BRIEFING PAPER

GUIDANCE ON BIOENERGY IN THE EU • JUNE 2024

WWF GUIDANCE FOR EU MEMBER STATES ON BIOENERGY PLANS AND POLICIES

Summary

Bioenergy has a role to play in the decarbonisation of the EU energy system, but only where it provides significant, near term cuts in emissions compared to fossil fuels. Unfortunately, the rules on bioenergy in the EU's revised Renewable Energy Directive (RED) remain deeply flawed in this regard, and pending further changes to that Directive Member States must apply stricter conditions at national level to ensure that bioenergy delivers genuine climate benefits.

Specifically, when finalising their National Energy and Climate Plans (NECPs), revising their national Long Term Strategies (LTSs), developing any national support schemes and transposing the new RED, they should:

1. Ensure that they have comprehensive, reliable statistical data on the supply and use of biomass for energy, by feedstock and by sector, and its impact on the LULUCF sink, and that this information is made available in a timely, accessible and transparent manner.

2. End all subsidies and other incentives for burning primary woody biomass, meaning tree trunks, branches and other material taken directly from the forest, regardless of which sector they're used in (power, heating, transport etc.). As hundreds of eminent climate scientists have warned, and as the European Commission Joint Research Centre (JRC) itself has made clear, burning trees can increase emissions for decades or even centuries compared to fossil fuels.

3. End all subsidies and other incentives for biofuel or other energy crops that involve the dedicated use of land, regardless of which sector they're used in (power, heating, transport etc.). The dedicated use of land for biofuel or other energy crops is unlikely to deliver climate benefits compared to growing food or feed, or letting the same land return to natural vegetation such as forest, and all fuels derived from such crops will therefore typically increase emissions compared to fossil fuels.

4. Invest the billions of euros currently being spent on burning primary woody biomass and dedicated biofuel crops on alternative ways of substituting fossil fuels, including energy efficiency and other demand reduction measures, wind and solar power, geothermal energy, thermal storage, heat pumps (including

community scale heat pumps linked to district heating systems) and synthetic fuels based on renewable hydrogen.

5. Ensure that the use of biogenic wastes and residues for energy only benefits from subsidies or other incentives where those materials have no significant alternative uses, whether for food, animal feed or bio-based materials (the cascading use principle) and where their extraction does not negatively affect soil fertility or soil carbon sequestration. No subsidies or incentives should be provided for burning primary woody biomass even where it has no commercial value (see above).

6. Prioritise the use of scarce bioenergy for niche sectors or purposes where it will add the highest value and/or deliver the greatest climate benefit.

INTRODUCTION AND CONTEXT: WHY NATIONAL PLANS AND POLICIES FOR BIOENERGY ARE IMPORTANT

The EU's rationale for incentivising the use of biomass as a source of energy is that it can provide significant reductions in GHG emissions compared to fossil fuels, and therefore contribute to tackling climate change. However, while biomass is technically a renewable resource, its use for energy does not necessarily provide climate benefits, and without appropriate restrictions on what is burnt the reverse can be the case. Indeed, as stated in the recitals to the EU's recast Renewable Energy Directive adopted in 2018:

> *"It is appropriate to introduce Union-wide sustainability and greenhouse gas emissions saving criteria for biomass fuels used in the electricity sector and in the heating and cooling sector, in order to continue to ensure high greenhouse gas emissions savings compared to fossil fuel alternatives";*
>
> *"It is necessary to lay down clear rules based on objective and non-discriminatory criteria, for the calculation of greenhouse gas emissions savings from biofuels, bioliquids and biomass fuels and their fossil fuel comparators"; and*
>
> *"The full carbon effects of [the conversion of land with high carbon stocks] should…be taken into account in calculating the greenhouse gas emissions savings of particular biofuels, bioliquids and biomass fuels. This is necessary to ensure that the greenhouse gas emissions saving calculation takes into account the totality of the carbon effects of the use of biofuels, bioliquids and biomass fuels."*

Climate impacts of different source of bioenergy

Leaving aside the conversion of land with existing high carbon stocks, the climate impacts of bioenergy from existing agricultural or forest land depend primarily on *what* is being burnt, i.e. the 'feedstock', not *how* it was produced. For example, there can be dramatic differences in the climate impacts of burning food crops as opposed to crop residues, or burning tree trunks as opposed to sawdust - regardless of how the crops were grown or how the forest was managed.

