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DATE: September 19, 2018

TO: Thomas Carpenter, DFO, United States Environmental Protection Agency (sent via email to carpenter.thomas@epa.gov)

FROM: Jennifer Jenkins, Ph.D.
Vice President and Chief Sustainability Officer, Enviva

SUBJECT: Comments on the August 29, 2018 draft report for quality review from the EPA Science Advisory Board (SAB) on the SAB's review of the 2014 draft *Framework for Assessing Biogenic CO₂ Emissions from Stationary Sources*

Dear. Mr. Carpenter:

Thank you for the opportunity to provide comments on the August 29, 2018 draft report for quality review from the EPA Science Advisory Board (SAB) on the SAB's review of the 2014 draft *Framework for Assessing Biogenic CO₂ Emissions from Stationary Sources*.

Enviva Holdings, LP is the world's largest producer of wood pellets, a renewable and sustainable energy source used to generate electricity and heat. Through its subsidiaries, Enviva Holdings, LP owns and operates wood pellet processing plants and deep-water export terminals in the Southeastern United States. While we produce our pellets using wood from the Southeast US, we export our product primarily to power plants and CHP facilities in the United Kingdom and Europe, where our customers typically use them to replace coal.

We believe that climate change is one of the biggest problems that we face as a society today, and we understand that the transition to a renewable energy economy is absolutely critical to the future of the planet. While its contribution today is small, policymakers around the world have concluded that a transition toward biomass and away from coal – given its ability to solve short-term intermittency, to utilize existing infrastructure, and to handle thermal loads – must be a key part of our transition away from fossil fuels.

Government policies are important for driving decarbonization in the energy sector; equally important is the growing corporate commitment to and demand for clean energy. Both public policy and corporate best practices for consuming and tracking renewable energy use require an accepted and workable carbon accounting solution for forest biomass energy. We do not think that a legitimate rule is to simply say that "all forest biomass is carbon neutral." At the same time, however, a carbon accounting solution

must be scientifically sound and based on the carbon benefits provided by sustainable forestry, *and* it must provide a workable and predictable basis upon which a potential user can make the investments necessary to convert from fossil fuel, knowing that a reliable supply of appropriate biomass will be available to fulfill that transition.

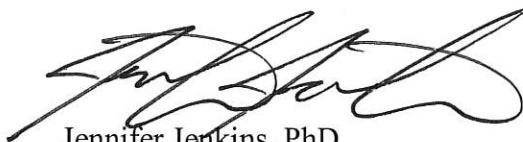
In the best interests of the climate, our goal for forest biomass should be to craft an accounting approach that: 1) discourages the conversion of forests to non-forest uses; 2) provides incentives for the growth – and not depletion – of forests; *and* 3) encourages the conversion away from fossil fuels. Together with my colleague Roger Ballentine, we laid out a framework for such an approach in our May 2018 paper (attached), entitled “A Climate Solution We Cannot Afford to Ignore: Biomass Sourced from Privately Managed Working Forests.” <https://www.energycentral.com/c/ec/climate-solution-we-cannot-afford-ignore-biomass-sourced-naturally-managed>

We agree with the SAB’s conclusion that an approach based on carbon stocks is appropriate for this purpose, and that such an analysis must be conducted on a landscape/regional basis and not at the stand level. We are pleased to see that the SAB has strongly questioned the utility of a modeling approach for this policymaking application. The market needs rules by which a consumer of forest biomass can prospectively identify adequate supply that will meet the zero carbon energy objectives that a growing number of energy consumers demand. Modeling approaches, and approaches that rely on a retroactive evaluation of the carbon value of each harvest of biomass, will not meet these needs. In particular, it is not practical or necessary to estimate some future scenario when evaluating stack emissions; instead, as we explain in our paper we can look at the landscape “balance” at the time of harvest.

