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## Research on Land Use, Land-Use Change, and Forestry (LULUCF)



The EU claim that it's GHG criteria, the Sustainability criteria, and the LULUCF criteria ensure that biomass burned for energy reduces emissions relative to fossil fuels is simply wrong. As a result it undermines its own purpose of reducing GHG emissions, violates the treaty obligations and infringes the fundamental rights of humanity.

37 NGO's Send Letter to the Dutch Government on Biomass  
[2019-11-25-ngos-letter-to-dutch-government-biomass-is-not-a-lifeline-for-coal-english.pdf](#)

In this letter 37 NGO's urge the Dutch House of Representatives to ensure that no further subsidies will be granted for burning biomass either in coal power stations or in dedicated biomass plants and to redirect the biomass subsidies already granted towards non-emissive renewable energy. Despite the fact that 800 scientists, many different studies (and counting) and EASAC having concluded that cutting down trees to burn in power stations is not compatible with the need to try and stabilise the climate, the EU

### RECENT

[2019-11-25-ngos-letter-to-dutch-government-biomass-is-not-a-lifeline-for-coal-english.pdf](#)

2019-11 \ \ 37 NGO's

[2019-10-09-ngos-letter-to-the-danish-parliament-and-climate-minister-regarding-forest-biomass-english.pdf](#)

2019-10 \ \ Multiple NGO's

[2019-09-09-dogwoodalliance-synthesis-of-best-available-science-and-implications-for-forest-carbon-policy-english.pdf](#)

2019-09 \ \ Dogwoodalliance

[2019-08-22-bioenergy-serious-mismatches-continue-between-science-and-policy-in-forest-bioenergy-english.pdf](#)

2019-08 \ \ BioEnergy

[2019-08-09-easac-serious-mismatches-continue-between-science-and-policy-in-forest-bioenergy-english.pdf](#)

hasn't budged. Most of the NGO's that cosigned the letter are from Estonia and the (southwestern) U.S. which are two areas whose forests have been heavily effected by the subsidies granted for the burning of woody biomass in the EU.

*"The current logging intensity is having a negative impact on landscape's ability to absorb carbon and is predicted to turn the LULUCF sector from being a sink into a source of carbon emission by 2034."*

*"In Latvia, the Government has reported that the country's greenhouse gas removals from Land Use, Land Use Change and Forestry – which primarily means carbon sequestration by forests -declined from 8.75 million tons of CO2e in 2000 to just 1.7 million tons in 2017."*

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NGOs Letter to Danish Parliament Regarding Forest Biomass  
[2019-10-09-ngos-letter-to-the-danish-parliament-and-climate-minister-regarding-forest-biomass-english.pdf](#)

In this letter to the Danish parliament, international NGO's, representing millions of activists in the United States, Estonia, Lithuania, the U.K., and Germany, urge government 1) to impose a levy on biomass, 2) to phase out the subsidy for burning biomass from wood, and 3) to determine a date for phasing out biomass as soon as possible. All this in order to avoid extensive harm to the world's forests and the acceleration of climate change that will be caused by treating biomass as a green energy resource. Nearly 70% of Denmark's renewable energy supply (2017) is met by burning woody biomass, as a result of which 30% more carbon is being emitted than is required to report. On top of that, TV2 investigation series made it apparent that voluntary sustainability standards agreed upon by the biomass industry are falling short of genuinely protecting forests, climate, and communities.

*"Clearcutting of highly-biodiverse bottomland-hardwood forests is commonplace, as is the subsequent conversion of those forests to monoculture tree plantations. Enviva, a supplier to Ørsted, admits that the majority of the wood it uses for pellets is hardwood. In that region, hardwood is predominantly found in natural forests, not in plantations."*

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2019-08 \\  
EASAC

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[2019-08-00-eu-biomass-legal-case-main-arguments-english.pdf](#)

2019-08 \\  
EUBiomassLegalCase

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[2019-06-23-wageningen-university-research-duurzame-biomassa-voor-de-productie-van-waterstof-dutch.pdf](#)