When it comes to **forest biomass**, as hundreds of scientists have warned, burning wood taken directly from forests (as opposed to waste from sawmills or paper mills) can increase emissions for decades or even centuries compared to fossil fuels. This is essentially because doing so creates more emissions for the same amount of energy and because of how long it takes for trees to grow back - or for dead trees to rot if they were left in the forest. The European Commission's own scientists at the Joint Research Centre have examined this issue and concluded in their 2021 report that burning wood from existing forests, including thinnings and salvage logging, will typically provide no carbon benefit compared to fossil fuels over a 10-year time period, and only small if any benefits over a 50-year time period (meaning that they would still be a relatively high carbon source of energy even over that timescale). In particular they conclude that burning 'coarse woody debris', which they define as "downed or standing dead wood of dimension greater than 10 cm of diameter under bark at the large end" will only provide

carbon benefits compared to fossil fuels over the long term, if ever. Annotated versions of the key tables from the JRC report are reproduced here.

It should be noted that these climate impacts related to the production of bioenergy are true regardless of how sustainably the forest is managed in ecological terms, or what is happening to carbon stocks at forest, landscape or country level. Whether materials result from pre-commercial thinning, wildfire prevention or salvage logging is also irrelevant. Such points (and other false or misleading arguments used by bioenergy industry lobbyists against appropriate restrictions on forest biomass use) are discussed in this WWF 'myth buster' on forest biomass.

WWF considers that the use of forest biomass for energy should only be incentivised where it delivers at least a 50% reduction in emissions compared to fossil fuels over the next decade, based on a full lifecycle assessment that includes all relevant factors (this is not an argument for burning fossil fuels - see below). In practice, as per the JRC report mentioned above, most primary woody biomass is unlikely to meet this test. Even where such materials have no commercial value - for example because they're bent, knotty, or simply too big for the sawmill - they would store carbon for decades if left in the forest and burning them for energy is therefore counterproductive in climate terms. Unfortunately the use of primary woody biomass has been increasing steadily in the EU over recent years, including the large-scale industrial use of forest biomass, as can be seen in these photos, taken in numerous different EU countries.

Wastes and residues produced by forest-based industries, for example sawdust or black liquor produced in sawmills or paper mills, and post-consumer waste wood, may in principle be suitable feedstocks for bioenergy purposes. But only where they cannot be used by other industries, such as the wood panel or chemical industries, in ways that would result in higher economic benefits and/or the carbon contained in the feedstocks being 'locked up' for longer in products - in line with the 'cascading use' principle.

One other point to note in this context is that the intensive management of forests to maximise wood production cannot be justified *on climate grounds*. While we will continue to manage forests and harvest wood for a number of purposes, the European Commission has pointed out that "As indicated in recent scientific studies, until 2050, the potential additional benefits from harvested wood products and material substitution are unlikely to compensate for the reduction of the net forest sink associated with the increased harvesting."[1] This concurs with the views of over 200 scientists who wrote to the US Congress[2] and a report by the UK research arm of the UK forest agency[3]. Instead we should be focusing on significant changes in forest practices in favour of closer-to-nature forestry and reduced levels of forest harvesting, in order to increase the storage or carbon in resilient, biodiverse, natural forests. This needs to be combined with innovation in the design of bio-based products, a rapid shift towards a circular economy, and support to ensure that the necessary transition in the forestry sector is achieved in a socially fair way.

