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Can Burning Trees Reduce Our Global Carbon Footprint?

The University of Montana, like many colleges across the nation, is to be commended for taking the threat of human-caused global climate change seriously and tackling the University's contribution to the problem. That is a refreshing and hopeful public response to our greatest environmental challenge when contrasted to our federal government's response, namely head-in-the-sand, know-nothing, anti-science rants and legislative paralysis.

Also like some other universities surrounded by forested landscapes, the University of Montana has proposed converting its heating system from a fossil fuel, natural gas, to a renewable fuel, wood fiber removed from the surrounding forests.

Such a shift in fuels can be justified by multiple objectives including the shift from a non-renewable fossil fuel to wood fiber, which, if the forests are managed sustainably, can be a renewable energy source. But some of the other objectives the University of Montana was pursuing with its forest biomass proposal may have to be reevaluated. These include, most importantly, whether the proposal will actually reduce the University's carbon footprint.

Originally the University said that it would use waste wood left behind in the forest as a result of forest management activities that would have taken place whether or not the University was operating a biomass facility. Montana law would have required that such wood waste created by forest management be burned or otherwise destroyed

or removed because it represents hazardous fuels that make the forest more flammable and dangerous.

That meant that the University was able to claim that burning those wood wastes on campus to generate heat and electricity would reduce its carbon footprint since these materials would have been burned in any case. That wood burning would now take place in a more controlled environment where the air pollution from the burning could be dramatically reduced and the carbon release would be the same as if the wood had been burned in the forest. More importantly, the burning of natural gas and the release of the carbon from the consumption of that fossil fuel would be avoided altogether. From a carbon point of view, that appeared to represent a clear reduction.

The problem that the University has run into is one that other schools in Montana and around the nation have also faced: For wood-waste heating systems to function well in terms of low maintenance costs, efficient burning, and low air pollution, one cannot really just collect wood waste from the forest floor, grind it up, and feed it into the boiler. The quality of fuel one gets from such ground wood, or hog fuel as it is called, is just not high enough to operate high efficiency, low polluting, boilers.

The Thompson Falls School District in northwestern Montana tried replacing its diesel fuel with woody biomass beginning five years ago. In reviewing that experience the school superintendent was quoted as saying the: “Hog fuel doesn’t work…The theory that we can go into the forest and take all the slash and use it no matter what kind of state it’s in caused too many problems. We always had maintenance problems and then we had to resort back to diesel.”[1] Glacier High School in the Kalispell area had

[1] ***Missoulian***, Chelsi Moy, Sunday, October 2, 2011, quoting Thompson Falls School Superintendent Jerry Pauli.

similar problems when it tried burning ground up wood waste. It had to abandon the use of hog fuel and turn to wood chips that come from chipping up or processing whole logs.[2]

Those wood chips cost more, of course, than hog fuel. But the bigger question is not the economics but what happens to the carbon balance of the project if whole trees are harvested to be chipped and burned? In that setting, it can no longer be asserted that the trees being turned into fuel would have been burned in any case and the University is just burning that wood in a cleaner manner.

Some have argued that if dead or dying or densely spaced trees are not thinned, they will burn in forest fires or ultimately will die, fall to the forest floor, and give off greenhouse gases as they decay. But whole trees do not fully combust in most forest fires. The bulk of the forest carbon survives the wildfire.[3] In addition, timing is everything in terms of preventing climate change. What we do in the next several decades to reduce carbon emissions is what is important, not what will happen a half-century or a full century from now.

Harvesting whole trees to be chipped for boiler fuel provides an immediate pulse of carbon dioxide into the atmosphere similar to what burning coal would have caused. Whether and when that pulse of greenhouse gas from harvesting and burning trees will be offset in the future by biological processes depends on many unknowns including

[2] Ibid. quoting Kalispell School District facilities supervisor, Jason Betterly.
[3]"Forest fuel reduction alters fire severity and long-term carbon storage in three Pacific Northwest Ecosystems, Stephen R. Mitchell, et al. ***Ecological Applications,*** 19(3):643-655, 2009***,*** p. 652.

future land use and management, future wildfire patterns, the rate of regeneration of the forest, etc.[4]

The University of Montana is reevaluating the economics of its proposal because the cost of its current heating fuel, natural gas, has fallen dramatically and future natural gas prices are now being forecast to increase much more slowly. The University also knows now that the woody biomass fuel it would be purchasing will cost more and/or will be of lower quality that it projected. Besides reevaluating the financial logic of its biomass project, the University should also reevaluate the likelihood that the biomass fuel will not be coming from forest slash that otherwise would have been burned in the in the forest anyway. Instead the University may be obtaining that biomass from the harvest and chipping of whole trees. If that is the case, the impact of this change on the University's original objective of reducing its carbon footprint also needs to be seriously reevaluated before the University proceeds with its biomass heating project.

[4] "Biogenic vs. geologic carbon emissions and forest biomass energy production," John S. Gunn et al., 2011, ***GCB Bioenergy,*** doi: 10.1111/j.1757-1707.2011.01127.x