BIRDLIFE POSITION ON BIOENERGY

FINAL

POST ATF MEETING - NOVEMBER 2023

# Future-proofing bioenergy

*The role of bioenergy in our future energy system needs to be redefined, because only a limited amount of biomass can be provided in a nature-friendly way. That's why we need to move away from biomass originating from intensive agriculture and forests towards using waste and residues remaining after the implementation of the cascading principle.*

## Background

For many years, EU governments have been promoting bioenergy, claiming that it significantly contributes to solving the climate crisis. This rests on the basis that everything harvested for energy from fields and forests will grow back, and can therefore be counted as zero-emission (or carbon neutral) in the greenhouse balance sheet.

But not all bioenergy is equal. This does not add up if, under the guise of climate action, natural carbon sinks like forests and bogs are damaged or destroyed for bioenergy, maize crops are planted on a large scale, and entire forests all over the world are cleared and burned for bioenergy. It takes decades for trees to regrow. Besides, the production and use of energy from biomass always involves $CO_2$ emissions. Regarding the carbon opportunity cost, this is never taken into account when it comes to bioenergy. Every hectare of land can absorb a certain amount of carbon through photosynthesis and any use such as logging or cultivation means less carbon accumulating than if the land is left to evolve freely towards the natural vegetation (forest in most of Europe, but sometime grassland, peatland or even desert). The evidence is, that once that opportunity cost is taken into consideration, most bioenergy doesn't actually save emissions and often it is a lot worse than the fossil fuel it replaces[1].It is also the case that many forms of bioenergy, particularly primary woody biomass, can result in more emissions relative to the fossil fuels they replace over climate-relevant timescales[2].

Bioenergy is mostly used in areas for which more nature- and climate-friendly alternatives are available. This is especially true for the transport sector, where the biofuels quota is used to improve the $CO_2$ balance and evade political regulation imposing lower $CO_2$ limits for vehicles. Legislation has stimulated this development through economic incentives. Bioenergy production has thus turned into

[1] Searching, Oliver and Dumas 2022. Europe's land future.

[2] https://publications.jrc.ec.europa.eu/repository/handle/JRC122719

an economic activity that aggravates the crisis of nature and endangers the climate. For this reason, BirdLife is opposed to plans to expand the use of biomass for energy production and advocates for leaving it as a niche energy production, under strictly framed situations.

Climate action and conservation efforts must go hand in hand. Intact ecosystems are capable of naturally extracting large amounts of $CO_2$ from the atmosphere and storing carbon without any complex technologies that are still under development. Against this background, bioenergy and its possible uses are re-evaluated in this position paper. We will make visible the multifaceted ways they conflict with the biodiversity conservation and protection targets and will identify opportunities for developing nature-friendly bioenergy.

## Conflicts between bioenergy and conservation efforts

### Negative ecological impact of biomass supply

**Energy from agricultural biomass/energy crops:** Biogas and biofuels are mostly produced from maize and rapeseed, which are grown as intensive crops. The cultivation of energy crops has been constantly rising for many years and by now comprises around 4 percent of agricultural land in EU[3] . The use of many hitherto extensively managed and ecologically valuable lands has been intensified. Increased application of fertilisers and pesticides has been found in many places to cause negative impacts on biodiversity as well as the quality of groundwater and surface water. Intensively managed soils emit stored carbon as well as nitrous oxide and fine particulate matter, thereby contributing even more to climate change. Machines used for tillage, harvesting and transport also add to the emissions.

Biomass from agriculture requires significantly more land than wind or solar farms, about five to fifty times more per kilowatt-hour (kWh) of produced energy and this demand could substantially increase by 2050, equalling to 1/5 of the EU crop land today[4]. It often can compete directly with food production and the cultivation of energy crops contributes to the rising sale and lease prices of land, which complicates the enforcement of conservation measures.

**Energy from forest wood:** Half of EU's wood harvest[5] is burned to produce electricity and heat. Though the amount of deadwood has increased it is mostly far below natural levels of deadwood availability and also below critical thresholds for many forest species and even low-quality wood is being extracted from forests on a grand scale to produce energy. Dead wood provides valuable living space for numerous organisms over many decades, contributes to the formation of topsoil and stores carbon by itself as well as being an essential link in the carbon sink of the forest floor. Dead wood on a large scale, for example as a consequence of a bark beetle infestation, should also be left in the forest, since it protects the soil from sunlight and drying out – this is an essential prerequisite for nature to be able to rejuvenate. Moreover, deadwood is an important carbon pool (not instant emissions as sometimes suggested) and in some cases the carbon from deadwood is emitted slower than from wood products[6].