There are important issues that remain unresolved, of course, and until these details are finalized we cannot endorse all of the SAB’s recommendations. These outstanding issues can and should be resolved by stakeholders working together in order to enable a working market for forest biomass that will allow for fossil fuel substitution with net-zero carbon fuel while also incentivizing net forest growth.

We appreciate the SAB’s work in moving this important dialogue forward, and we welcome the opportunity to contribute meaningfully and collaboratively to the regulatory development process that will undoubtedly follow.

Respectfully submitted,



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<http://www.theenergycollective.com/rogerballentine/2433941/a-climate-solution-we-cannot-afford-to-ignore-biomass-sourced-from-naturally-managed-working-forests>

A Climate Solution We Cannot Afford to Ignore: Biomass Sourced From Naturally Managed Working Forests

May 23, 2018 by [Roger Ballentine](#) [Leave a Comment](#)



By Roger Ballentine and Jennifer Jenkins.

Outside the realm of climate change deniers, there is broad consensus that we need rapid and deep decarbonization of modern energy systems to have any chance of stabilizing global average temperature rise in the neighborhood of two degrees Celsius, the threshold widely viewed as critical for avoiding the most dangerous impacts of climate change.

However, the window of opportunity for achieving the emissions reductions needed to meet this target is narrowing quickly in the face of stubborn political and economic headwinds. We can't afford to wait: we need immediate emissions reductions, and we need them urgently.

Given these narrowing odds and the enormity of the climate crisis, any suggestion that we remove a potential low-carbon energy source or technology from our climate change mitigation toolkit bears a very high burden of proof.

This climate imperative has lessened the opposition from some environmentalists to certain energy options like nuclear power, carbon capture and sequestration, and hydropower. Forest biomass, however, is still subject to withering criticism by some in the environmental community, as well as by otherwise well-meaning commentators. The media firestorm over EPA Administrator Pruitt's recent announcement that the Agency plans to treat emissions from forest biomass energy as carbon neutral certainly has not helped elevate the debate.³

But categorically discounting the climate change mitigation offered by forest biomass could make the mission of rapid and deep decarbonization more difficult to achieve. Biomass can directly displace fossil fuels for energy production, and when harvested from certain forest landscapes we can – and should – treat that energy as a zero-carbon resource.

First, let's limit the scope of the discussion. We describe a framework appropriate for evaluating the climate impacts of a critical subset of forest biomass — bioenergy feedstocks harvested from privately owned “working” forests, such as are prevalent in the southeastern United States – based on net changes in carbon stocks on the lands from which the biomass is harvested.

With this focus, we need not debate clearly “bad” biomass (*e.g.*, biomass harvested from otherwise untouched or conservation forests) or clearly “good” biomass (*e.g.*, wood wastes or residues from commercial forestry operations that would otherwise be burned or left to decompose on site) – we should not use the former and there is not enough of the latter to make a meaningful difference.

We are also not addressing here the very important concerns about how forest product harvesting can impact important issues like biodiversity, water quality, or habitat value. These concerns are not germane to determining the ultimate climate impact of bioenergy but can – and should – be addressed by separate sustainability guidelines and best practices.

Energy from biomass harvested from managed working forest landscapes where growth outpaces harvest is zero-net-carbon energy.

Yes, biomass combustion emits CO₂. And yes, it's true that biomass utilization can be less efficient, in terms of CO₂ emitted per unit of energy produced, than fossil fuels in conventional thermal and power plants. And while it is true that a molecule of emitted CO₂ has the same warming impact regardless of its source, it does not necessarily follow that emissions from biomass combustion should be treated as new net-positive CO₂ added to the atmosphere.

If biomass energy feedstocks come from working forest systems in which harvested wood is continually and in real time completely replaced by new growth — the substitution of this energy source for fossil fuel eliminates fossil emissions without adding any new and net incremental CO₂ to the atmosphere at the time of combustion.⁴

A market for sustainably sourced bioenergy creates incentives for better forest management and the maintenance of net carbon stocks, particularly on privately owned lands.