As regards the dedicated use of land for **bioenergy crops**, such an activity comes with an opportunity cost, in that it reduces the amount of land available for other activities, including carbon sequestration. And as numerous studies make clear, reforestation will typically sequester many times more carbon from the atmosphere per hectare (both above and below ground) than could be saved in emissions by using the same area of land for biofuel production. The same will often be true of simply letting land revert to forest or other vegetation through natural succession.[4] Similarly, where agricultural land is not used for carbon sequestration in resilient natural ecosystems,

[1] https://ec.europa.eu/commission/presscorner/detail/en/qanda_21_3548
[2] https://www.documentcloud.org/documents/6889670-Scientist-Letter-to-Congress-8May20.html
[3] See "Carbon sequestered in harvested wood products" in section 3.3.3 of this report: https://europeanclimate.org/wp-content/uploads/2018/05/CIB-Summary-report-for-ECF-v10.5-May-20181.pdf
[4] E.g. see Righelato & Spracklen, 2007 "Carbon mitigation by biofuels or by saving and restoring forests" or Evans, Ramage, DiRocco and Potts, 2015 "Greenhouse Gas Mitigation on Marginal Land: A Quantitative Review of the Relative Benefits of Forest Recovery versus Biofuel Production". Note that in the latter paper the high rates for miscanthus are unlikely to be realistic as they assume yields roughly three times higher than those achieved in the field (e.g. see Searle and Malins, 2014 "Will energy crop yields meet

the best use of it from a climate perspective is likely to be food or feed production. Devoting it to biofuel or other energy crops will on aggregate reduce the amount of land available for food or feed production globally and so increase pressures on deforestation elsewhere.

This is not to say that the agricultural sector has no role to play in the provision of low carbon bioenergy. The use for energy of agricultural wastes and residues can be positive from a climate perspective and should be encouraged – provided that the feedstocks have no other use and their extraction does not negatively affect soil fertility or soil carbon sequestration. For example, producing biogas from the anaerobic digestion of short-lived wastes such as slurry can provide significant climate benefits – not least because doing so can reduce emissions of the potent greenhouse gas methane.

Biodiversity impacts

The industrial farming of biofuel crops and - as the JRC report mentioned above makes clear - the extraction of primary woody biomass for energy can have serious impacts on biodiversity. And while agriculture and forestry can be carried out sustainably - something that is very far from the case in most of the EU at present - that is not a proxy for the climate impact of biomass use for energy, which as explained above depends primarily on the feedstock, not how it was produced. Those feedstocks that deliver significant near-term reductions in emissions, for example wastes and residues from sawmills or paper mills that have no other uses, certain agricultural wastes and residues, and post-consumer or municipal waste, will generally also pose very few problems from a biodiversity perspective.

Competing demands for biomass

As the EU and global economy seeks to reduce its dependence on fossil fuels, the demand for biomass is likely to increase dramatically. As a recent report by Material Economics and others makes clear, the demand for climate-friendly sources of biomass hugely exceeds the likely available supply, and decision makers need to prioritise the uses with the highest economic and societal value, for example its use for products in the chemical industry and others. Scarce supplies of bioenergy will need to be directed at “niche specific high-value niches – such as hybrid solutions for high-temperature industrial heat; integrated value propositions in waste and carbon management services; and aviation fuels, until or unless hydrogen and carbon capture costs drop to levels where synthetic fuels become cheaper. Even for these niches, the analysis suggests, there will be stiff competition from alternative solutions in the long term”. The growing imbalance between demand and likely supply of biomass is also covered in a recent report by the European Environment Agency where key synergies and trade-offs in the use of biomass for different sectors are discussed.