2019-06 \\  
WUR

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[2019-06-18-european-commission-staff-working-document-assessment-for-the-national-forestry-accounting-plans-english.pdf](#)

2018-12 \\  
European Commission

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[2019-05-14-un-environment-the-emissions-gap-report-2017-executive-summary-english.pdf](#)

2019-05 \\  
United Nations

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[2019-04-00-ipcc-report-global-warming-chapter-2-mitigation-pathways-compatible-with-1-5-degreas-in-the-context-of-sustainable-development-english.pdf](#)

2019-04 \\  
IPCC

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[2019-03-25-wetenschappelijkbureaugroenlinks-maak-een-einde-aan-de-co2-neutraliteit-van-houtstook-dutch.pdf](#)

2019-03 \\  
Scientific Thinktank GL

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[2019-03-04-vox-europes-renewable-energy-policy-is-built-on-burning-american-trees-english.pdf](#)

## Synthesis Best Available Science & Forest Carbon Policy [2019-09-09-dogwoodalliance-synthesis-of-best-available-science-and-implications-for-forest-carbon-policy-english.pdf](#)

This report synthesizes and analyzes the best available climate science on the impacts of industrial forest practices in North Carolina. The first part of this report, the one we'll be focusing on, discusses how industrial forest practices disrupt nature's carbon cycle and provides an overview of three key climate impacts—loss of carbon storage, increased emissions from logging and wood products, and loss of carbon sequestration capacity. Emissions associated with logging and wood products in North Carolina averaged 44.59 MMT CO<sub>2</sub>-e per year between 2000 and 2018. It represents the third largest source of emissions statewide. If, on the other hand, "climate smart practices" were implemented across the board 3 additional gigatons of CO<sub>2</sub> could be stored on forestlands in North Carolina alone.

*"The climate impacts of [logging] are often ignored in climate policy discussions because of flawed greenhouse gas accounting and the misconception that the timber industry is carbon neutral. The reality, however, is that industrial logging and wood product manufacturing emit enormous quantities of greenhouse gases and have significantly depleted the amount of carbon sequestered and stored on the land."*

*"How industrial forest practices disrupt nature's carbon cycle and provides an overview of three key climate impacts—loss of carbon storage, increased emissions, and loss of carbon sequestration capacity."*

*"When timber is harvested from a site, sequestration is reduced or eliminated until a new stand is established. If all other factors are held constant, the atmosphere will experience an increase in CO<sub>2</sub> concentration merely because the carbon dioxide once removed from the atmosphere by forest carbon sequestration at the site of harvest no longer occurs."*

*Research has demonstrated that in multiple North American forest regions where even-aged (clearcut) techniques prevail, sequestration capacity is eliminated for an extended period after harvest. [...] In particular, net ecosystem productivity (NEP)—sequestration by young seedlings and brush minus emissions from decay and combustion of logging residuals—is actually negative for 3 to 15 years after clearcutting, meaning that these lands are not only carbon sequestration dead zones but net emissions sources."*

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2019-03 \ \ VOX Research

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[2019-02-10-easac-forest-bioenergy-carbon-capture-and-storage-and-carbon-dioxide-removal-english.pdf](#)

2019-02 \ \ EASAC

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[2019-02-06-shareaction-investor-report-the-biomass-blind-spot-english.pdf](#)

2019-02 \ \ ShareAction

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### **ATTENTION!**

We are analyzing reports and creating & posting new summaries every day. This is time consuming work but we will try to deliver multiple summaries per day. We are currently processing reports from 2019 and will work our way back into the [hundreds of official research reports commissioned the last decade](#).

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## Serious Mismatch Between Science & Policy

[2019-08-22-bioenergy-serious-mismatches-continue-between-science-and-policy-in-forest-bioenergy-english.pdf](#)

This report based on recent work by Europe's Academies of Science was commissioned by 16 international institutions and finds that current policies are failing to recognize that removing forest carbon stocks for bioenergy leads to an initial increase in emissions and states the periods during which atmospheric CO<sub>2</sub> levels are raised before forest regrowth can reabsorb the excess emissions are incompatible with the urgency of reducing emissions to comply with the objectives enshrined in the Paris Agreement.