Wood, as a material, should preferentially be used for products that effectively sequester carbon over an extended period. Utilizing wood in products with a longer life cycle maximizes its ability to store carbon. Only wood residues that have reached the end of their life cycle and can no longer be used as material should be considered for energy production.

The increased use of pellet heating is linked to a rise in climate damaging emissions like CO2, but also fine particulate matter which can lead to noxious smell and health problems, especially in densely

[3] https://www.transportenvironment.org/discover/land-used-for-european-biofuels-could-feed-120-million-people-daily/

[4] Searching, Oliver and Dumas 2022. Europe's land future.

[5] https://unece.org/DAM/timber/publications/SP-42-Interactive.pdf

[6] https://forestecosyst.springeropen.com/articles/10.1186/s40663-018-0131-5

populated areas. Climate neutrality in the building sector must be achieved with solutions such as heat pumps that make efficient use of renewable energy.

## Problems connected to the high volume requirements

Most climate plans proposed by political and economic actors include scaling up bioenergy. They argue that bioenergy is reliable and climate neutral and should therefore play a significant part in substituting fossil sources of energy in the course of transforming the energy system. The use of bioenergy as a source with reliable availability is being considered to secure the power supply by balancing out the fluctuations of wind and solar power. For instance, wood should replace coal as an energy source in some power plants in Germany and France. The large quantities of wood needed for this can in no event be made available in a nature-friendly way, and thus risk undermining energy security instead of improving it. The regional availability of waste wood is also limited, so it would need to be either transported over long distances or imported or the demand will have to be covered with forest wood. When we divert to bioenergy food or wood, the world market replaces these with production elsewhere, often by pushing further the agriculture frontier or logging of frontier forests. Bioenergy thus doesn't only create (often) local damage but it almost always drive global damage, concentrated in some of the most critical biodiversity crisis areas.

**Energy from forest wood has no future if we want to preserve our natural carbon sinks and improve their condition.**

The industry is planning to use bioenergy to substitute coal, oil and natural gas in the energy supply. For example, multiple climate neutrality scenarios assume the utilisation of wood from forests and short rotation plantations for high temperature production, ever increasing the pressure on the valuable resource that is wood as well as on biodiversity. Alternatives need to be discussed urgently – especially since there is also high demand in the industry for renewables used as materials to substitute fossil resources. BirdLife recommends the EU governments to conduct analysis and asses the available biomass supply by including an effective application of the cascading principle and circular economy and engage discussions starting from these facts.

The European Commission's own scientists in the Joint Research Centre (JRC) made clear in their report[7] on forest biomass use for energy in 2020 that burning 'coarse woody debris' meaning materials wider than 10cm at their widest point, if burnt for energy, would increase emissions compared to fossil fuels for over 50 years and potentially indefinitely - essentially due to the slow rate at which such materials would decay and release carbon back into the atmosphere. Even smaller 'fine woody debris' would be unlikely to provide climate benefits compared to fossil fuels over a ten or twenty year period, and would by implication still be a high source of energy over a much longer timescale. This means a continued reliance on primary forest for bioenergy risks aggravating the climate crisis, and thus undermining nature further.

Vast amounts of bioenergy would need to be available for the realisation of these plans. The quantities needed could not be provided by nature-friendly bioenergy. As a consequence, even more deforestation, land use and intensive agriculture would occur – and that worldwide, because these undertakings would not be viable without imports, e g. of wood pellets[8]. The rising demand for biomass as a material increases the pressure further.