Alternatives to bioenergy

The fact that many types of biomass will increase emissions isn’t an argument for burning fossil fuels. On the contrary, it’s an argument for investing in energy efficiency and other demand reduction approaches, and in alternative renewable energy supply sources. The latter vary depending on the sector, but in the power sector include wind and solar, accompanied by grid balancing options such as demand side response, interconnection and various types of storage. In the building sector, where near-complete decarbonisation is also a prerequisite for reaching climate neutrality, nearly all demand will ultimately need to be electrified, for example through heat pumps - including community scale heat pumps connected to district heating and thermal storage. In the transport sector, battery electric vehicles are likely to meet the vast majority of demand for road transport, with synthetic fuels based on renewable hydrogen providing alternatives in sectors such as long distance shipping and aviation. Investment in bioenergy-based options in such cases carries a serious risk of stranded assets, and diverting resources from the necessary long term solutions.

Fuel poverty

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expectations?”). Note also that only above ground biomass was considered, and so the true figures are likely to be even more supportive of carbon sequestration over biofuel production.

On average, 25% of residential space heating in the EU27 is provided by primary solid biofuel. In some Central and Eastern Europe (CEE) countries this share is over 50% (for example in Bulgaria, Croatia, Slovenia and Romania). Generally, the lower the income quintile, the higher the share of biofuel in space heating all over Europe, but the most affected region is Central and Eastern Europe. There is also a strong correlation between level of urbanisation and primary energy form, with wood/biomass use much more prevalent in rural areas. For many households, heating with firewood is not a matter of choice but a necessity. Policy incentives for the use of primary woody biomass to replace fossil fuels - in addition to negative climate and biodiversity impacts - are therefore also undesirable on fuel poverty grounds, as they are likely to drive up firewood prices, which can often lead to illegal logging or the burning of household waste.

As fuel poverty is typically associated with poor energy efficiency in buildings, support for deep energy renovation would not only help tackle fuel poverty but also significantly decrease the overall demand for firewood, and hence emissions. Member States should ensure that there is tailor-made renovation programme for affected households (e.g. with lower pre-financing requirements and higher shares of non-repayable funds), and that future Social Climate Plans not only support households in the transition away from fossil fuels, but from biomass as well. Given that use of solid biofuel is strongly linked to rural situations, strategies and policies to tackle energy poverty should be planned within a local/ regional context (not only as a national 'one-size-fits-all' model).

Air pollution

In 2021, more than 250,000 premature deaths were caused by fine particulate matter pollution in Europe. Solid fuel heating is the major source of such emissions, with and almost 60% share.[5] The total health-related costs to society of outdoor air pollution due to residential wood burning in Europe amounted to € 12.7 billion in 2018, resulting in a 57 euro/year average cost per household.[6] Wood burning releases health alarming pollutants linked to, among others, ischemic diseases, lung cancer, respiratory and pulmonary diseases, and premature mortality.[7] Even though ecodesign-ready stoves can deliver around 80% emission cuts compared to older stoves, ecodesign requirements cannot eliminate emissions from solid fuel heating. This reason, together with the arguments on climate and biodiversity, is an argument for not subsidising the replacement of existing wood-fired heating systems, but instead investing in the alternatives discussed above.

Practices in firewood use can also significantly worsen the level of pollution, for example using damp wood or providing insufficient air for efficient combustion. Raising awareness on proper approaches to wood burning could therefore have positive impacts for the transition period. Wood moisture content is an important factor of influencing air pollution, and depending on local climate conditions, it can take up to 2 years for firewood to dry out properly. This seasoning is usually not followed, especially by energy poor households, due to the high upfront cost, and regulation on this point may therefore be a good solution. In England, for example, under air quality regulations, the moisture content of wood fuel supplied or sold in quantities below a certain volume must not exceed 20%.[8]

BECCS

Bioenergy with carbon capture and storage (BECCS) is land-intensive and limited in spatial suitability but could, in appropriate circumstances and with adequate safeguards, provide carbon dioxide removal. However, too high of a reliance on BECCS could have drastic negative impacts on biodiversity, freshwater, and food availability due to the risk of contributing to unsustainable land use and management. And it is clear that not all BECCS projects truly result in negative emissions,[9] and it is not proven at scale. On this basis the balance between costs and benefits resulting from BECCS and the unknown risks associated with it are not yet clear. Further research and development is needed to ascertain whether BECCS can be part of the climate solution, and as such, it should neither be ruled out nor actively supported. The urgent need for increased carbon dioxide removal, in addition to

