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## Research on the Health Risks of Burning Biomass



New research by leading independent experts draws attention to serious impacts on human health of burning solid biomass, mainly wood, for heating and power generation in the European Union. It points to evidence that tens of thousands of EU citizens are dying prematurely every year as a result of exposure to air pollution from burning solid biomass. Other health impacts include cancers, cardiac and respiratory complaints, asthma attacks and working days lost to ill health.

### EU Clean Energy Policies Lead Forest Destruction [2019-11-12-nrdc-burnout-eu-clean-energy-policies-lead-forest-destruction-english.pdf](#)

This report is based on research from the consulting firm Trinomics. It provides the most comprehensive and up-to-date assessment of government subsidies and other forms of financial support offered to biomass energy producers in the European Union. We focus on the 15 E.U. member states most heavily reliant on bioenergy and cover the period from 2015 to 2018. The Technical Appendix contains Trinomics' full report, including a detailed description of methods, analyses, and results.

### RECENT

[2019-11-12-nrdc-burnout-eu-clean-energy-policies-lead-forest-destruction-english.pdf](#)

2019-11 \ \ NRDC

[2019-09-03-mob-milieuorganisaties-voorzien-nieuwe-juridische-stikstofprocedures-waarschuwing-voor-quick-fix-die-niet-tot-de-oplossing-leidt-dutch.pdf](#)

2019-09 \ \ MOB

[2019-08-08-ipcc-summary-report-for-policymakers-on-climate-change-and-land-english.pdf](#)

2019-08 \ \ IPCC

[2019-04-00-environmentalpaper-the-reputational-and-financial-risks-of-investing-in-forest-biomass-energy-english.pdf](#)

2019-04 \ \ EnvironmentalPaper

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

*"...biomass electricity is just as much of a climate threat as fossil fuels; Drax's biomass plants actually emit more carbon than coalfired plants. The wood pellet mills that supply Drax release dangerous pollution into the air, including particulate matter associated with a range of public health harms. So do power plants like Drax Power Station when they burn the pellets..."*

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## Warning for quick fix that does not lead to the solution

[2019-09-03-mob-milieuorganisaties-voorzien-nieuwe-juridische-stikstofprocedures-waarschuwing-voor-quick-fix-die-niet-tot-de-oplossing-leidt-dutch.pdf](#)

This document written by Johan Vollenbroek from the Mobilisation for the Environment organisation warns against another quick fix and states biomass power plants should be shut down immediately.

*"...It often remains unmentioned that the excessively high nitrogen emissions in the Netherlands also cause billions in damage every year..."*

*"...The Dutch Environmental Assessment Agency estimates damage to health and nature between € 2.5 and 12.6 billion damage per year, of which more than half due to premature death and health damage..."*

*"...The critical deposition limit is exceeded in 70% of nature, what leads to natural damage and a reduction in rare plants and animal species..."*

*"...Measures that lead reduced nitrogen deposition in nature areas will therefore also lead to less health damage..."*

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## Climate Change and Land

[2019-08-08-ipcc-summary-report-for-policymakers-on-climate-change-and-land-english.pdf](#)

This report was commissioned by the IPCC and is intended for policymakers and discusses sustainable forest management and carbon sinks and storage methods.

2019-04 \ IPCC

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[2019-03-29-hei-ihme-report-global-exposure-to-air-pollution-and-its-disease-burden-english.pdf](#)

2019-03 \ HEI IHME

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

2019-03 \ WB GL

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[2019-03-20-pfpi-aps-technologies-are-more-polluting-than-fossil-fuels-per-unit-of-energy-produced-and-should-not-be-subsidized-english.pdf](#)

2019-03 \ Scientific Thinktank GL

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[2019-03-08-drax-uk-1000-tonnes-of-deadly-particulate-pollution-a-year-a-400-increase-since-they-switched-from-coal-to-biomass-english.pdf](#)

2019-03 \ EU Biomass Legal Case

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[2018-02-02-fern-covered-in-smoke-why-burning-biomass-threatens-european-health-report-english.pdf](#)

2018-02 \ FERN

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[2018-01-05-fern-covered-in-smoke-why-burning-biomass-threatens-european-health-summary-english.pdf](#)

2018-01 \ FERN

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[2016-09-13-lung-health-organizations-letter-burning-](#)

*"...Developing, enabling and promoting access to cleaner energy sources and technologies can contribute to adaptation and mitigating climate change and combating desertification and forest degradation through decreasing the use of traditional biomass for energy while increasing the diversity of energy supply. This can have socioeconomic and health benefits, especially for women and children..."*

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## The Reputational & Financial Risks of Investing in Forest Biomass Energy

[2019-04-00-environmentalpaper-the-reputational-and-financial-risks-of-investing-in-forest-biomass-energy-english.pdf](#)

This briefing document, a collaborative effort by Environmental Paper Network, Biofuelwatch and Global Forest Coalition, sums up the reputational and financial risks involved with investing in forest biomass energy. "Reputational risks stem from the growing awareness and body of evidence showing that forest biomass is far from being a low carbon or even carbon neutral energy source. [...] Reputational risks can translate into financial risks given the high level of dependence of this form of energy on public subsidies. Failure to fully disclose environmental, social and governance (ESG) risks in portfolios exposes financial institutions to regulatory risk."

