Response to the comments made by Manomet regarding the recent paper by FutureMetrics about the Manomet Study on biomass

By Dr. William Strauss, President, FutureMetrics, June, 2011

Manomet's comments are here => http://www.manomet.org/node/322
Original FutureMetrics paper is here =>
http://www.futuremetrics.net/papers/Manomet%20Got%20it%20Backwards.pdf

The suggestion in the comment by John Hagan, President of the Manomet Center, that I misunderstood the policy question is incorrect. From my perspective, to dismiss my argument by suggesting that I do not understand the question is bordering on an ad hominem argument and distracts from the core of the debate.

The question that they worked on that I supposedly misunderstood is a result of being tasked as follows (as John Hagan paraphrases it): "The Massachusetts Department of Energy Resources asked Manomet to quantify the benefit (or cost) in greenhouse gas emissions from increased use of forest biomass for energy generation." Hagen continues with the following statement: "The three critiques are flawed, we believe, because they do not address 'what the atmosphere will see' as a result of switching from fossil fuels to woody biomass. And that was the policymaker's key question to us."

I understand the question but I continue to believe that the Manomet team framed the question in such a way that there is only one conclusion (and I make that point on the first page of my paper).

They are certainly correct in that if you start "today" (which they point out in their comments on my paper) and compare CO_2 output for coal and wood at the combustion source, then the atmosphere will see more CO2 from coal than from wood coming out the stack. That will be true forever. I believe that this is the fundamental issue that the anti-biomass to energy advocates look at. If that is the case, all the rest of the discussion is a waste of time since there is no way to repeal the laws of the chemistry of combustion.

Of course the CO_2 from coal is a net new addition to the atmosphere while the CO_2 from wood is not as long as the net stock of wood is not depleted. If one can only conceive of using wood in the context of forest destruction then it is understandable that one would be against the use of wood for energy. But as my paper made very clear (and as is required for use in European utilities and should be here as well), the wood has to be from certified sustainable working forests if the carbon advantage is to be accepted. That sustainability criterion is also implicit in the Manomet Study since there is regrowth after the harvest sufficient to recycle the CO_2 released. The Manomet Study and my work are in agreement in terms of seeing a closed cycle. Where we disagree is over when to start the accounting for the carbon cycle.

I suspect that we will never find common ground on that point. The Manomet team has clearly stated that the Study was for MA only (a point lost in the media) and, as my paper points out, it is probably true that MA does not have the forest resources or the history of working forests to provide a foundation for a growing wood-to-energy sector. In Maine, where I live and work, there is a foundation for a growing wood-to-energy sector. My paper spends many pages making that case.

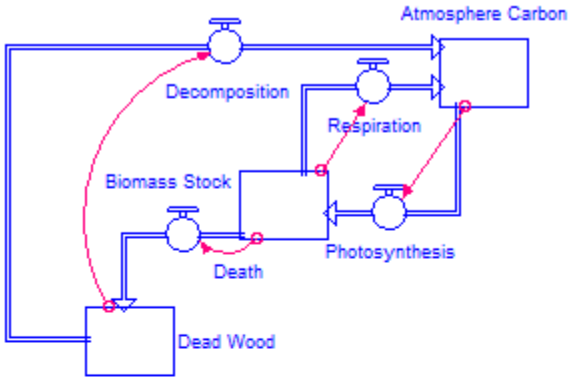
But to expand my concerns over the Hagan rebuttal (or more correctly, his reprint of an earlier rebuttal), it makes no "commonsense" to ignore the fact that trees are not only soaking up the CO_2 from their own decay or combustion but also from the combustion of fossil fuels. If we continue with business as usual (BAU) then we will need more and more trees to balance the increased use of coal and other non-sustainable fuels. Clearly under BAU we cannot