*"..The UNFCCC accounting rules already mentioned allowing an importing country to count emissions from biomass as zero, are based on the assumption that reductions in forest biomass are accounted in the exporting country's LULUCF statistics. Since implementation and verification of the latter vary considerably between countries, the trade-off between reductions in carbon stock and emissions into the atmosphere at the point of combustion lacks transparency. Emissions reporting can thus be highly misleading since the importing country will record biomass emissions as zero and as reducing its national emissions inventory, even though the net effect of switching from coal to biomass pellets may be to increase atmospheric CO<sub>2</sub> levels for decades.."*

*"..The IPCC accounting rules aggregating all forestry-related emissions to the LULUCF category have created a reward for countries importing biomass since, even though overall emissions are likely to have increased as a result of switching from coal to imported biomass, the country can count them as zero and report a reduction. Considerable economic assets are now locked into the converted coal-fired power stations, the transport infrastructure and the forest biomass supply chain which could be stranded if the simplistic assumption of carbon neutrality was corrected.."*

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## Serious Mismatches Between Science & Bioenergy Policy

[2019-08-09-easac-serious-mismatches-continue-between-science-and-policy-in-forest-bioenergy-english.pdf](#)

This report considers how current policy might be reformed to reduce negative impacts on climate and argue for a more realistic science-based

assessment of the potential of forest bioenergy in substituting for fossil fuels. Since the length of time atmospheric concentrations of CO<sub>2</sub> increase is highly dependent on the feedstocks, the authors argue for regulations to explicitly require these to be sources with short payback period.

Furthermore, they re-emphasize the reasons why current policy is achieving the opposite of that intended, and why the urgency of its revision has increased following the conclusion of the Paris Agreement.

*"Rules for accounting for forestry emissions had to be developed. These started with the assumption that the carbon in a forest should be regarded as released when harvested (regardless of the subsequent use). Thus, when it came to accounting for emissions if forest biomass was burned, the carbon emitted should (for accounting purposes only) be regarded as zero because the forestry carbon had already been counted in the 'land use, land-use change, and forestry' (LULUCF) category. [...] However, a consequence unforeseen at the time was that this rule creates an opportunity for a country to import biomass, use it for energy production and zero rate its emissions on the assumption that they are recorded in the exporting country's LULUCF statistics. The importing country can thus shift responsibility for reporting its own emissions from forest biomass to the exporting country."*

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## EU Biomass Legal Case Main Arguments

[2019-08-00-eu-biomass-legal-case-main-arguments-english.pdf](#)

This legal document contains the main arguments in the EU Biomass Legal Case where the applicants seek annulment of the inclusion of "forest biomass" – essentially trees, including, stems, stumps, branches and bark – as a renewable fuel within the Renewable Energy Directive (recast) 2018.

*"...The claim that the GHG criteria, the Sustainability criteria, and the LULUCF criteria ensure that biomass burned for energy reduces emissions relative to fossil fuels is simply wrong.*

*As a result it undermines its own purpose of reducing GHG emissions, violates the treaty obligations and infringes the fundamental rights of humanity.*

*"...LULUCF for biomass qualification criteria are far too weak to protect against the harms to forests that are allowable under the sustainability criteria or to*

*justify the zero-rating of biogenic emissions for forest biomass under the GHG criteria..."*

*It follows from the fact that biomass can comply with the LULUCF criteria merely by coming from a country that is a party to the Paris Agreement. This is an exceptionally weak requirement which includes all biomass sourced from any of the 184 countries who have (to date) ratified the Paris Agreement, without even any requirement that the party in question is complying with its Paris Agreement obligations. The requirement that the source country has an accounting system in place covering emissions and removals from forestry... is insufficient to compensate for the inadequacies of the GHG and sustainability criteria. The LULUCF requirement simply assesses the balance of forest carbon stocks at the national level. A requirement that LULUCF sector emissions do not exceed removals does not ensure that any particular forest site will be protected or regrown.*