[7] https://publications.jrc.ec.europa.eu/repository/handle/JRC122719

[8] The report from Material Economics 2021 has estimated that the availability gap for biomass demand in EU would be between 40 to 70% by 20250. See https://materialeconomics.com/material-economics-eu-biomass-use-in-a-net-zero-economy-online-version.pdf?cms_fileid=55bb9c799d736d81fdfb372fa5f59013

Furthermore, natural gas is planned to be phased out and replaced by renewable gases, which also include biomethane (biogas processed to attain the quality of natural gas). The required quantities would be vast and could in no event be covered by biomethane (see section on biogas). Production of bioenergy with subsequent Carbon Capture and Storage (BECCS) is currently being considered as an option to going beyond climate neutrality. Provided that bioenergy is emissions free in principle, a permanent storage would lead to negative $CO_2$ emissions. These could be used to offset unavoidable emissions, emanating primarily from industry and agriculture. However, the assumption that all biomass is automatically$CO_2$-neutral is wrong. The incentive to create negative emissions through BECCS could lead to further deforestation, a rise in energy crop cultivation with high land use and consequently to more indirect emissions[9]. The IPCC and the IPBES point out the dangers of BECCS for biodiversity and climate. Taking into account the high energy consumption of the entire process chain makes it even less likely to add up. The potential of BECCS in climate change mitigation is extremely limited. Today, this potential is being systematically overstated especially by some in the industry to also ward off fast-acting climate measures and to delay the energy transition. **Nature-friendly bioenergy cannot be supplied in vast quantities.**

## Bioenergy in the context of ecological targets

BirdLife supports targets to halt and reverse the biodiversity loss, notably farmland birds, and of the greenhouse gas concentration in the atmosphere and to limit global warming to 1.5 degrees. We want to achieve climate neutrality in the EU considerably in advance of 2050. To achieve climate neutrality, we need to reduce our energy consumption (sufficiency), use energy more efficiently (efficiency) and cover the remaining energy needs with 100% renewable energy. Among renewable energies, bioenergy as well as hydropower have a particularly high consumption of natural resources and land. For this reason, bioenergy and hydropower as opposed to solar and wind power cannot be the pillars of our future power supply. This is why BirdLife advocates for not developing the capacities for bioenergy further but instead put in place incentives and measures to reduce the current demand for energy and replacing the bioenergy used at the moment for power, heating of buildings and as fuel for motorised private transportation with solar and wind power[10].

## Necessary legislative changes

Policymakers must make a decisive turnaround. Only when the negative impacts of the use of biomass on our ecosystems are eliminated via legislation and the actual emissions are being considered, can the destruction of nature be held back and the path to nature-friendly bioenergy be cleared.

### Necessary changes in the European legislation

**The Renewable Energy Directive of the EU**

The European Renewable Energy Directive (RED) classifies bioenergy as sustainable and climate neutral, even if it is produced from intensively cultivated biomass and from forest wood. Furthermore, it prescribes a biofuel quota, specifying a minimum share of biofuels in petrol and diesel, which leads to the increasing cultivation of rapeseed and the import of primarily palm oil and soy.

We demand:

[9] See the 2023 report done by RSPB and WWF UK: https://www.wwf.org.uk/our-reports/beyond-beccs-summary

[10] While this paper is about bioenergy, we think that solar and wind power projects should align with practices that prioritize the safeguarding of biodiversity and ecosystems. https://www.birdlife.org/wp-content/uploads/2021/11/birdlife_climate_change_position_lores-november-2015.pdf

- → Bioenergy from intensively cultivated energy crops and primary wood from forests must not be classified as sustainable and climate neutral and counted towards greenhouse gas reduction targets.
- → Biofuel quotas must be scrapped and instead $CO_2$ limits for vehicles must be significantly tightened.

**The Emission Trading System (ETS) of the EU**

Until now, no certificates need to be purchased for $CO_2$ emissions from energy production using biomass, although the combustion of biomass involves high levels of emissions.

We demand:

- → Emissions from bioenergy production must be included in the Emission Trading System. Regarding the combustion of primary wood, European as well as national emission trading systems should consider the IPCC emission values for „solid biofuels".

**The EU Gas Regulation**

The proposed Gas Regulation[11] lays down that Member States shall ensure that by 2030 at least 35 billion cubic meters (bcm) of sustainable biomethane is produced and injected into the natural gas system, with the aim of safeguarding the security of the EU's gas supply and decreasing dependence on fossil fuel gas imports. In terms of the evidence base for this target, the proposed Gas Regulation refers to a 2021 study *"Assistance to assessing options improving market conditions for biomethane and gas market rules"* by experts and the European Commission's Joint Research Centre (JRC). This EC Assessment concluded that around 24 bcm (259 TWh) of biomethane could be produced sustainably by 2030.