Many criticisms of forest bioenergy make the mistake of not distinguishing managed working forests, like those in the southeastern U.S. that are managed in such a way as to maintain net carbon stocks, from other types of forest landscapes, such as conservation lands.

The private working forest landscape in the Southeast is managed to continually produce an array of products into the forest products market, only a small portion of which are bioenergy feedstocks. And by “managed” we mean that harvest, growth, and regeneration are constantly occurring across the forest landscape so that when one stand is harvested, the carbon removed from that pool is being returned by new growth elsewhere on the landscape⁵.

While one could argue that the most climate beneficial management approach would be to let forests grow unfettered without ever harvesting them, that scenario is not the relevant or realistic “counterfactual” *for private working forests, particularly in the SE, which is one of the most productive commercial wood-producing regions in the world.* Rather, research on this question suggests that the opposite is true.

Absent demand for forest products – including an economic outlet for low-value fiber such as that used for energy — the working forest landscape in the U.S. Southeast would grow more slowly with respect to the amount of merchantable timber they produce or possibly even decline, and therefore would likely sequester less carbon.⁶

We know this because there is a positive relationship between forest harvest and forest growth in these landscapes: somewhat counterintuitively, it is the profitable harvest of trees that give landowners the reason to continue actively managing these forests for growth and bioenergy markets are a key part of these economics (providing a market for low-quality material harvested from the forest but undesirable for other uses).

And if these working forests are not producing profits for the landowner there is the additional risk they could be converted to another revenue-generating use involving the clearing of part if not all of the forest – the worst possible climate outcome.⁷

For managed working forests, a focus on the temporary CO₂ emissions of a given isolated harvest misses the larger climate-relevant point.

Without question, harvesting and combusting biomass from a forest stand results in net emissions *from that forest sub-unit* until the stand in question regrows biomass equal to what was harvested from it.

But for a working managed forest landscape, at any given time, across all the different stands that make up that landscape, the forest is yielding emissions from those units being harvested *while simultaneously* sequestering carbon as a result of new growth and regeneration in other units harvested previously. This is how sustainably managed working forests have always operated.

Every year in the southeastern U.S., 2% of the working forest is being harvested while the remaining 98% is in various stages of regrowth (and within that 2%, several different forest products are produced, a small but economically important portion of which is biomass for energy use). The International Energy Agency (IEA) has described the role of bioenergy production in sustainably managed forests:⁸

*Biomass extraction for energy is one of many interacting factors influencing the development of forest carbon stocks, including forest product markets, forest ecosystem structure and management, and natural conditions. Silvicultural operations and harvest activities are coordinated across a forest landscape to maintain a healthy forest and to obtain a continuous flow of wood for society, while maintaining or increasing wood volume in the forest. Carbon losses in some stands are balanced by carbon gains in other stands, so that across the whole forest landscape the fluctuations in carbon stock even out.*⁹

Building a carbon accounting policy framework for working forests by attempting to model emissions and sequestration for an individual tract at the stand level ignores the carbon that is being re-sequestered by the re-growing portions of the previously harvested landscape; only simultaneous analysis of emissions and regrowth can determine the net climate impact of a given landscape. The production of wood in response to market demand is enabled by the simultaneous management of a very large number of stands on the landscape, not by management of one individual tract over time.

If there is net sequestration at the scale of the managed forest landscape, then a specific harvest within that landscape is *not* a net emission that must be “accounted” for; the climate is receiving a net CO₂ *benefit* or dis-benefit depending on the change in carbon stocks on that managed forest landscape. The management of the working forest system *as a whole, land-use trends, changes in carbon stocks, net storage in long-lived products as well as the impact on the use of other products* determines the net climate impact.

For those steeped in the language of corporate carbon accounting, net climate impact is how we do carbon accounting and reporting. One could analogize to how a corporation reports and tracks greenhouse emissions. A given factory or

facility, for example, may produce an increase in emissions (as might a portion of a working forest), but if other units of the company reduce their emissions correspondingly, the company reports no net increase in emissions.

