

Two simple changes that would fix the EU's dependence on burning trees for "renewable" energy

July 5, 2021

Burning forest biomass for renewable energy threatens the EU's goals on climate, forests, and air quality. What is a *safer* way forward? Two main policy changes are needed:

1. The EU must stop counting "forest biomass" toward renewable energy targets, and stop providing subsidies and other types of support for forest biomass. (Forest biomass means biomass sourced directly from forests, and is the same thing as "primary woody biomass")

Why?

Forest biomass provides less than 20% of the EU's renewable energy, but logging and burning forest wood is causing disproportionate negative impacts.

Greenhouse gas impacts: European Commission scientists have affirmed that even when forest biomass is harvested "sustainably," burning it emits more CO₂ than fossil fuels and net emissions exceed those from fossil fuels for decades to centuries. Logging and burning forest wood for fuel undermines the EU's greenhouse gas reduction targets and is degrading the forest carbon sink just when we urgently need to increase it to meet "net zero" goals.

Forest ecosystem impacts: Half the wood harvested in the EU is burned for energy. Harvesting pressure and replacement of natural forests with plantations is causing biodiversity to crash and forest ecosystems to collapse. The EC's scientists have confirmed that even harvesting forestry "residues" can seriously damage forest ecosystem function. The EU's Biodiversity Strategy acknowledges that we must reduce harvesting pressure on forests to restore them. Allocating renewable energy subsidies to logging forests for fuel is literally subsidizing forest destruction and undermining ecosystem restoration.

Air quality impacts: Burning wood for energy, especially for residential heating, is the largest source of particulate pollution. This contributes to the death of hundreds of thousands of EU citizens every year. Burning wood undermines the EU's "zero pollution" goals and the impacts are likely to worsen given how air pollution exacerbates COVID impacts. It is inappropriate to continue subsidizing this dangerous, polluting form of energy.

2. The EU can continue to allow secondary woody biomass to count toward renewable energy targets, as long as there is no "higher" use for this material. (Secondary woody biomass is mill residues like sawdust, and post-consumer wood waste.)

Why?

Prioritizing re-use is in line with the Biodiversity Strategy, which refers to use of "residues and non-reusable and non-recyclable waste" for advanced biofuels, and states, "**This approach should continue for all forms of bioenergy.**" This accords with principles of the circular economy and the waste hierarchy, that material should only be burned for energy if there is no way to recycle it for material use. Importantly, re-using wood wastes can help take harvesting pressure off forests.

Summary: To reduce actual emissions and restore forests, we must decrease forest harvesting. The best way to do this is to stop promoting harvesting and burning forests for "renewable" energy, and to prioritize use of wood wastes for materials, not energy. With these reforms, EU member states can redirect the billions of euro they spend per year on forest bioenergy to clean energy and forest restoration.

Background and more details

As temperatures set new records around the world it is important to recognize that burning wood for energy emits *more* carbon pollution than fossil fuels at the smokestack, and net CO₂ emissions exceed those from fossil fuels for decades to centuries. In other words – burning forest wood for energy is worsening climate change. (See [this link](#) for an online model demonstrating net emissions).

Burning biomass increases emissions compared to fossil fuels

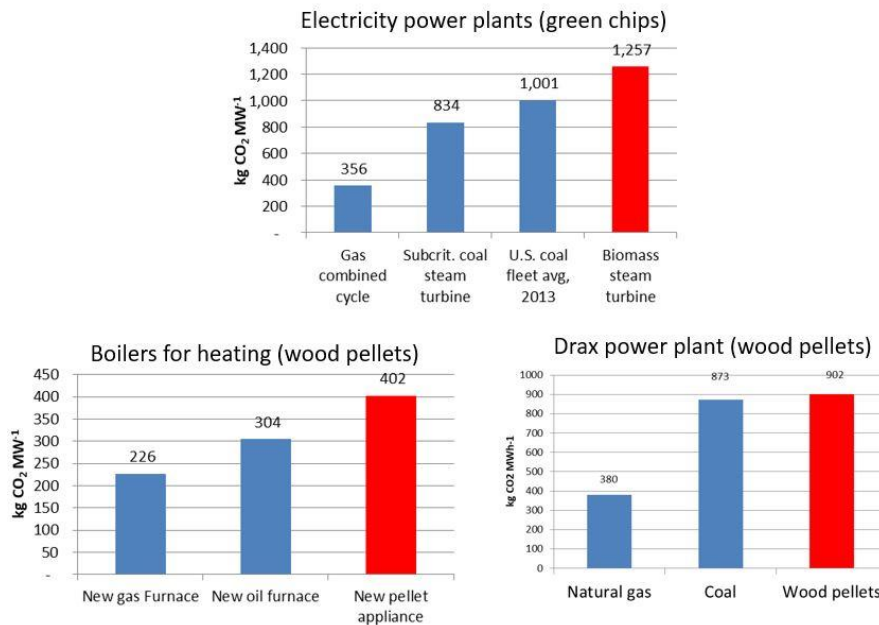


Fig 1. Smokestack emissions for biomass versus other fuels. These values do not include the emissions from manufacturing and transporting the fuels, which can be significant, particularly for wood pellets that are manufactured in North America and the Baltic countries and transported to other countries to be burned as a replacement for coal. “Net” emissions (cumulative emissions over time that take into account offsetting by regrowing forests) still exceed fossil fuel emissions for decades to centuries.