However, Feedback EU's analysis[12] of the feedstock assumptions underlying the 35 billion cubic meter biomethane[13] target shows that at best it will be simply impossible to reach this target. At worst, strong policy support for the target will lock in dangerously unsustainable agricultural, land use and energy practices.

A case in point is the use of manure, which inaccurate projections of volumes risk severely undermining the potential benefits such as its treatment via anaerobic digestion (AD) that can help mitigate manure related GHG emissions and produce digestate to replace chemical fertiliser. Indeed, promoting the use of manure for biogas and biomethane production risks sustaining or even increasing the scale of livestock production, driving an overall increase in emissions. A further 2022 study by the JRC[14] concludes that better manure management is not sufficient to address the nitrogen issue ... " dietary change is a pre-condition for achieving the substantial reduction of nitrogen needed in EU agriculture ." which means less consumption and production of animal based proteins. Basing biomethane targets on

[11] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2021%3A804%3AFIN&qid=1640001545187

[12] https://feedbackglobal.org/research/briefing-the-35-bcm-biomethane-target/

[13] Biomethane is a type of renewable gas which is produced by anaerobic digestion (AD). AD is the process of taking organic materials, known as 'feedstocks', both purpose-grown, like maize and other crops, and waste streams, like food waste and manure, and breaking them down using micro-organisms in the absence of air. This produces methane-rich biogas, which can be used to generate heat or electricity, and nutrient-rich digestate, which can be used as a fertiliser. After a purification process this gas can be injected into the gas grid or used as a fuel and is therefore presented by the industry as a viable replacement for fossil fuels.

[14] Leip et al., "Halving Nitrogen Waste in the European Union Food Systems Requires Both Dietary Shifts and Farm Level Actions," Global Food Security 35 (2022). https://www.sciencedirect.com/science/article/pii/S2211912422000384

current livestock production volumes will lock in an agricultural system unable to meet the Nitrates Directive or the Farm to Fork nutrient waste reductions (see Feedback EU policy briefing for further recommendations on biomethane production).

We demand

- → **Abandon the target of 35 billion cubic meters** by 2030 and replace this target with a much lower, evidence based target developed in conjunction with sustainable food system experts.
- → **Methane leakage**: To ensure that biomethane emits less greenhouse gases than conventional fossil gas, it is crucial that the Gas Regulation legislates for continuous emissions measurement and enforcement of greenhouse gas emission prevention (methane leakage) along the whole biomethane supply chain.
- → **Agricultural plant biomass** (45% of 35bcm target): explicitly prohibit the use of energy crops and commission independent agricultural and food system expert assessment to determine at which volumes agricultural residues and sequential crops can be produced without directly, or indirectly, impacting food security or land use for instance through reducing the yield of the primary food crop.
- → **Manure** (32% of 35bcm target): Significantly reduce any livestock production related feedstock targets (manure, meat and dairy industry waste waters) so that biomethane feedstock demand for manure does not undermine overall climate mitigation, nitrogen waste and population health objectives. To ascertain sustainable volumes of manure, commission an independent multi-disciplinary expert team so that all livestock related scientific knowledge is considered. Given the broad scientific consensus on these issues, an expert team can do this within a short timeframe.
- → **Food waste** (5% of 35bcm target): ensure that demand for food waste feedstock does not undermine the EC food waste reduction targets, or the Sustainable Development Goal of 50% food waste reduction by 2030, by ensuring that food waste reduction at source is prioritized in policy and financial incentives. Ensure that incentives for biogas and biomethane do not indirectly or directly reduce food waste reduction efforts.

**Promotion of bioenergy on national level**

Since EU member states can count bioenergy against the greenhouse gas reduction quota as having zero emissions, EU government wants to achieve the national $CO_2$ reduction targets with the help of bioenergy. Consequently, bioenergy is being massively promoted. The subsidies for energy production are largely responsible for the rise of bioenergy – primarily biogas from intensively cultivated energy crops and wood combustion in power plants. In addition, there are several programmes promoting the use of bioenergy.

