

The Myths of Dangerous Methane Emissions from Forests, and Cutting Trees to Curb Greenhouse Gas Emissions

By Glen Ayers

Undisturbed forests are one of the best and most efficient carbon sequestering organisms on the planet. Highly disturbed forests will emit CO₂ for a long time, due to the massive organism death and disruption of ecological cycling, but this lasts for several years and then the forest slowly returns to a steady state, eventually recovering its ability to capture CO₂ in excess of what it releases. Removal of slash will immediately throw all of that carbon into the atmosphere when it is burned, a process that can not be compared with leaving the slash in the forest to provide the same amount of energy and nutrients to help recover the damaged ecosystem. Essentially the removal robs the forest of what it needs most to restore lost functioning and disrupted cycles: energy and biomass (or food). An abused and starved forest will take that much longer to recover, leading to a greater length of time before it reached the break-even point and once again starts to absorb more CO₂ than it releases.

Forest debris left in the woods will produce very minor amounts of methane, if any, unless it is squashed into a swamp or buried in a stump dump. In fact, un-chipped slash is very slow to decompose, taking many years, and is unlikely to produce any measurable methane, except for that which is a direct result of the damage done to soil porosity by compaction from logging equipment. Many logging jobs leave the soil in a very damaged state, especially when the wrong equipment is used or the operator is not extremely careful to avoid soil compaction.

In addition, the removal of slash from the forest might lead to the production of way more methane, depending on how it is handled and stored, than will be produced by leaving it to "rot" in the woods. The huge piles of tree chips that most existing biomass incinerators use, which is the same for all of the proposed incinerators in MA, will create conditions that produce large amounts of methane, because the wood particle size is greatly reduced (more reactive surface area and available nutrients), the piles are too deep and compacted to remain aerated, they are uncovered and quickly become water-logged, especially at the bottom of the pile, and the green chips, leaves, and twigs provide a highly digestible source of material that rapidly composts, but quickly becomes anaerobic due to the depth and size of the piles (poor air/oxygen exchange). This is why the piles so often spontaneously catch fire, the piles get very hot while they are generating flammable breakdown products like methane, alcohols, and other gasses or volatile compounds that have a low flash point. These are produced under anaerobic conditions and high temperature, something that does not typically occur in upland forests.

Inside the huge wood chip storage piles there are anaerobic conditions and sometimes anoxic (low oxygen) conditions where there are mixed zones of partially anaerobic sites. With the higher temperatures from thermophilic bacteria (metabolic heat) and the blanketing effect of large piles of wood chips, the conditions are perfect for anaerobic

bacteria that produce large amounts of methane gas. Without the high temperatures, anaerobic decomposition is very slow and methane production is likewise low. This is a microbiological reality based on scientific common sense.

As far as I am aware, no proponents of these huge storage piles have addressed this overlooked problem. These piles could be huge emitters of greenhouse gases (GHG's), equivalent to feedlots and other well known methane producers. They would be worse than landfills, because the porosity of the piles would let almost all of the methane escape into the atmosphere unimpeded by an impervious cap or a gas collection system. I am not a big fan of landfills, but overall landfills are major carbon sequestration mechanism. Yes they slowly release some methane, but that methane can be captured and used for energy production. Most of the carbon in a landfill will never be converted to methane, the temperatures are too low underground and the biological activity is too slow.

There is plenty of hard science to back up everything written above. There is nothing available that I am aware of to support the biomass proponent's claims that slash on the ground produces large quantities of methane. The argument that burning wood and immediately releasing the CO₂ will somehow reduce total GHG emission impact because it prevents the wood from decomposing on the forest floor and producing methane, a much more potent GHG, is a scientifically absurd fallacy. Anyone smart enough to try to use this sort of twisted logic should be smart enough to know better. If anyone brings it up, you can be pretty sure that they either don't know what they are talking about or they are intentionally green-washing you.

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