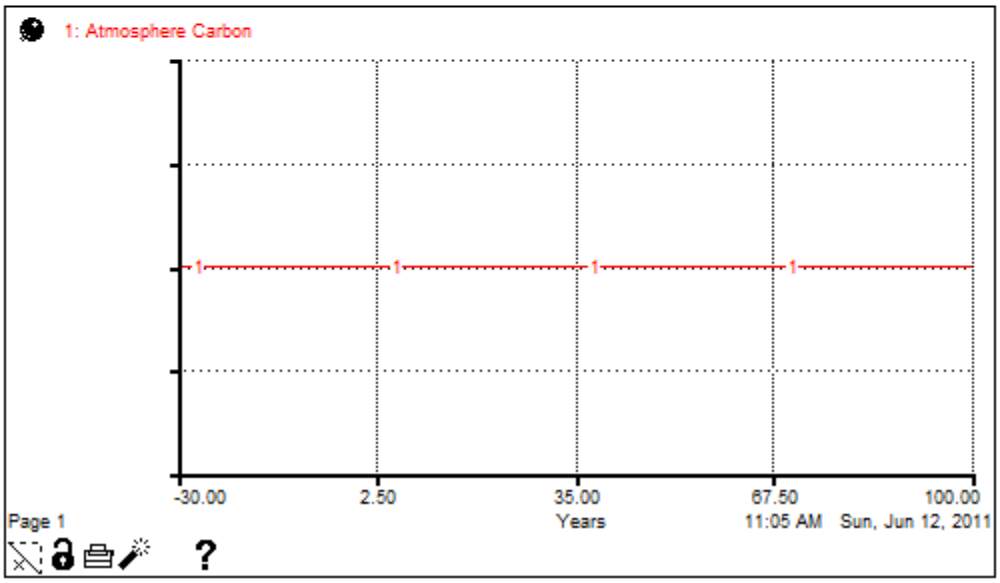
be satisfied with stable stocks of biomass; we need more and more if we are to maintain any chance of mitigating increasing GHG levels.

I think that the misunderstanding is not mine of the question that needs to be answered but is theirs regarding the complexity and interconnectedness of the systems.

Below are a couple of very simple model runs (using STELLA software). The diagrams show simple stocks and flows and feedback loops. The charts below the diagrams show the stock of atmospheric carbon over time. The initial condition values and the flow rates used in the models are proportionally about right for atmospheric carbon.

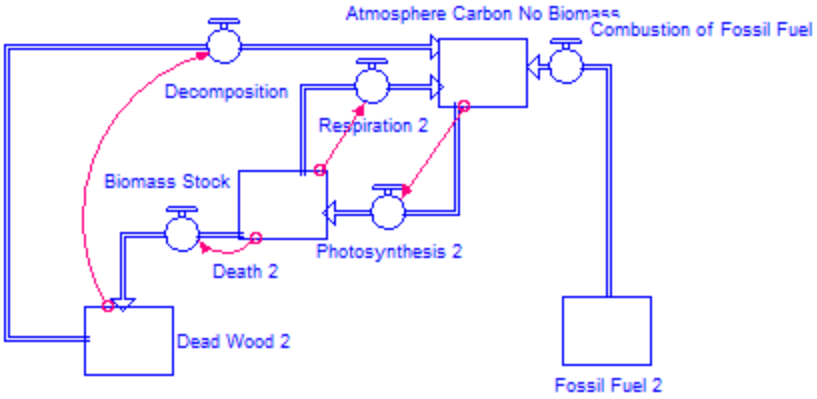
The first run only looks at the carbon cycle with biomass and with no combustion of fossil fuels or wood fuels.

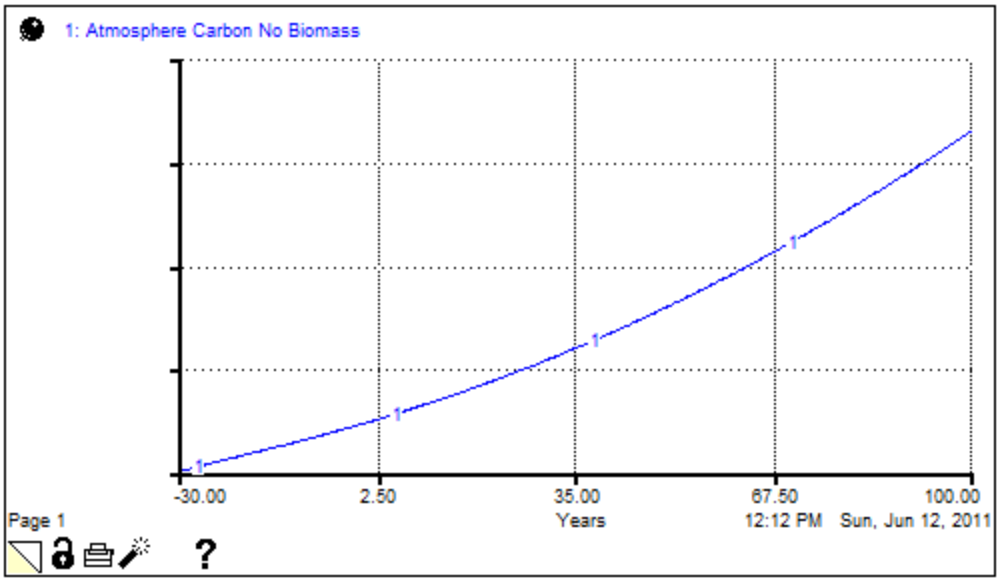




The system is in balance.