Similarly, if there is a net increase in carbon stocks year over year in a given working forest landscape then the use of forest products for energy should not be “assigned” emissions independent of the net sequestration of the working forest landscape from which they came.

An approach that focuses on actual, measured changes in carbon stocks over time is more practical and offers greater assurance of climate benefits than an approach that relies on speculative modeling and unrealistic “counterfactuals”.

Some forest bioenergy critics take the position that climate benefits should be assessed by comparison to modeling scenarios that assume no forest harvest at all, or perhaps no forest harvest for energy purposes. Modeling is not the best way to formulate a carbon policy, because modeling alternative scenarios is complex and necessarily entails numerous assumptions and as a result to date has proven ineffective at predicting future trends.

Modeling inevitably includes the heroic assumption that a model can reliably predict what would happen to future markets for forest products absent the additional driver of demand for energy applications. And perhaps more importantly, a counterfactual of unfettered growth with little or no harvesting is simply not applicable for most private working forests such as those that are prevalent in the southeastern U.S. Without harvest (and the income it generates), some portion of these forests assets is likely to be converted to crops or other non-forest uses.

There is no need for speculative modeling: measured data can be used to determine if the forest landscape is, in net, sequestering or losing carbon. If (and only if) it is net sequestering, then energy from biomass harvested from that landscape should be treated as carbon-neutral. The European Union’s proposed clean energy policy follows this approach.¹⁰

Far from labeling all biomass, regardless of its source, as “carbon neutral,” a landscape-level, carbon stock framework for managed working forests appropriately bounds the designation of climate-beneficial forest biomass energy.¹¹

Such a carbon accounting policy approach, along with other non-carbon environmental safeguards, will help maintain a viable forest products industry, incentivize sustainable forest management, and ensure that appropriately-sourced bioenergy remains available as an alternative to fossil fuel use.

Policies pertaining to forest bioenergy, whether they are imposed by governments or adopted voluntarily, must reflect several key points:

- We should not categorically remove forest biomass from our climate mitigation toolkit and we need not label all biomass as “carbon neutral”. We should use biomass from landscapes where carbon stocks are stable or increasing and where adequate sustainability standards are met.
- Owners of working forests are more likely to manage their assets in ways that foster stable or increasing carbon stocks when markets for forest products are robust. Perhaps counterintuitively, research suggests that increased demand for forest biomass can lead to management practices that are more likely to maintain forest carbon.
- Modeling is not needed to apply this framework, since there is an existing robust system for providing actual regional inventory data can be used to directly quantify carbon stocks at the landscape scale.
- Important international scientific bodies and environmentally progressive governments support the landscape carbon stock approach.
- The landscape/sustainable harvest approach will give would-be bioenergy consumers clear guidance as to a carbon neutral subset of biomass they can source.
- Simply limiting biomass energy use to very narrowly sourced feedstocks (such as sawmill residues) will miss the opportunity to further reduce net carbon emissions to the atmosphere as the supply chain will be inadequate to enable fossil users to invest in conversion; these users will

transition to lower carbon options only if they can secure a supply base at scale that can guarantee bankable delivery.

As in most energy and climate debates, the issues surrounding forest biomass are complex. All energy production technologies, including options like wind and solar, have advantages and drawbacks, and all have elicited legitimate environmental concerns. Biomass is no exception and its specific attributes mean that it will be important to apply robust sustainability criteria and other environmental protections—including tracking of net carbon stocks in source forests—as a condition of using additional wood for energy production.

But biomass has advantages, in terms of supply reliability and compatibility with existing energy infrastructure that can accelerate the displacement of fossil fuels in the near term. A policy based on unrealistic counterfactuals or that focuses only on the carbon impacts in only a subset of a larger working forest misses the forest for the trees, so to speak, and risks foregoing a low-carbon energy option that—given the scale and urgency of the climate challenge—we can ill afford to lose.