[5] https://www.eea.europa.eu/publications/air-quality-in-europe-2022/sources-and-emissions-of-air
[6] https://epha.org/wp-content/uploads/2022/03/epha-position-paper-clean-heating.pdf
[7] https://www.env-health.org/new-infographic-on-the-health-and-climate-threat-from-wood-burning/
[8] https://www.legislation.gov.uk/ukdsi/2020/9780348210194
[9] https://easac.eu/publications/details/forest-bioenergy-update-beccs-and-its-role-in-integrated-assessment-models

rapid emissions cuts, should instead be pursued at present through a focus on increasing carbon sequestration in natural ecosystems in ways that have benefits for nature, people and climate, for example through the restoration of forests, peatlands and other landscapes.

The impact of LULUCF rules on bioenergy use

The recently agreed changes to the accounting rules in the EU's LULUCF Regulation, which will come into force from 2026 onwards, represent a significant improvement on the very weak system in place at present. But they won't solve the bioenergy problem because they won't provide strong enough incentives - either at national level or for individual operators - not to burn biomass for energy, including biomass imported from outside the EU. Much more would be needed - including targets and/or carbon prices for the LULUCF sector as demanding as those in the energy sector, both in the EU and all countries that might supply the EU with biomass for energy. But none of these conditions is likely to be met in the foreseeable future. These basic problems with relying on LULUCF as a solution to the bioenergy problem were raised by scientists when the Renewable Energy Directive was being revised in 2018, and are still applicable.

RECOMMENDATIONS ON TRANSPARENCY OF BIOMASS SUPPLY, USE, AND IMPACTS

In order to be able to assess biomass sustainability for the current and future planned use, the minimum requirement is to have clear, detailed and reliable data on the biomass use and its impact on forests and other landscapes.

There are a number of pieces of legislation that contain requirements relating to the planned supply and use of forest and other biomass. In particular, the Governance Regulation,[10] whose primary purpose is to provide the legal framework for the National Energy and Climate Plans (NECPs) and Long-Term Strategy process (LTS), and it contains provisions on specific details that need to be included in those plans and in progress reports thereon. Although not binding, the Commission's Guidance on the NECP revision also incorporates clarifications and further suggestions.

Annex I of the Governance Regulation set up the general framework for the NECP. Section iv. of chapter 2.1.2 on renewable energy should describe "the estimated trajectories on bioenergy demand, disaggregated between heat, electricity and transport, and on biomass supply by feedstocks and origin (distinguishing between domestic production and imports). For forest biomass, an assessment of its source and impact on the LULUCF sink."

Reported use of feedstocks

Annex IX of the Governance Regulation requires additional information on renewable energy, including primary supply of solid biomass, disaggregated by different specific feedstock categories. The structure and detailness of reporting is the same as what Eurostat already collects on biomass supply (Supply of biomass - annual data). Except Hungary all Member States are providing some data, however, data is often missing for different subcategories, and there are also inconsistencies between the values of the different subcategories and the main categories (e.g. the sum of the subcategories are not equal to the value of the main category in some cases).

Fuel trajectories on supply

But data reporting is unclear not only on the reported used feedstocks, but on the future plans as well. By March, 2023, Member States had to submit their first biennial progress report on the status of implementation of its original NECPs. From 2023, by the end of October the Commission also must submit to the European Parliament biennial report on Union bioenergy sustainability. This report, based on the progress reports, pointed out that, "Member States provided limited information on projected primary supply of biomass by feedstock and origin." Five Member States (HR, ES, HU, LT, SE) have expressed concerns meeting the demand, while seven Member States have not provided

[10] Regulation (EU) 2018/1999.

any information (BE, EE, DE, IE, LU, PL, RO). The only country which introduced strict intervention was the Netherlands which introduced a cap on woody biomass for heating. Because of the information gap on the demand side as well, the document could not give any comprehensive insight on bioenergy demand and supply.