Now with the addition of fossil fuels (note that the time scale starts 30 years ago).

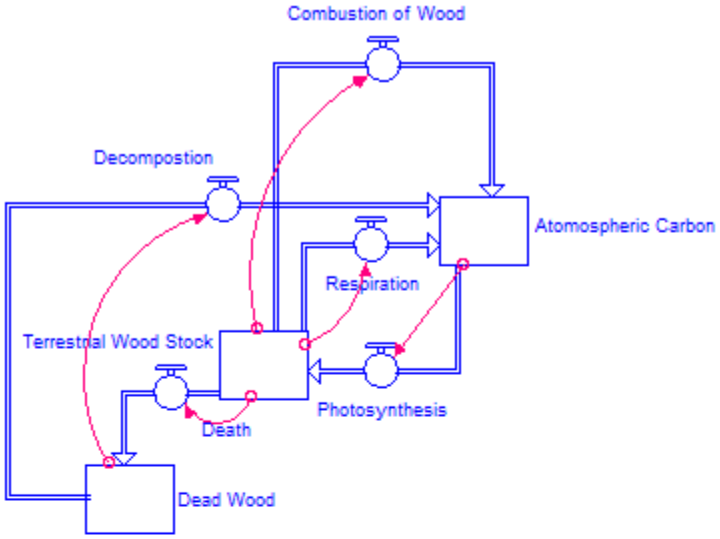


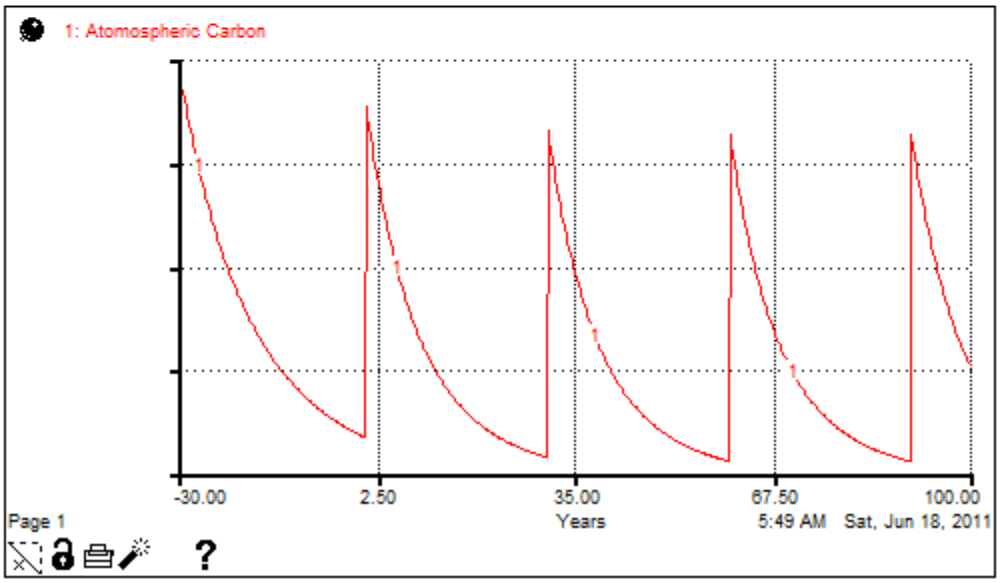


With fossil fuels added and the net stock of biomass constant, atmospheric carbon is growing.

Now we look at a scenario with only biomass combustion. There is no fossil fuel combustion and again the time starts 30 years ago – note that a 30 year growth cycle is not realistic but to be consistent with the stylized model in my paper I will use it – it does not matter what the cycle is as long as the stock of biomass is not depleted over time – that means that the intensity of wood to energy has to match the ability of the ecosystem to sustain the biomass stock. This scenario also eliminates most of the flow from the stock of terrestrial biomass to dead wood since a working forest will be selectively cut to minimize waste from deadwood. This will eliminate much of the flow of CO_2 from decomposition back into the atmosphere and allow the net carbon stock in the forest to grow and the net CO_2 in our model's atmosphere to decline (the dividend that will yield the benefit when harvested).