*"Biomass plants are associated with a particularly high risk of fires and explosions, especially those burning pellets. Woodchips and especially pellets can self-heat and ignite during storage and wood dust from the chips and pellets can self-ignite and lead to explosions."*

*"Although the risks are well recognised and widely mitigated, there has been a high number of accidents involving biomass plants and pellet mills already."*

*"State of the art' or 'advanced', high- efficiency biomass projects carry a higher risk of technical failure."*

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[biomass-creates-proven-harm-to-human-health-english.pdf](#)

2016-09 \ \ LUNG

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[2016-06-14-ers-health-impacts-of-anthropogenic-biomass-burning-in-the-developed-world-english.pdf](#)

2016-06 \ \ ERS

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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](#).

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.

*"BECCS rely on CCS and would require safe storage space in geological formations, including management of leakage risks and induced seismicity.*

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## Global Exposure to Air Pollution and its Disease Burden

[2019-03-29-ihme-report-global-exposure-to-air-pollution-and-its-disease-burden-english.pdf](#)

Air pollution consistently ranks among the top risk factors for death and disability worldwide. Breathing polluted air has long been recognized as increasing a person's chances of developing heart disease, chronic respiratory diseases, lung infections, and cancer. In 2017, air pollution was the fifth highest mortality risk factor globally and was associated with about 4.9 million deaths and 147 million years of healthy life lost.

This publication, the third annual State of Global Air report, presents the latest information on worldwide air pollution exposures and health impacts. It draws from the most recent evidence produced as part of the Global Burden of Disease (GBD) project of the Institute for Health Metrics and Evaluation (IHME).

To track outdoor air quality, the report focuses on the concentrations of two pollutants in particular: fine particle air pollution (particulate matter measuring less than 2.5 micrometers in aerodynamic diameter, or PM<sub>2.5</sub>) and ozone found near ground level (tropospheric ozone). This assessment also tracks exposure to household air pollution from burning fuels such as

coal, wood, or biomass for cooking. These forms of air pollution are considered key indicators of air quality, and each contributes to the collective impact of air pollution on human health.

*"In 2017, 92% of the world's population still lived in areas where PM2.5 exceeds the WHO guideline for healthy air; 54% still lived in areas exceeding the WHO's least-stringent interim target, often by substantial margins. Household burning of solid fuels — coal, wood, charcoal, dung, and other forms of biomass — remains an important source of exposure to particulate matter [...]."*

*"Household air pollution [related to the burning of biomass] remains a leading cause of death and disability worldwide."*

*"Based on current understanding of its health impacts, household air pollution ranks among the most important global risk factors for early death and disease. In 2017, household air pollution contributed to 1.6 million deaths."*

*"Scientific evidence supports a causal relationship between exposure to ambient PM2.5 and ischemic heart disease, cerebrovascular disease (ischemic stroke and hemorrhagic stroke), lung cancer, COPD, and lower-respiratory infections (in particular, pneumonia). [...] In addition, growing scientific evidence suggests that air pollution may contribute to the development of asthma in children, low birth weight and pre-term birth, and neurological or cognitive disorders such as Alzheimers disease."*

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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](https://www.groenlinks.nl/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.

*"Even the big biomass plants that are equipped with filters cause health related problems, due to high quantities of wood being burned in them."*

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## APS Technologies More Polluting Than Fossil Fuels

[2019-03-20-pfpi-aps-technologies-are-more-polluting-than-fossil-fuels-per-unit-of-energy-produced-and-should-not-be-subsidized-english.pdf](#)

This document is a call from PFPI to legislators to support act H.853, an "Act to Assure the Attainment of Greenhouse Gas Emissions Goals in the Alternative Portfolio Standard (APS)", stating that "these technologies are more polluting than fossil fuels per unit of energy produced and should not be subsidized through Massachusetts' clean energy programs."

