

Forest Bioenergy and Climate Change

POLICY BRIEF



KEY POINTS

- Forest bioenergy is not “carbon neutral.”
- Carbon accounting rules that treat forest bioenergy as carbon neutral encourage policies that worsen climate change.
- Compared to burning coal to produce electricity, even sustainably grown forest bioenergy adds CO₂ to the atmosphere for decades or centuries. This does not allow us to limit global warming to 1.5 or 2°C, which would require completely eliminating CO₂ emissions, and then removing CO₂ from the atmosphere before the end of this century.

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BACKGROUND

“Forest bioenergy” refers to the burning of wood or wood products to produce electricity or heat. Burning wood releases CO₂ into the atmosphere, just as burning fossil fuels does. (In fact, for a given amount of electric power generated, burning wood releases about 1.5x as much CO₂ as burning coal.) Forest bioenergy can be used to generate electricity by forming the wood into pellets, which are burned instead of coal. Alternatively, forest bioenergy can be made into liquid fuels. In some cases, these fuels are exported before being burned.



In international climate policy, emissions from forest bioenergy are supposed to be counted when the wood is cut—as an emission from land use change—rather than when it is burned. Proposed policies could be interpreted as allowing emissions from forest biomass not to be counted at all.

IMPLICATIONS FOR CLIMATE

Forest bioenergy is sometimes incorrectly described as “carbon neutral.” The basis of this misconception is that wood used for forest bioenergy can be regrown, and in the process CO₂ is removed from the atmosphere.

In practice, forest bioenergy falls short of being carbon neutral because:

- Forest regrowth can take 50-100 years. During this period, atmospheric CO₂ is elevated, extra heat is trapped by the atmosphere, and irreversible impacts will occur (e.g., ice sheet melting and release of greenhouse gases from thawing permafrost).
- There is no requirement that wood used for forest bioenergy be replaced. Even if there were, there can be no guarantee that new trees would grow to maturity.
- The process of harvesting forest bioenergy releases carbon into the atmosphere from soil disturbance.
- Processing wood into either pellets or liquid fuels, and transporting these to the point of combustion, requires energy and results in significant greenhouse gas emissions.

To be likely to meet the widely-held goal of limiting global warming to 2°C, global net CO₂ emissions would need to be zero by around 2070, and substantially negative after then. Forests can make an important contribution to meeting this goal by storing large quantities of carbon that would otherwise be in the atmosphere (causing warming) or in the ocean (causing acidification). Recent work shows that aggressive restoration of tropical forests, for example, could lower atmospheric CO₂ by about 75 ppm.



RECOMMENDATIONS

Employ truly low-carbon energy technologies like wind and solar. Since 2009, the cost of solar power has decreased by 80%, and the cost of wind power has decreased by 60%, making these technologies highly competitive. For a given area, solar panels produce up to 80x more power than bioenergy.

Account for emissions realistically. Rules for accounting for CO₂ emissions should reflect as closely as possible what actually goes into the atmosphere. They should not count as carbon neutral practices which add large amounts of CO₂ to the atmosphere, even if only temporarily.

Restore forest, soils, and other land carbon reservoirs. Adding carbon to land reservoirs, such as forests, can buy substantial additional time to stop fossil fuel burning. Use of forest bioenergy, which reduces the amount of carbon stored on land, sacrifices an opportunity to use land management as part of the solution to climate change.

FURTHER READING

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