Future use by different sectors

Section vii of chapter 3.1.2 in the NECP, according to the Governance Regulation, should assess the biomass use by other sectors (agriculture and forest-based sectors). With the planned growth in the bioeconomy, and using woody feedstock for materials to substitute fossil-fuel based one, the importance of the assessment of possible future conflict is inevitable. The assessment of the EU Bioeconomy Strategy Progress Report has warned that by 2050, a gap of 40-70% between sustainable biomass supply and biomass demands for materials and energy could arise.

Although not explicitly underlined by the Governance Regulation, the planned use of biomass and the future available biomass for energy use must be consistent. Therefore, the two should be comparable, i.e. the available supply of biomass feedstocks should be indicated in energy volume as well, in order to be comparable with the planned use. The level of detail of the planned supply analysis should be in line with what is required for the NECP progress report.

Impacts of bioenergy on the LULUCF sink

Art. 29.7a and 7b of the RED III create a link between the biomass use for energy and the LULUCF sink, by requiring Member States use of domestic forest biomass to be consistent with their targets under the LULUCF Regulation and provide an assessment in the NECP of whether that will be the case, given their planned policies. This practically means that Member States have to ensure that first, they have comprehensive assessment of the projected forest biomass use and, second, that they have modelled how the projected use will affect the LULUCF sink. As the level of the carbon sink needs to be enhanced in the post-2030 period in order to reach carbon neutrality, and a long-term carbon sink approach is a requirement for national Long Term Strategies (see Art. 15 of the Governance Regulation), the Commission Guidance on the NECP update process rightly encourages Member States to include 2050 scenarios for this sector in their updated NECP.

Needless to say, the higher the biomass use, the lower the carbon sink, therefore, this exercise should have been part of the first calculations of the draft revised NECPs. Unfortunately, few Member States have so far provided the required information in their NECPs (see this report by PFPI and the Commission recommendations on this subject in the Annex). Although not specifically referring to the production of heat, power and transport fuels from biomass, the European Commission recognises increased harvesting levels as a major driver of the declining carbon sink in forests.[11] The Commission's guidance on NECP revision also draws attention to the interlink with the Nature Restoration Law, including the requirements on restoration of ecosystems and the enhancement of organic carbon stored in forests. More generally, if Member States exclude from their bioenergy plans the use of dedicated crops and primary woody biomass then that will likely have a positive impact on efforts to increase the LULUCF sink.

Taking all of the above considerations into account, and in order to ensure that their plans and policies on bioenergy are based on a solid foundation, Member States must:

- **Ensure that NECPs, LTSs, and their progress reports have comprehensive, reliable statistical data on the supply and use of biomass for energy, by feedstock and by sector, and its impact on the LULUCF sink, and that this information is made available in a timely, accessible and transparent manner**.

[11] Report from the Commission to the EU Parliament and the Council on the operation of Regulation (EU) 2018/841 ("LULUCF Regulation") pursuant to Article 17(2) as amended by Regulation (EU) 2023/839, COM(2024) 195 final.

RECOMMENDATIONS ON IMPLEMENTING RESPONSIBLE AND SCIENCE-BASED BIOENERGY POLICIES AT NATIONAL LEVEL

The main rules on what sources of bioenergy can count towards EU targets and be eligible for subsidies and other incentives are set out in the EU's recently revised Renewable Energy Directive[12] (RED III), which Member States are required to transpose by 21 May 2025 (Article 5). The content of this Directive is also critical because it is relied on by other relevant EU policies, including the Emission Trading System (EU ETS), the Effort Sharing Regulation (ESR), the Sustainable Finance Taxonomy, the Carbon Removals Certification Framework (CRCF), etc.