*"...The LULUCF criteria which assume the application of the LULUCF Regulation in EU Member States, represent an attempt to balance of GHG emissions and removals nationally, and reflect necessary compromise with administrative practicality. The approach is not a perfect reflection of emissions that actually occur when forest wood is harvested and burned. Thus, the Directive wrongly treats the LULUCF criteria as a protective justification for the zero-rating of forest biomass emissions..."*

*"...the new LULUCF Regulation does not perfectly account for forest carbon losses due to biomass burning. However, even if it did, this would not resolve the incompatibility of the goals of building the forest carbon sink for climate change mitigation, and authorizing member states to provide incentives for biomass burning, thus encouraging transfer of forest carbon to the atmosphere..."*

*"...EU Member States are not free to adopt more onerous criteria or insist that only the most onerous criterion it sets out be used. This means that the EU has outsourced oversight of the accounting of emissions from biomass to source countries, including those outside the EU, without mandating any requirement for carbon stocks to be maintained or increased. Further, as explained above, even if the LULUCF criteria required carbon stocks to be maintained, this still would not ensure that forest biomass delivers carbon savings relative to fossil fuels..."*

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## Sustainable Biomass for the Production of Hydrogen

[2019-06-23-wageningen-university-research-duurzame-biomassa-voor-de-productie-van-waterstof-dutch.pdf](#)

This report discusses the burning of woody biomass to generate electricity to be used for the production of hydrogen.

*"..The arguments of the proponents and opponents [of burning woody biomass] have to do with the:*

- CO<sub>2</sub> and energy balance in the chain and the moment at which you measure the carbon stock;*
- biomass additional growth in relation to consumption and the effects of harvest on the landscape and the ecosystem;*
- guaranteeing sustainability through an administrative system of certification;*
- market forces and market failures, due to the exploitation of subsidies (level playing field) and the absence of a CO<sub>2</sub>-related market mechanism;.."*

*"...[proposed] requirements for the various parties in the chain:*

*The use of biomass must lead to a substantial reduction in greenhouse gas emissions, calculated over the entire chain. The calculated reduction in greenhouse gas emissions must be at least 70% relative to the reference value for fossil fuels.*

- production of raw biomass must not lead to destruction of carbon reservoirs.*
- biomass production may not lead to long-term carbon debt.*
- biomass production must not lead to indirect land use change (ILUC) with a negative impact on carbon capture.*
- relevant international, national and regional / local laws and regulations are followed.*
- biodiversity must be preserved and, where possible, strengthened.*
- the production capacity of each forest type must be maintained.*
- forest management contributes to local economy and employment.*
- sustainable forest management is realized on the basis of a management system..."*

*"... if nature areas are converted for the production of biomass, this will have serious negative effects on biodiversity in the short term (direct effects) ... With these kind of conversions, it can take centuries for the effects of land use change on biodiversity to be restored..."*

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[2019-06-18-european-commission-staff-working-document-assessment-for-the-national-forestry-accounting-plans-english.pdf](#)

This report is commissioned by the European Commission and contains an assessment for the national forestry accounting plans.

*"...Member States should ensure that sinks and reservoirs, including forests, are conserved or enhanced with a view to meeting the ambitious greenhouse gas emissions reduction targets of the Union by 2030 and strategies to reduce emissions to net zero by 2050, in line with the Paris Agreement..."*

*"...To help achieve these goals, the LULUCF Regulation sets out a robust accounting system. This Regulation sets a binding commitment for each Member State to ensure that accounted emissions from land use are at least compensated by an equivalent removal of CO<sub>2</sub> from the atmosphere through action in the sector. This is known as the 'no debit' rule..."*

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## The United Nations Emissions Gap Report

[2019-05-14-un-environment-the-emissions-gap-report-2017-executive-summary-english.pdf](#)

This report, which is the eighth Emissions Gap Report produced by UN Environment, focuses on the "gap" between the emissions reductions necessary to achieve these agreed targets at lowest cost and the likely emissions reductions from full implementation of the Nationally Determined Contributions (NDCs) forming the foundation of the Paris Agreement and discusses "bioenergy" in combination with "carbon dioxide capture and storage".