By Roger Ballentine¹ and Jennifer Jenkins²

1 Roger Ballentine is the President of Green Strategies, Inc. He served as Chairman of the White House Climate Change Task Force under President Bill Clinton and is the Co-Chair of the Aspen Institute Clean Energy Innovation Forum.

2 Jennifer Jenkins is Vice President and Chief Sustainability Officer at Enviva Biomass. She holds a PhD in ecosystem ecology from the University of New Hampshire and a Master of Forest Science from Yale University's School of Forestry and Environmental Studies.

3 In the current environment it is hard to separate the details of any EPA policy from its controversial Administrator. We don't here defend or dissect what EPA did, but EPA has not indicated that carbon neutrality is assumed automatic under all circumstances and for all time: EPA has committed to revisit its policy should the trajectory of US carbon stocks shift. Irrespective of EPA's policy, we

suggest a narrow framework that can put the right biomass into our climate toolkit.

4 Of course, the production and transportation of bioenergy products like pellets have emissions associated with them. It is the same with the production and transportation of Chinese solar panels. We do not attribute such supply chain emissions to the emissions rate of the energy eventually produced.

5 Note that typically a share of the carbon removed from the forest – the portion of the harvested timber that is sold into sawtimber markets – is stored over the long term in harvested wood products, providing additional sequestration. Far from reducing these climate-helpful uses of forest biomass, a market for low value fiber such as for bioenergy helps support the economics of these uses.

6 According to a report published in July 2017 by Forest2Market that examined data from the U.S. Department of Agriculture’s Forest Service Forest Inventory and Analysis for the southeastern U.S. over the six decades from 1953 to the present. Over that period, the data confirm a positive relationship between forest harvest and forest growth, indicating that landowners responded to a stable market for forest products by planting more trees. Jefferies, H.M., T. Leslie. 2017. Historical Perspective on the Relationship between Demand and Forest Productivity in the US South.

<https://blog.forest2market.com/forest2market-report-shows-increased-demand-for-wood-fiber-leads-to-forest-growth>

7 Dale, V. H., Kline, K. L., Marland, G., & Miner, R. A. (2015). Ecological objectives can be achieved with wood-derived bioenergy. The Ecological Society of America Frontiers in Ecology and the Environment, 297-299.

8<http://www.ieabioenergy.com/>

9<https://www.chathamhouse.org/sites/files/chathamhouse/publications/2017-04-05-IEABioenergy.pdf>

10 The current version of the EU’s RED2 package, “Clean Energy for all Europeans,” considers the use of U.S.-sourced biomass in stationary facilities

such as power plants as a greenhouse gas reduction tool only if the biomass is sourced from a supplier whose forest stocks are stable or increasing. As agreed by Plenary Vote in the EU Council on December 18, 2017 and by Plenary Vote in the EU Parliament on January 17, 2018.

*11 Moreover, there is little potential for detrimental “leakage” from these forests whereby increased demand for bioenergy from managed forests shifts overall demand and results in increased harvesting from forests that are not managed for continued growth. The decline of the region’s pulp and paper industry since the 1980s (due to a broader reduction in demand for paper and printed products) has made an abundance of low-quality feedstocks available. Woodall, C. W., Ince, P. J., Skog, K. E., Aguilar, F. X., Keegan, C. E., Sorenson, C. B., . . . Smith, W. B. (2012). An Overview of the Forest Products Sector Downturn in the United States. *Journal of Forest Products*, 595-603. Further, even if concerns remained about demand for feedstocks increasing to the point where local leakage became a problem, these concerns could be mitigated by monitoring the forest landscape over time to ensure that overall carbon stocks are stable or increasing. Provided the landscape carbon stock analysis is conducted over an area large enough to capture any effects of leakage outside a given producer’s supply region, this approach would provide confidence that the use of the producer’s feedstocks for energy purposes is not leading to additional greenhouse gas emissions.*

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