This means that instead of working together, the EU’s two goals on climate – of increasing use of renewable energy, and of reducing greenhouse gas emissions – are actually working at cross-purposes. The more the EU depends on burning wood for renewable energy, the more forest carbon will be transformed into atmospheric CO₂, undermining climate goals.

Fortunately, it is possible to fix this problem. While bioenergy as a whole constitutes about 60% of the renewable energy in the EU, forest biomass is around 20% (“forest” biomass is biomass sourced **directly from forests**, also known as “primary woody biomass,” as opposed to “secondary woody biomass” which is mill residues and post-consumer wood waste). Replacing this 20% with true zero-emissions energy should be possible.

Policymakers allowed the EU to become more and more dependent on burning forest biomass even though the European Commissions’ own scientists have acknowledged that burning wood emits more CO₂ than burning coal, and trees regrow too slowly to offset those emissions. The following is a section from the “[Paper Tiger](#)” report, regarding EC scientists’ admissions about emissions from burning forest biomass: “A 2016 EC impact assessment on bioenergy sustainability¹ acknowledged the obvious problem:

‘compared to crops which regrow over short periods, forest biomass is part of a much longer carbon cycle. A forest stand typically takes between decades and a century to reach maturity. Recent studies have found that when greenhouse gas emissions and removals from combustion, decay and plant growth (so-called biogenic emissions from various biological pools) are also taken into account, the use of certain forest biomass feedstocks for energy purposes can lead to substantially reduced or even negative greenhouse gas savings compared to the use of fossil fuels in a given time period (e.g. 20 to 50 years or even up to centuries).’

The 2016 assessment specifically rejected the equivalence of “sustainability” and carbon neutrality:

‘Certain forest management practices can enhance the carbon sink, but ensuring that the harvest level stays below the growth rate of the forest is not sufficient to ensure climate change mitigation.’

And (emphasis added),

‘Sustainable forest management practices (e.g. implemented through national legislation or in the context of certification schemes) play a role in mitigating the risk of overharvesting of forests. As such, **they cannot guarantee that an increase in forest biomass for energy will deliver greenhouse gas savings**, but they can avoid excessive wood removals which would result in a decrease in carbon sinks.’²

The 2016 assessment determined that a central objective of any sustainability policy adopted by the EU should be to ‘Ensure that bioenergy use in the EU delivers a significant contribution to climate change mitigation, taking into account the full lifecycle emissions including biogenic carbon.’”

The recent Joint Research Centre report on biomass also found that even burning “just” forestry residues (tops and limbs left over after sawtimber harvesting) increases emissions for 10 – 20 years compared to fossil fuels when the material is fine woody debris that can decompose quickly. Biomass net emissions are greater than fossil fuels for 100 years or effectively “forever” when the material is coarse woody debris. The chart from the recent JRC report is annotated and reproduced in Figure 2; an overview of the report is [here](#).

Yet although EC scientists have repeatedly stated that burning forest biomass increases emissions compared to fossil fuels, **the EC has never conducted a real impact assessment on the greenhouse gas impact of burning wood for energy** that actually counts the GHG emissions from burning the wood, assess how long it would take for forests to regrow to offset those emissions, and determine how the emissions affect the EU’s ability to reduce GHG emissions in a timely way. They are blindly encouraging burning wood for energy, without evaluating the GHG or the biodiversity impacts.

Just as importantly, the EU’s forests are in crisis. Ecosystem function and biodiversity are crashing under current levels of harvesting. Policymakers have acknowledged something must be done. For instance, VP Timmermans himself has [said](#) “75% of our forests are in bad shape. We have a huge biodiversity challenge. Ecocide threatens the survivability of our forests.”

The JRC’s report on biomass found that even “just” harvesting forestry residues can cause a grave threat to ecosystem function and biodiversity. Many of the harvesting scenarios are in the yellow or red zones.