*"Whether there are substantial, or even any carbon reductions when accounting for displaced activities is unclear"*

*"The potential competition for land from widespread use of bioenergy with carbon capture and storage remains a major issue for large-scale bioenergy with carbon capture and storage deployment and policymaking"*

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Mitigation Pathways Compatible with 1.5 Degrees



This chapter in the IPCC report assesses mitigation pathways consistent with limiting warming to 1.5°C above pre-industrial levels. One of the mitigation measures that is considered is Carbon Dioxide Removal (CDR) and most scenarios to keep warming below 1.5 degrees need at least some type of CDR, but for most types more research is needed and are therefore not integrated into the mitigation models. That is, except for carbon capture and storage in combination with biomass energy (BECCS), since this is one of the few CDR measures that have been more thoroughly investigated. But, as additional CDR measures are being built into IAMs (Integrated Assessment Modeling), the prevalence of BECCS is expected to be further reduced.

*"Evaluating the potential from BECCS is problematic due to large uncertainties in future land projections due to differences in modelling approaches in current land-use models, and these differences are at least as great as the differences attributed to climate scenario variations. [...] It is not fully understood how land-use and land-management choices for large-scale BECCS will affect various ecosystem services and sustainable development, and how they further translate into indirect impacts on climate, including GHG emissions other than CO<sub>2</sub>."*

*"Whether bioenergy has large adverse impacts on environmental and societal goals depends in large parts on the governance of land use. [...] Here IAMs often make idealized assumptions about effective land management, such as full protection of the land carbon stock by conservation measures and a global carbon price [...]."*

*"Terrestrial CDR measures, BECCS and enhanced weathering of rock powder distributed on agricultural lands require land. Those land-based measures could have substantial impacts on environmental services and ecosystems. Measures like afforestation and bioenergy with and without CCS that directly compete with other land uses could have significant impacts on agricultural and food systems"*

*"Most of the CDR measures [including BECCS] currently discussed could have significant impacts on either land, energy, water, or nutrients if deployed at scale"*

*"BECCS using dedicated bioenergy crops could substantially increase agricultural water demand and nitrogen fertilizer use."*

*"In [mitigation] pathways that allow for large-scale afforestation in addition to BECCS, land demand for afforestation can be larger than for BECCS. [...] However, pursuing such large-scale changes in land use would pose significant food supply, environmental and governance challenges, concerning both land management and tenure"*

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## Burning Woody Biomass is Not CO<sub>2</sub>-Neutral

[2019-03-25-wetenschappelijkbureaugroenlinks-maak-een-einde-aan-de-co2-neutraliteit-van-houtstook-dutch.pdf](#)

In this document the scientific think tank of GroenLinks (GreenLeft party) argues against the status of burning woody biomass for our energy supply as carbon neutral, and in effect, against subsidizing the burning of woody biomass. They suggest CO<sub>2</sub> emissions caused by the burning of biomass should be added to the total sum of emissions of the country where the biomass is actually burned. And the CO<sub>2</sub>-balance should be checked by taking up the preliminary CO<sub>2</sub> uptake in the LULUCF balance of the country where the biomass stems from.

*"Through international agreements on Land Use, Land Use Change and Forestry (LULUCF) every country is committed to keep track of the amount of CO<sub>2</sub> that's being stored and lost in their soil and forests. [...] But these measures don't safeguard against losses of stored CO<sub>2</sub> in forests, since there is no penalty in place for the exporting countries, whereas importing countries, like the Netherlands, subsidize the burning of trees. This policy functions as an incentive to cut down more trees than is sustainable considering the CO<sub>2</sub> balance and biodiversity [...]."*

*"According to current agreements on LULUCF the CO<sub>2</sub> balance of a forest worsens once trees are being cut down."*

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## EASAC Forest Bioenergy BECCS and CO<sub>2</sub> Removal

[2019-02-10-easac-forest-bioenergy-carbon-capture-and-storage-and-carbon-dioxide-removal-english.pdf](#)

