DNRC perspectives on woody biomass energy development in Montana
Potential Discussion Points

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In recent years, significant public funding has been available for renewable energy projects, combined heat and power, biomass utilization, and the transportation of biomass for energy. Many lessons can be learned by investigating why some biomass CHP projects have been unable to come to fruition in spite of the fact that on its face, public policy appears to support them. This analysis provides some of the answers to that question and some suggestions for moving forward, but by no means should be considered a complete understanding of all of the issues associated with biomass energy development.

In our great state of Montana, several wood products manufacturing businesses have investigated the feasibility of developing CHP plants that would sell electricity to the grid and make productive use of a portion of the waste heat associated with steam production. One major obstacle to their feasibility has been the cost of making electricity with biomass, particularly in relation to the inexpensive electricity rates in our region. In addition, some of the incentive programs available at the federal level have not been a good fit for these potential projects. This raises the question: what are the goals of federal incentives? What are our goals in Montana? What ***should*** a biomass energy incentive program's goals be?

One issue that has been recognized in subsidy programs is that biomass, and especially forest biomass, is relatively low in density and expensive to collect and transport. The recent Biomass Crop Assistance Program's (BCAP) Collection, Harvest, Storage and Transportation program has attempted to address this. But one could argue that by subsidizing transportation of this material, you are primarily enabling one to transport it longer distances more affordably, which in most instances, increases the fossil fuel use associated with biomass energy production. It is an oversimplification, but still holds some truth in that if we incentivize transportation, that's what we will get more of. There are several other issues with BCAP as well, most of which raise the question: what was the goal of this program?

Another set of incentives, offered by the U.S. Department of Energy for renewable energy and CHP projects, requires that CHP plants achieve at least 60% efficiency. If our primary goal is to recover the maximum energy out of every particle of biomass, efficiency requirements make sense. But is that the right goal? Are we requiring that of other energy sources? Typically, no, we are not. One could argue that we should be. But in order to get built, energy producing plants also have to be practically achievable and economically feasible. Maximizing efficiency is a good goal, but at some point there is a cost/benefit calculation that needs to be made, in order to ensure the most effective use of public funds. That is, if we can spend a fraction of the public money that would be needed to get to 60% efficiency and achieve 40 or 50%, wouldn't that be more economically efficient as well as increase energy efficiency?

Most energy produced in this country is not combined heat and power – it is straight electrical production between 25-30% efficient in energy recovery, regardless of fuel. If all of the waste heat associated with electrical production is used for some productive purpose, CHP can be highly efficient, e.g., 80-90%. In the case of Montana's proposed projects at sawmills, most would be sized between 12 and 18 MW. This size strikes a balance between return on investment and potential fuel costs and availability. The Return On Investment gets better as

plants get larger, because small equipment costs almost as much as large equipment, but the fuel gets more expensive as the plants get larger, mostly due to increasing transportation costs. At this projected size range (12-18 MW), the sawmills would be able to use some of the waste heat for drying lumber and other industrial uses, but would not use enough waste heat to get to 60% efficiency. Again, the question … isn't 40-50% better than straight electricity at 25%? Are there are good public reasons for the 60% requirement that override the public good associated with slightly less efficient plants?

Maximizing efficiency will generally drive CHP plants to be sized smaller, to match localized heat demand. On the other hand, maximizing biomass utilization will drive plants to be larger. The Forest Service woody biomass grant program tends to make awards to projects that project higher volumes of biomass utilization. For a variety of reasons, neither of these strategies is appropriate for what we want to promote in Montana.

Unlike many western states, Montana still has a functioning integrated wood products industry, in which primary manufacturers mill logs into boards, and secondary manufacturers take the byproducts of these processes (sawdust, shavings and chips) to make wood pellets, particleboard, fiberboard, and pulp/paper. We also have one large CHP plant at our pulp mill that burns ground logging residue and black liquor (byproduct of pulp) to generate electricity and heat for the plant. Many other mills have boilers to burn their own waste for process heat, but are not currently generating electricity. Since 1990, 27 mills have shut down in Montana; those that remain have been struggling for some time. This infrastructure is a valuable asset to the state, not only due to the jobs and economic activity they provide, but perhaps even more importantly, due to our forest management challenges of insects, diseases, and wildfire. Without uses for some of the byproducts of forest management, that management becomes extremely expensive — surrounding states that have lost this infrastructure are paying 2-4 times the per acre treatment costs.

So a central goal in Montana is to maintain and strengthen the infrastructure we currently have. Bringing in new large biomass users in close proximity to existing biomass users would be disruptive in most cases/locations.[1] Sizing CHP plants for maximum efficiency would require substantially more financial assistance in order to truly strengthen these businesses. If instead we built incentives to maximize the carbon benefits of forest management in Montana, we could achieve all of our goals including greenhouse gas reduction, economic stability, and forest health management.

Research from the Consortium for Research on Renewable Industrial Materials (CORRIM) suggests that the best overall forest management-forest products scenario from a carbon perspective is: 1.) manage forests to maintain or enhance their carbon sequestration capacity (helping forests adapt to warmer and drier conditions, and improving resilience to insects, disease and wildfire are part of this); 2.) convert as much of the wood removed as possible into solid wood products (boards, beams, plywood, particleboard, etc.) to maximize sequestration of carbon for as long as possible, while substituting wood for far more energy

[1] There are significant exceptions to this. Considerations of supply and proximity to existing users are important. There are several geographic areas in the state that do not currently support milling infrastructure, and thus would be unable to capture the CHP alternative without concurrently establishing a significant industrial heat user. In these cases, establishing standalone new biomass users sized to the locally available supply would be appropriate.

intensive products like concrete and steel; 3.) use the remaining woody material to offset fossil fuel use for heat and/or electricity. Thus, the goal of maximizing the carbon benefit aligns very well with the goal of strengthening and stabilizing our integrated forest industry.

So how can incentives be structured to accomplish this? They should minimize disruption on current wood users, particularly those users that convert wood into long-lived solid products that sequester carbon in the near term. A few thoughts about how to achieve this: .1) exclude clean mill residue from BCAP and similar programs to avoid skewing the value of material that gets used in solid wood products; 2.) consider some kind of siting requirement for incentive programs that would only allow tax credits, grants or other financial incentives for projects located a certain distance from a current biomass user; and 3.) ensure that carbon management legislation accounts for the value of sustainable forest management, and the value of substituting solid wood products for more energy intensive materials that do not sequester carbon. This list is a start; many more approaches are possible, and there are tradeoffs. The point of this analysis is to frame this problem in terms of what we are truly trying to achieve, and urge policy makers to approach any new incentives with this in mind.

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