Sierra Forest Legacy
Protecting Sierra Nevada Forests and Communities

Sierra Nevada Forests and Biomass Utilization Facilities: Evaluating Benefit

Sierra Forest Legacy supports the use of small, community-scaled biomass facilities when we determine them to be sustainable and provide a public benefit. We define sustainability as "meeting human needs without compromising the health of ecosystems."[i] We also apply the concept of strong sustainability in which the benefits of nature are irreplaceable and the entire economy is reliant on society, which in turn is entirely dependent on the environment.[ii] Embedded in our view of strong sustainability is the expectation that facilities should be collaboratively developed with local and other stakeholders. Public benefits may include converting trees that are a hazard or fire risk to homes and infrastructure into energy and increasing the capacity to apply prescribed fire. In places where smoke impacts limit the use of fire, woody slash can be delivered to a biomass facility rather than burned in a pile as is commonly practiced. Eliminating the contribution of smoke from pile burning could increase the number of days available for prescribed fire.

To gain our support, biomass facilities should be in the **right location**, of the **right size**, and utilize the **right woody biomass**. We discuss each of these factors below.

Right Location

This factor takes into account the effects of the biomass facility on the local human community and the availability of woody biomass to support operation. Facilities should be sited in locations where the daily traffic of diesel trucks carrying biomass stock will not adversely impact a community. Sufficient distance from human communities is also important to support dispersion of any residual air pollution from the facilities.

The right location is also important to providing the appropriate type of woody materials at an ecologically sustainable rate to the facility. Close proximity to a large forested landscape can minimize the travel distance to the facility, reducing energy and emission costs.

Right Size

The capacity of a facility to generate power sets the demand that the facility will place on the amount of woody biomass to support operation. The facility needs to utilize woody biomass at an annual rate and for a period of time that is ecologically appropriate for the surrounding forested landscape. We favor the use of facilities that generate less than 5 MW of power, i.e., 3 MW for external distribution and up to 2 MW for internal use. A facility of this scale is most likely to match the restoration need to remove biomass from the surrounding forest ecosystem. We will consider supporting facilities up to 10 MW if they have a diversified woody biomass source and do not rely solely on biomass from forests. Larger facilities need to show how they will change operations as restoration goals are achieved and forest biomass is no longer available. This could include shifting to other non-forest wood waste or shifting to a creating a more efficient product like heat. We also favor facilities that will deliver both heat and electricity, since the generation of heat is far more energy efficient than the delivery of electricity.

Right Woody Biomass

Ecologically appropriate woody biomass may be generated from forest restoration projects that maintain ecological integrity and species viability, or from implementation of fire safe clearing and removal of tree hazards from around buildings and infrastructure. The demand for power generation at any facility should never drive removal of biomass from the forest.

Proposals for biomass facilities include feedstock assessments. The assessment should be well documented and include evaluations of biomass availability under current management and accelerated management. The assessment should also evaluate the demand for biomass over the lifetime of the facility. The assessment needs to be sufficiently detailed so that it can be determined if the amount of woody biomass needed to support the facility is scaled to the ecologically appropriate amount of biomass that can be removed from the forest.

Factors to consider when evaluating the costs and benefits of a specific biomass facility:

Right material over the long-term: As restoration proceeds, the availability of material may drop substantially. How will the operation adjust to the decline in material? By adding landfill yard waste? By sorting small wood into higher value material like landscape chips, shavings, poles, firewood, pellets? Or by demanding more material than what is ecologically appropriate?

Type of facility and economies of scale: What are the power, heat, or other product uses planned for the facility, and the scope of proposed power purchase agreements? Are community-based power agreements and uses available? Is it a combined heat and power facility? Is it a biochar facility? Does the facility plan to supply synthetic gas as a product? What is the track record of the developer? What do the experts say?

Regulation and pricing: Currently, facilities 5 MW in size are supported with a public purpose pricing structure, i.e., 3 MW for export and 2 MW for internal use like heating a building, growing greenhouse vegetables, or drying wood in a kiln. Smaller facilities tend to be cost-prohibitive to build at $1 million/MW. Assuring feedstock availability is a big issue and it includes gathering, chipping and transporting material. The current energy pricing structure strongly supports natural gas, and PG&E is opposed to bioenergy.

Projects that generate the biomass: Are the projects that removed the biomass "good" projects? Factors to consider when evaluating a logging or thinning project include the history of a century of fire exclusion, and past management decisions that have produced an excess of crowded, small trees in the forest understory; negative effects from logging on wildlife and other sensitive resources, negative effects from extreme wildfire if surface and ladder fuels are not reduced, and potential for continuing and increased tree mortality due to drought. One might also consider if the project area could benefit from managed fire today or if there are other actions that are needed first, such as creating fire control points to enable the use of fire. Treating surface and ladder fuels should be the primary focus for changing fire behavior and limiting extreme effects. But there are few other economic incentives for removing these fuels, and using biomass removed by such projects can offset costs.

Emissions tradeoffs: The Best Available Control Technology (BACT) is required under the California and Federal Clean Air Acts (https://www.arb.ca.gov/bact/docs/controltech.htm). These regulations do not mean there will be no pollution from the facility, but they do significantly limit annual production of PM 2.5 compared to open burning or an extreme wildfire. One should consider how unplanned wildfire smoke is impacting disadvantaged communities. Much of the woody material generated from thinning projects is burned in piles. Pile burning reduces the number of days available for prescribed burning. Would it be better to remove these piles to a biomass facility to enable more prescribed fire?

For additional information:

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[i] Callicott, J.B. and Mumford, K., 1997. Ecological sustainability as a conservation concept. *Conservation biology*, *11*(1), pp. 32-40.
[ii] USDA Forest Service 2011. National Report on Sustainable Forests – 2010. US Department of Agriculture. FS-979. June 2011. Accessed on March 12, 2018: https://www.fs.fed.us/research/sustain/docs/national-reports/2010/2010-sustainability-report.pdf