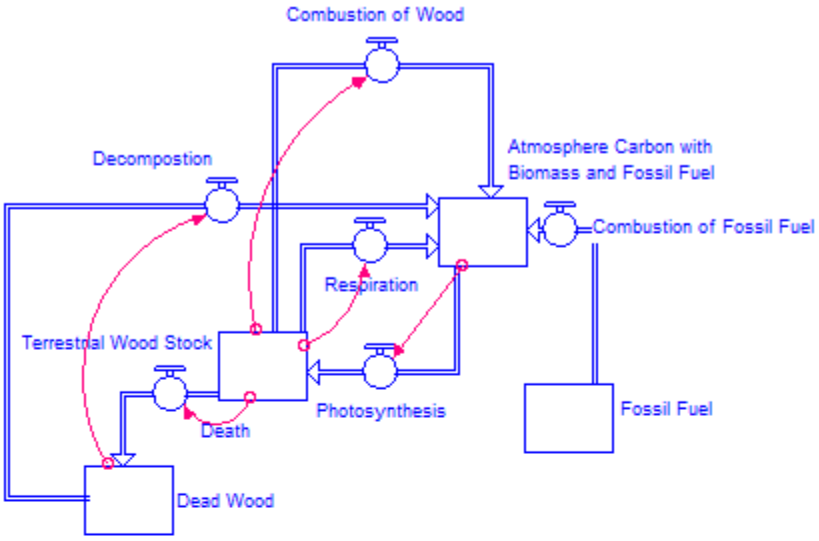
This picture assumes that we are looking at a dedicated set of trees that are harvested after 30 years (thus the spike). Of course in a forest system, trees are at many stages of growth and in aggregate, as my paper shows, the net stock remains more or less constant (assuming sustainable forestry) or grows (assuming better silviculture).

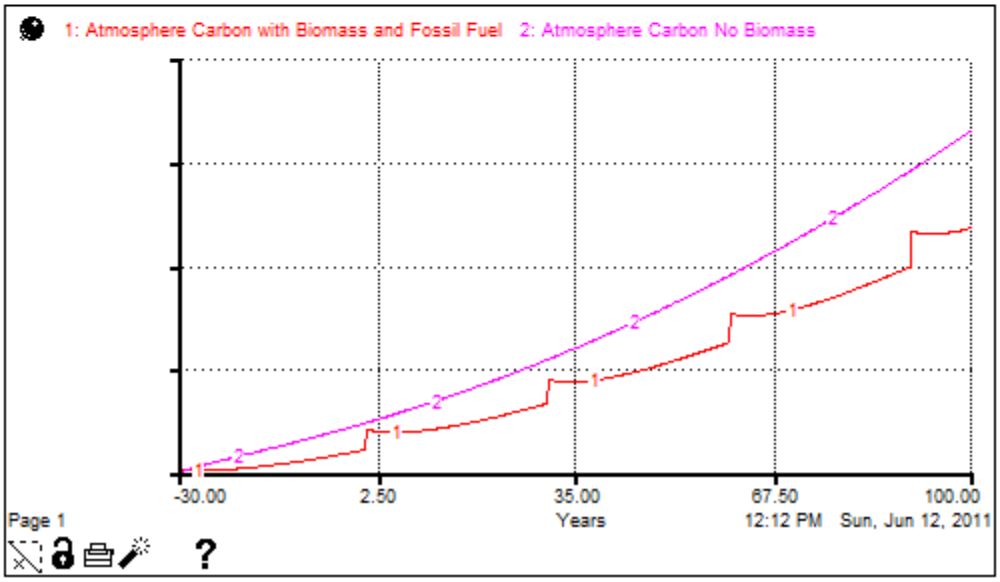




Manomet starts at time zero at the bottom point (just to the left of year 2.50). The model starts at time 30 years ago. Otherwise the graphical view are about the same.

Finally lets add fossil fuel back in at about the proportion it will have to grow to meet energy demand even with a some conversion to wood energy. This very stylized model has us harvest in 30 year cycles (with no harvest in between). This it totally detached from the reality of how forests are managed but shows the net carbon effect of two cases: fossil fuel only and fossil fuel with some biomass to offset some of the growth in fossil fuel demand. Both cases show overall growth in CO_2 because the fossil fuel growth is required in both cases.





Here we see that BAU is worse than the scenario in which biomass is used for some of the energy. The Manomet Study, by starting "today" excludes the accrued dividend and only shows the spike at a starting point from which the spike jumps above the fossil fuel output. The system dynamics that get us to "today" are excluded from the logic.

So in conclusion, I do not think my so-called misunderstanding is at the heart of the matter. The same set of data with the same task from the MA DOER could have had a very different result if the Manomet team had considered the so-called question in the context of a working forest system. What happens "today" is not an isolated event unconnected with the past.

As a final thought experiment: If I have $1,000,000 saved up and earn 5% per year, at the end of a year I will have $1,050,000. If I spend $50,000 over the next year, following the Manomet view of the world, I would simply say that I have spent and lost $50,000. Following a more commonsense view of the world, I would say I have a benefit that was earned by 30 years of management and growth, that I have lost nothing, and that in fact I have sustainably managed my nest egg.