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Missed opportunity: Draft Scoping Plan fails to address biomass pile burning and decay

June 9, 2022Posted by [Sam Uden](https://www.csgcalifornia.com/blog/author/samcsgcalifornia-com/)

*California recently released a draft version of its main climate plan, finding that it is preferable to open burn or leave to decay in the forest a significant portion of biomass residues resulting from wildfire prevention treatments. This is a missed opportunity: as a robust strategy to collect and convert forest waste into carbon-negative wood and energy products is a*[*promising*](https://www.pnas.org/doi/10.1073/pnas.2019073118)[*path*](https://www.scienceforconservation.org/assets/downloads/tnc_AFR_v9.pdf)*to enable the state’s goal of treating*[*one million acres per year*](https://www.gov.ca.gov/wp-content/uploads/2020/08/8.12.20-CA-Shared-Stewardship-MOU.pdf)*. This is essential to reduce the risk of high-severity wildfire in California, where a*[*single runaway season*](https://ww2.arb.ca.gov/sites/default/files/2021-07/Wildfire%20Emission%20Estimates%20for%202020%20_Final.pdf)*can emit volumes of CO2 that rival what the state can reduce in a decade.*

*In this technical blog post, we analyze the role of forest biomass in the*[*Draft 2022 Scoping Plan*](https://ww2.arb.ca.gov/sites/default/files/2022-05/2022-draft-sp.pdf)*. We identify various modelling assumptions that bias residues towards being left in the forest. We provide recommendations to improve the treatment of forest biomass in the Plan, feasibly driving a host of co-benefits to watersheds and local communities. Finally, we highlight how biomass utilization could support California’s need for*[*carbon dioxide removal*](https://www.csgcalifornia.com/blog/could-carbon-dioxide-removal-support-californias-climate-change-goals/)*to achieve net-zero emissions and below by 2045 or sooner.*

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The California Air Resources Board (CARB) recently released a draft version of its [Scoping Plan](https://ww2.arb.ca.gov/sites/default/files/2022-05/2022-draft-sp.pdf), which describes how the state could achieve net-zero emissions by 2045. The Plan covers all sectors of the economy. It also incorporates a substantial new component that assesses the carbon sequestration potential of the state’s Natural and Working Lands (NWLs), including forests, croplands, wetlands, and more. This is an important addition because of the increasing role NWLs are likely to play both as a carbon sink but also source of emissions, driven by impacts such as wildfire as well as the management of farm and forest biomass residues.

One area where the Plan falls short, is in relation to forest biomass. Specifically, the proposed management of residues resulting from wildfire prevention treatments. These volumes are expected to increase substantially, as governments ramp up treatments to [one million acres per year](https://www.gov.ca.gov/wp-content/uploads/2020/08/8.12.20-CA-Shared-Stewardship-MOU.pdf). CARB models an even more ambitious level of treatments in the Plan, at 2.3 million acres per year.

**The biomass utilization imperative**

It is generally estimated that 10-15 dry tons of forest residues will accrue per acre treated,[[1]](http://www.csgcalifornia.com/blog/wp-admin/post.php?post=360&action=edit#_ftn1)equal to 10-15 million new tons per year (at one million acres treated) and 23-34.5 million new tons (at 2.3 million acres treated). These huge volumes underscore the pressing need to expand product markets and progressively build out an infrastructure capable of managing them. A strategic focus on residue utilization can [support](https://bof.fire.ca.gov/media/mn5gzmxv/joint-institute-forest-biofuels_final_2022_ada.pdf) [the cost](https://www.scienceforconservation.org/assets/downloads/tnc_AFR_v9.pdf) of forest treatments, provide [economic opportunities](https://www.sierrabusiness.org/archives/biomass-in-the-sierra-nevada-a-case-for-healthy-forests-and-rural-economies/) in rural communities, and avoid the [alternate scenario](https://escholarship.org/content/qt29d705xw/qt29d705xw.pdf?t=nwtotz) where forest biomass is piled and burned or left to decay, releasing CO2, PM2.5, and powerful short-lived climate pollutants such as methane. A rough calculation shows that this could result in an additional 63 Mt of CO2 emissions per year.[[2]](https://www.csgcalifornia.com/blog/missed-opportunity-draft-scoping-plan-fails-to-address-biomass-pile-burning-and-decay/#_ftn2)

**Contentious assumptions adopted by CARB**

Despite the utilization imperative, CARB’s model is biased towards leaving biomass in the forest – not only generating emissions, but also maintaining a clear wildfire risk to communities. This follows certain assumptions adopted in the [underlying modeling](https://ww2.arb.ca.gov/sites/default/files/2022-05/2022-draft-sp-appendix-i-nwl-modeling.pdf). We describe three of these below:

* **70% assumption**: As a baseline assumption, a maximum of 70% of gross residues resulting from a fire prevention treatment can be collected, with at least 30% left in the forest. This is based on a 2011 [national study](https://dr.lib.iastate.edu/entities/publication/bc6bb2b0-9280-4b13-940b-4804a3bdb8f6) that arguably does not reflect the presently [vulnerable state](https://www.fire.ca.gov/media/ps4p2vck/californiawildfireandforestresilienceactionplan.pdf) of Western forests.
* **Indifference assumption**: Relatedly, CARB assumes that regions are indifferent to collecting the available 70% of residues, and would (with equal probability) collect smaller portions, such as 50% or 30% of residues. CARB takes an average of possible collection scenarios to develop a final estimate of “mobilizable” residues (i.e., the volume of residues that the model says could technically be collected). By taking an average, this estimate is lower than if it was assumed that regions prioritized collecting all available residues that posed a wildfire risk to communities.
* **Social cost assumption**: As a final screen, CARB assumes that only a portion of the residues deemed “mobilizable” would be collected, based on the “social cost” of open burning or leaving the residues to decay. Social cost is measured as the criteria pollutant and CO2 emissions damages associated with open burning and decay. In a number of cases, including notably the North Coast the model concludes it is preferable to open burn or leave residues to decay because of the low value attributed to reducing air pollution and wildfire in those regions.