As global emissions of carbon dioxide (CO<sub>2</sub>) continue to exceed levels compatible with achieving Paris Agreement targets, attention has been focusing on the role of bioenergy as a 'renewable' energy source and its potential for removing CO<sub>2</sub> from the atmosphere when associated with carbon capture and storage (CCS). This new commentary of EASAC updates its findings from 2017/2018, based on peer-reviewed papers and environmental reviews that have been published since then. The overall conclusion is that the use of biomass, even when combined with with carbon capture and storage (BECCS) remains associated with substantial risks and uncertainties, both over its environmental impact and ability to achieve net removal of CO<sub>2</sub> from the atmosphere. The large negative emissions capability given to BECCS in climate scenarios limiting warming to 1.5°C or 2°C is not supported by recent analyses [...]"

*"[In our previous report] EASAC also pointed to the perverse incentives that result from the accounting rules of the United Nations Framework Convention on Climate Change, which record forestry harvesting emissions together with those from land use, land use change and forestry (LULUCF) and (to avoid double-counting) as 'zero' when burnt. As pointed out, 'current rules allow countries to record imported biomass as zero emission on combustion, giving a false impression of the importing country's progress towards reducing emissions, and shifting responsibility for LULUCF reporting to the exporting country'. Currently there is no requirement in the EU's Emission Trading Scheme (ETS) to consider the length of the payback period when reporting biomass emissions as zero."*

*"EASAC had emphasised the need to reverse current trends towards deforestation and soil degradation which continue to add substantial quantities of CO<sub>2</sub> and other greenhouse gases to the atmosphere, at the same time as seeking to increase land carbon stocks."*

*"The ability of BECCS to remove carbon could easily be offset by losses due to land-use change"*

*"[T]he replacement of temperate forests to grow the bio-crops offering such high yields has been shown to release so much soil carbon that the BECCS-driven crop would have to be grown for over 100 years before the initial surge in atmospheric CO<sub>2</sub> levels from conversion was offset and net negative emissions could be achieved."*

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## Investor Report the Biomass Blind Spot

[2019-02-06-shareaction-investor-report-the-biomass-blind-spot-english.pdf](https://biomassmurder.org/research/index.html)

Carbon emissions from burning wood have been ignored by utility companies and policy makers for two reasons. Firstly, because it is incorrectly seen as a "renewable" resource. The carbon emissions from combustion are assumed to be recaptured as trees regrow. However, at the point of combustion, wood emits more CO<sub>2</sub> than coal. It takes decades for this carbon to be reabsorbed by forest growth. Given that we urgently need to reduce greenhouse gas (GHG) emissions over the short-term to reach a net zero energy system by 2050, biomass is not compatible with achieving this. The second reason is related to international carbon accounting rules. UNFCCC's reporting guidelines require GHG emissions related to bioenergy to be counted in the land-use sector, where the tree is felled rather than at the point of combustion. [...] This paper challenges the assumption that carbon is recaptured by forest regrowth, at the rates required to offset emissions from combustion. Converting natural forests into a managed or plantation forest reduces their stored carbon. In addition, the methods used to grow and harvest biomass feedstocks also have an enormous impact on how quickly forest carbon can recover."

*"Luyseart et al. (2008) demonstrate that ancient forests can continue to absorb carbon at a rate of about 2 to 5 tC/ ha each year."*

*"As the intensity of forest management increases, the aboveground carbon stocks decrease."*

*"Land-use conversion, for example from woodland to arable land or pasture, has a detrimental impact on below-soil carbon. There is widespread research to show that removing forest residues will also reduce soil carbon."*

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All Research Papers on Deforestation & Woody Biomass  
<https://biomassmurder.org/research/index.html>

We have collected and read all the research reports and official documents from the past decades and have started to make summaries for each subject and published the summaries on the following pages:

[Biomass Research Abbreviations](#)

[Biomass Research Availability](#)

[Biomass Research Biodiversity](#)

[Biomass Research Carbon Dioxide](#)

[Biomass Research Certification](#)

[Biomass Research Ecotoxicity](#)

[Biomass Research Health Risks](#)

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