While it now contains an extremely complex and administratively burdensome array of requirements relating to bioenergy, including some new additions (Fern and Client Earth have produced a detailed guide to the provisions of the revised RED relating to forest biomass) these largely fail to address the critical issues relating to climate impact, meaning that EU rules will continue to incentivise types of bioenergy feedstocks that increase emissions compared to fossil fuels.

The main problems are:

1. While there are restrictions on subsidies for the burning of saw logs, veneer logs, industrial grade roundwood, stumps and roots, there are major loopholes, notably as regards roundwood that has no commercial use. For example the Directive excludes from the definition of "industrial grade roundwood" "roundwood the characteristics of which, such as species, dimensions, rectitude and node density, make it unsuitable for industrial use as defined and duly justified by Member States according to the relevant forest and market conditions".

2. There is a new restriction on subsidies for burning forest biomass in electricity-only plants, but there are exemptions for wood burnt in Just Transition regions or in BECCS facilities, and the restrictions obviously don't apply to forest biomass burnt for heat or used for the production of transport fuels.

3. There are new provisions on cascading use, but these do not include leaving dead wood in forests in the list of priorities, and exempt pre-commercial thinnings, wood obtained from wildfire prevention measures and salvage logging, and wood whose characteristics are not suitable for local processing facilities.

4. There are no restrictions or limits on what types of woody biomass can count towards the EU renewable energy target and thus be counted as zero carbon under the ETS (and therefore exempt from the carbon price, which creates an increasingly powerful incentive to burn biomass even without direct subsidies).

5. Though there is a cap of a maximum of 7% on food and feed-based biofuels in transport, there is no limit on food and feed-based biofuels or biogas in the heat or power sectors, or any limit on the use of other dedicated energy crops at all.

These crucial failures mean that primary woody biomass of the type shown in the photos of EU pellet and energy plants linked to above - which may have no commercial use but has high value in terms of carbon storage - will continue to be burnt for energy, as will dedicated bioenergy crops, despite both of these practices being seriously damaging in climate terms.

[12] Directive (EU) 2023/2413.

In light of the complete inadequacy of EU rules on bioenergy, **Member States must apply stricter rules at national level** in order to ensure that bioenergy makes a genuine contribution to tackling the climate and biodiversity crises, and to address the energy poverty and air quality issues associated with residential firewood use. Specifically, Member States must:

- **End all subsidies and other incentives for burning primary woody biomass, meaning tree trunks, stumps, branches and other woody material taken directly from the forest. As hundreds of eminent climate scientists have warned, and as the European Commission Joint Research Centre (JRC) itself has made clear, burning trees can increase emissions for decades or even centuries compared to fossil fuels - even if they have no commercial value for products.**

- **End all subsidies and other incentives for biofuel or other energy crops that involve the dedicated use of land, regardless of which sector they're used in (transport, power, heating etc.). The dedicated use of land for biofuel or other energy crops is unlikely to deliver climate benefits compared to growing food or feed, or letting the same land return to natural vegetation such as forest, and all fuels derived from dedicated crops will therefore typically increase emissions compared to fossil fuels.**

- **Ensure that the use of biogenic wastes and residues for energy only benefits from subsidies or other incentives where those materials have no significant alternative uses, whether for food, animal feed or bio-based materials (the cascading use principle). No subsidies or incentives should be provided for burning primary woody biomass even where it has no commercial value.**

- **Prioritise the use of scarce bioenergy for niche sectors or purposes where it will add the highest value and/or deliver the greatest climate benefit.**

- **Invest the billions of euros currently being spent on burning primary woody biomass and dedicated biofuel crops on alternative ways of substituting fossil fuels, including energy efficiency and other demand reduction measures, wind and solar power, geothermal energy, thermal storage, heat pumps (including community scale heat pumps linked to district heating systems) and synthetic fuels based on renewable hydrogen.**

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