The fallout of CARB’s modeling approach is that only a small volume of forest biomass is recovered – on average, 2 tons per acre – into [hydrogen with carbon capture and storage](https://gs.llnl.gov/sites/gs/files/2021-08/getting_to_neutral.pdf). Relative to estimates of 10-15 tons per acre, this suggests that 80-90% of what could be collected is burned or left to decay (Fig. 1).

**Fig. 1**stylistically represents how model assumptions adopted by CARB limit the volume of residues recovered in the Scoping Plan (on average, 2 tons per acre) relative to the gross residue resource total. Note that this is not an exhaustive assessment of the assumptions and approach adopted by CARB.

**Recommendations to improve the model**

The minimization of the role of forest biomass in the draft Plan is significant, as it could justify limited investments and policy support for climate-resilient California forests and local communities. CARB should consider the following strategies to improve the treatment of forest biomass in the Plan:

* **Review 70% assumption**: It is essential to retain some residues in the forest to meet ecological and operational needs, although 30% is arguably too high in water-scarce, fire-prone, vulnerable Western forests. CARB should engage forestry experts further to review this assumption.
* **Revise indifference assumption**: It is reasonable to assume that, when faced with a choice of recovering all available residues or just a portion (the remainder of which would be burned or left in the forest), regions would prioritize full residue recovery. This reflects regional and state goals to reduce wildfire risk and CO2 emissions and support rural economic development.
* **Abandon social cost method**: While we recognize CARB’s effort to develop this screening method, it is limited in that it fails to incorporate the benefits of collecting residues. These include improvements to downstream water supply, wildfire risk reduction for communities, and regional economic development associated with the creation of new manufacturing facilities and carbon management supply chains. Factoring-in these benefits would almost certainly increase the volume of residues deemed “mobilizable” in the model. However, to do so would be an extremely challenging (and frankly, unreliable) analytical exercise. Instead, CARB should abandon this method, recognizing that robust considerations regarding air quality and public health will always be made at the project level under CEQA and NEPA.

**CARB should target the carbon dioxide removal opportunity**

A system that mobilizes forest waste into products will not only reduce fire risk and CO2 emissions, but could also help California achieve another objective: its need for [carbon dioxide removal (CDR)](https://www.csgcalifornia.com/blog/could-carbon-dioxide-removal-support-californias-climate-change-goals/).

CDR refers to actions that physically remove CO2 from the atmosphere. The Plan estimates that 100 Mt of CDR will be needed per year by 2045 to compensate for hard-to-abate emissions in the economy, such as animal agriculture, aviation, shipping, and some industrial processes, as well as to address legacy emissions. As NWLs are expected to be a net source of emissions, removals can only come in the form of direct air capture with carbon storage (DACCS) and bioenergy with carbon capture and storage (BECCS). As a [relatively](https://netzeroamerica.princeton.edu/the-report) [low-cost](https://www.frontiersin.org/articles/10.3389/fclim.2020.618644/full) CDR option, CARB should target forest BECCS for the CDR opportunity it provides.

BECCS is routinely shown as the [main CDR option](https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_FinalDraft_TechnicalSummary.pdf) by the IPCC, and California is [well-placed](https://www.cell.com/joule/pdf/S2542-4351%2821%2900301-9.pdf) to advance this technology for global benefit. Lawrence Livermore National Laboratory’s award-winning [*Getting to Neutral*](https://gs.llnl.gov/sites/gs/files/2021-08/getting_to_neutral.pdf) report provides a helpful starting point by showing biomass waste availability on a county-by-county basis, including forest, agricultural and urban residues. The Low Carbon Fuel Standard is a [policy mechanism](https://www.frontiersin.org/articles/10.3389/fclim.2021.665778/full) that can support sustainable forest BECCS (and fire prevention) in California. BECCS projects also qualify for $3.5 billion in forthcoming federal funding for [Regional Direct Air Capture hubs](https://www.fedconnect.net/FedConnect/default.aspx?ReturnUrl=%2Ffedconnect%3Fdoc%3DDE-FOA-0002746%26agency%3DDOE&doc=DE-FOA-0002746&agency=DOE).

**Conclusion**

In 2020, wildfires [emitted](https://ww3.arb.ca.gov/cc/inventory/pubs/wildfire_emissions_faq.pdf) over 100 Mt of CO2 in California. This amount alone is greater than the total emissions reductions achieved by the state since the passage of AB 32. Reducing the risk of high-severity fires and improving forest resilience is one of California’s most pressing climate problems.

A robust forest biomass strategy that has the capacity to manage at, or near to, the gross resource total from ecological land management is essential to this. Moreover, a state biomass strategy that prioritizes CDR can help assure the negative emissions needed to achieve net-zero and below by 2045 or sooner.

For more information on CSG’s research and policy initiatives in support of California’s clean energy transition, please contact Sam Uden ([sam@csgcalifornia.com](http://sam@csgcalifornia.com)).