrepreneurialism, research and innovation.* Short-term subsidies should help foster the development of long-term self-sustaining uses and technologies.
- *Local context is essential to appropriately choosing and siting biomass utilization facilities*: what are the restoration needs (and biomass supply) that can drive facility development; what combination of technologies will add the most value to biomass and create the most jobs in the area; what experiments can be supported locally to advance regional knowledge of opportunities for innovative utilization?