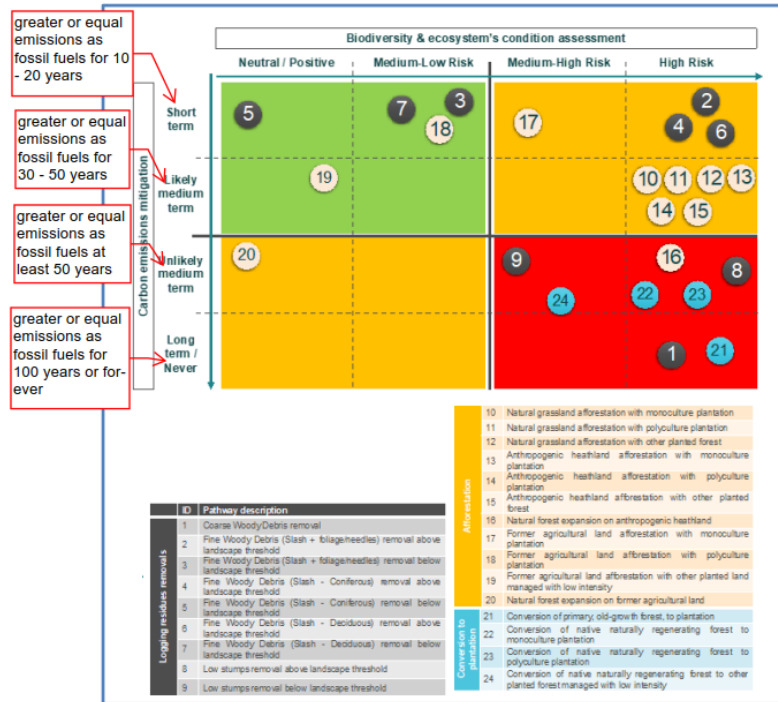


Figure 2. Overview of climate and ecosystem impact risk of 24 forest biomass scenarios assessed by the JRC (annotations in red boxes added for clarity). Even burning “fine” forestry residues (tops and limbs left over after sawtimber harvesting) increases emissions for 10 – 20 years compared to fossil fuels. Biomass net emissions are greater than fossil fuels for 100 years or effectively “forever” when the material is coarse woody debris. For assessments on emissions from burning stemwood, see above.

With regard to air pollution impacts, EU data reveal that that fine particulate matter (PM_{2.5}) alone was responsible for up to 379,000 deaths in the EU-28 in 2018. The majority of PM_{2.5} - 54% - was emitted by households and other establishments that burn solid fuels,³ mostly wood,⁴ for heat, while the energy sector and road transport were responsible for 18% and 11% of PM_{2.5} respectively. Wood burning for energy at sawmills, paper mills, and smaller local power plants can be a large source of pollution. Wood-burning is also a significant source of mercury re-emissions and other toxic pollutants.⁵

Residential wood-burning poses a significant threat to human health both indoors and out because emission sources are located in homes and close to the ground. Studies have shown that homes with a woodstove experience high intensities of PM_{2.5} even with normal use.⁶ According to the World Health Organization, premature mortality rates in the EU could be decreased by up to 27% if the EU achieved the WHO’s PM_{2.5} standard.⁷ Reducing wood-burning in homes and power plants is the fastest way to clean up the air.

The take-home message: The more the EU depends on forest biomass to meet renewable energy targets, the more this undermines climate mitigation, biodiversity restoration, and zero-pollution goals. The solution is to reduce forest harvesting and use of forest biomass as fuel. Since around 50% of the wood harvested in the EU is burned for energy, that is the obvious place to start reducing harvesting.

¹ European Commission. 2016. Impact Assessment: Sustainability of Bioenergy. Accompanying the document Proposal for a Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources (recast). Brussels. At https://eur-lex.europa.eu/resource.html?uri=cellar:1bdc63bd-b7e9-11e6-9e3c-01aa75ed71a1.0001.02/DOC_1&format=PDF

² Ibid, p.107

³ European Environment Agency. 2020. Air quality in Europe - 2020 report. EEA Report No 09/2020. Luxembourg: Publications Office of the European Union, 2020. At <https://www.eea.europa.eu/publications/air-quality-in-europe-2020-report>

⁴ Bertelsen, Nis, and Brian Mathiesen. 2020. "EU-28 Residential Heat Supply and Consumption: Historical Development and Status." *Energies* 13:1894. At: <https://www.mdpi.com/1996-1073/13/8/1894/htm>

⁵ Huang, Jiaoyan, et al. 2011. "Mercury (Hg) emissions from domestic biomass combustion for space heating." <http://www.sciencedirect.com/science/article/pii/S0045653511005091>

⁶ Chakraborty, R., et al. 2020. "Indoor Air Pollution from Residential Stoves: Examining the Flooding of Particulate Matter into Homes during Real-World Use." *Atmosphere* 11(12): 1326. <https://www.mdpi.com/2073-4433/11/12/1326>

⁷ European Environment Agency. 2020. Air quality in Europe - 2019 report. EEA Report No 10/2019. Luxembourg: Publications Office of the European Union, 2019. https://www.eea.europa.eu/publications/air-quality-in-europe-2019/at_download/file