Taken at face value, use of woody biomass as an energy source to replace fossil fuels looks like a good solution; it keeps new carbon from entering the biosphere and adds only carbon which is already part of the existing carbon cycle. Presumably this biomass fuel would enter the atmosphere naturally as it decays even if it were not burned.

Indeed, if this biomass is taken from sources which are solely waste products which would be sent to landfills, burned in situ, left to decay in storage sites, (urban tree trimming, agricultural waste, "industrial" tree farm management, etc.) then the repacement of fossil fuels with biomass makes sense. However, reducing the nutrients available to naturally regenerating forests by creating a new "forest product" in the form of chipped low grade logging slash is a bad idea.

It's a bad idea for a number of reasons:

1. The slash which is normally left on the forest floor after a logging operation has the highest percentage of nutrients. Left in place it aids forest regeneration. Although some part of the slash can be removed with little immediate effect, *no one knows how much*; estimates appear to center on a minimum of 30% should be left. How do you enforce that? On private land? I have not seen any estimates of the cumulative effects, i.e., depletion of soil nutrients over many harvests (cod fishery redux?)
2. Offering up slash as a new forest product creates an economic incentive to harvest forests at more frequent intervals; high grade timber takes a human lifetime to become useable. Firewood maybe half that. Woody biomass which can be chipped and burned for fuel, maybe half that again.
3. Mature forests not only take up free carbon from the atmosphere, but also lock it into the soil (also taking up CO2 naturally released from soil decay); removing the slash exposes the soil to the atmosphere, allowing release of soil-bound CO2 into the atmosphere (also drying it out and killing the living organisms in the soil which retain carbon).
4. Forestry professionals would have us believe that the early successional regeneration of the forest makes up for the carbon released in a harvest, but this is by no means a proven fact. In fact, the DCR/Harvard Forest study, "Wildlands and Woodlands" states that "as early successional trees decline and longer-lived trees become dominant, carbon uptake actually increases"; p.18. Shouldn't we be managing forests for high-grade timber production thereby increasing their ability to sequester carbon?
5. A forest will regenerate and resume carbon sequestration at the same rate it had pre-harvest, but how much time will this take? Surely the more nutrient rich slash left on the forest floor, the faster the regeneration. Fifty years ago, even thirty years

ago, we could have gotten away with this grand biomass experiment, stepped back, looked at the results, given it up as a mistake, or tweaked it if it looked promising, but at this point, we don't have fifty years, we need to protect and increase the natural ability of forests to sequester carbon. After all, the fossil fuels we have over-relied on are just that; over-whelming evidence of a forest's potential to store carbon. We need to ask them to do it again.

I am not a forestry or ecosystems expert and I'm sure much of what I've stated is known to you, but it seems to me the biomass option is only viable if one can assure the biomass sources are truly waste and does not put negative pressure on forest regeneration. I am also sure the chances of implementing any of the above as policy or regulation are zero to none, so here are a few ideas which could satisfy the biomass market for waste wood, thus giving an economic dis-incentive to leave the more expensive to remove slash on the forest floor where it belongs.

1. Require all state-produced wood waste to be directed to biomass incinerators; DOT, DCR, any operation which produces (or can produce) chipped wood waste.
2. Require the same at town landfills. Currently here in Conway residents can't bring woody yard waste to the transfer station; they burn it or stockpile it and let it decay.
3. Give tree removal companies, arborists, etc. incentives to bring their chipped wood waste to biomass incinerators. Make sure loggers are not included; offer them incentives to leave the slash in the forest.
4. Get the power companies off the herbicide fix and require them to mechanically remove vegetation and bring it to biomass incinerators - the power line rights of way represent significant land area which could be "farmed" for biomass - this is state land, right? Same for roadside telephone line, etc., tree removal operations.
5. Offer farmers incentives to grow fast-growing trees as a source of biomass; willow has been proposed as a suitable species.

If energy from biomass is going to make a dent in the use fossil fuels, then the wood waste stream has to be actively directed to the biomass incinerators, this can't be passively left to the vagaries of the free market. Furthermore, if the State of Massachusetts is going to promote biomass power plants in-state, then ensuring (i.e., through incentives, regulations, statements of policy) that as much wood waste as possible gets to the power plants has to be part of the package. Anything less would be irresponsible.

Jeff Knox
75 Main St.
Conway Massachusetts 01341