"Massachusetts established the Alternative Energy Portfolio Standard (APS) in 2009 to complement the state's Renewable Energy Portfolio Standard (RPS). While the RPS is designed to increase the use of renewable energy for electricity, the APS is intended to reduce greenhouse gas emissions from the heating sector. However, the inclusion of biomass and garbage incineration in the APS undermines this goal. "

*"According to the National Emissions Inventory, biomass combustion accounted for 83% of all PM2.5 emissions from heating in Massachusetts in 2014, and a quarter of the state's total PM2.5 emissions. In addition to particulates, biomass and waste incineration release large quantities of nitrogen oxides, sulfur dioxide, heavy metals and volatile organic compounds."*

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## 400% Increase of Particulate Pollution Due to Biomass

[2019-03-08-drax-uk-1000-tonnes-of-deadly-particulate-pollution-a-year-a-400-increase-since-they-switched-from-coal-to-biomass-english.pdf](#)

The DRAX report discusses the estimated number of premature deaths in EU-28 attributed to PM2.5 (particulate matter 2.5 microns in diameter and below) NO2 (nitrogen oxide) and O3 (ozone) exposure was 436,000, 71,000, and 16,000, respectively which the European Environment Agency concluded in 2013. Data from the coal/wood-powered station Drax in the UK illustrates a relationship between burning biomass and the increase of particulate pollution with 400%.

*"...Drax started co-firing wood pellets with coal certain of its six boilers several years ago, and has now converted four of the six boilers to burn only biomass. Over that time, particulate matter emissions have increased about 400% to 1,000 tonnes per year, even though power output has remained fairly constant."*

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## Why Burning Biomass Threatens European Health

[2018-02-02-fern-covered-in-smoke-why-burning-biomass-threatens-european-health-report-english.pdf](#)

This report contains new research by a leading independent expert draws attention to serious impacts on human health of burning solid biomass, mainly wood, for heating and power generation in the European Union.

*"...More than 1,300 deaths a year are linked to air pollution from 27 biomass burning power stations in the EU..."*

*"...Exposure to smoke from domestic biomass use caused 40,000 deaths across the EU in 2014..."*

*"...Economic costs of health impacts from domestic biomass use in the EU are estimated to be in the range of 33 billion euros to 114 billion euros a year..."*

*"...Recast of the Renewable Energy Directive likely to cause between 435 and 1,100 additional deaths each year due to increased emissions from biomass power station, depending on the renewables target adopted..."*

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## Burning Biomass Creates Proven Harm to Human Health

[2016-09-13-lung-health-organizations-letter-burning-biomass-creates-proven-harm-to-human-health-english.pdf](#)

This report is commissioned by a dozen health organizations who oppose policies that would encourage or expand the use of biomass for electricity production.

*"...burning biomass creates air pollution that causes a sweeping array of health harms, from asthma attacks to cancer to heart attacks, resulting in emergency room visits, hospitalizations, and premature deaths..."*

*"...Burning biomass from any source generates immediate dangerous air pollution that puts health at risk..."*

*"...Among the most dangerous of these emissions is particulate matter, also known as soot. These particles are so small that they can enter and lodge deep in the lungs, triggering asthma attacks, cardiovascular disease, and even death.i Particulate matter can also cause lung cancer..."*

*"...Biomass combustion also creates nitrogen oxide emissions, which are harmful in their own right and also contribute to the formation of ozone smog and particulate matter downwind..."*

*"...Ground-level ozone pollution can trigger asthma attacks and cause premature death, and newer research shows possible links to reproductive and central nervous system harm..."*

*"...Burning biomass also creates carbon monoxide, which leads to headaches, nausea, dizziness, and in high concentrations, premature death;v and carcinogens, including benzene and formaldehyde..."*

*"...The dangerous air pollution from burning biomass endangers some people more than others. Millions of infants and children, older adults, individuals with respiratory or cardiovascular disease or diabetes, and individuals with lower incomes face a higher risk of suffering serious health effects from these pollutants..."*

*"...Burning biomass creates proven harm to human health through direct air pollution impacts, as well as the potential for increasing climate change..."*

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Health Impacts of Anthropogenic Biomass Burning  
[2016-06-14-ers-health-impacts-of-anthropogenic-biomass-burning-in-the-developed-world-english.pdf](#)

This report is commissioned by 22 universities and public health organizations worldwide and discuss the health impacts of burning biomass for energy.

*"...Epidemiological studies in the developed world have documented associations between indoor and outdoor exposure to biomass combustion products and a range of adverse health effects. A conservative estimate of the current contribution of biomass smoke to premature mortality in Europe*



amounts to at least 40 000 deaths per year. We conclude that emissions from current biomass combustion products negatively affect respiratory and, possibly, cardiovascular health in Europe..."

"...Across Europe, the Renewable Energy Directive has set a goal to produce 20% of energy from renewable sources by 2020, increasing wood/biomass combustion for power generation. As mentioned in the Introduction, biomass combustion is expected to become the major source of primary PM emissions over the next 5-15 years. This will compromise efforts to reduce ambient PM concentrations to below the current WHO Air Quality Guidelines. This, in turn, will probably result in large numbers of avoidable, premature deaths across Europe over that time period..."

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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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