We demand:

- → Bioenergy produced from intensively cultivated energy crops and forest wood must not be eligible for subsidies or finanical support from MSs.
- → Instead of biogas or any other forms of bioenergy from energy crops, alternatives like solar and wind power should be promoted, which use less land if measured by energy yield.
- → Support measures subsidising the use of pellet, wood and wood chip heaters must be abolished and replaced with a stronger promotion of heat pumps.

# Nature-friendly biomass

**Biomass production must be compatible with protecting nature and the environment.** Species-rich ecosystems are more resilient against the consequences of the climate crisis. We need to preserve our natural carbon sinks and improve their condition to stabilise the climate. Agriculture designed in an eco-friendly way, close-to-nature forest management and more conservation areas are needed. These environmental protection goals must not be hampered by bioenergy.

**The use of biomass for energy ranks last.** Plant biomass is a lot more than just an energy source. Plants are oxygen producers, pollutant filters, carbon sinks and provide living space and livelihood for both humans and animals. In addition, biomass can be used as a material in numerous ways – for medicinal purposes, clothing, building material and a lot more. When used as a material, biomass binds the carbon within for longer, while energy production immediately releases it into the atmosphere.

Furthermore, there is also biomass that has no other use, e.g., household bio-waste and green waste from landscaping. It would be reasonable to produce energy from such biomass in suitable facilities before the carbon contained in it is directly released into the atmosphere.

### Biomass that can be used for energy production

If we respect the requirements for environmental protection, bioenergy should primarily be produced from bio-waste and residues that cannot be used in other ways. Another option is to replace intensively cultivated energy crops with flowering crops than can be exploited for energy. However, all nature-friendly possibilities need additional constraints to be consistent with the protection of nature and the environment:

**Residues**

- → Bio-waste has the greatest potential but is normally only nature-friendly when waste is first used for energy in fermentation plants and subsequently composted.
- → Yard waste can be exploited for energy if there are no options for use as a material.
- → The use of straw has potential if the formation of topsoil on agricultural land is secured. However, the utilisation of straw as a material (e.g., for insulating boards) should be preferred in the spirit of cascading use. Furthermore, the demand for straw as bedding and feed for animals must always be covered, caveating that we need to progressively reduce the sizes of the herds.
- → Green waste and hedge trimmings from garden and park maintenance should be composted, surplus amounts can be used for energy.

**Cultivated biomass**

- → The cultivation of flowering crops and species-rich flowering mixes[15] for bioenergy is a nature-friendly alternative to intensively cultivated maize, if part of the land is left unharvested. This is necessary to avoid creating an ecological trap by mowing for the organisms living on the meadow, e.g., insects.
- → Short rotation plantations[16] can very successfully be used as structuring elements on large intensively managed crop land. Planting superior quality groves, e.g. fruit trees gives added value to these hedges. Still, production of materials should be given precedence over energy production.

## Applications for a nature-friendly bioenergy

[15] For further recommendations see tab in the Annex

[16] By short rotation plantation, we exclude the problematic short rotation coppice or willow plantations which would present the same negative impacts on biodiversity as the energy crops.

Bioenergy is more useful when it is rolled out as a flexible, storable energy source to complement the volatile wind and solar energy production. Nature-friendly bioenergy can be used in the following cases:

**Decentralised energy supply:** When bioenergy is used where it is produced, emissions from transport can be reduced to a minimum.

Supplying villages, communities and neighbourhoods with local heating is a sensible and efficient option, if CHP plants (CHP – combined heat and power) coupled with biogas plants are nearby, for example bio-waste fermentation plants at the outskirts of settlements or biogas plants in rural areas. In many places, local heating networks already exist that can be run on energy from bio-waste. But there is ample potential left that can be raised with diverse measures, such as better coverage with bio-waste containers.

Power produced in CHP plants can be used both locally as well as in a decentralised way or can be fed into the grid. Adding a gas storage facility to biogas plants enables a needs-based power supply, for example at times when too little wind and solar power is produced. Through the decentralised flexible power availability, supply shortages can be balanced out in a targeted way on the regional level as well.

Due to its limited quantities, nature-friendly bioenergy can only be used in regional energy supply systems for heat and possibly also power in combination with other energy sources, like wind and solar energy. At the conception of a regional energy supply system, the share of bioenergy should be limited to biogas from waste, flowering cultures and residues as well as wood left over from landscaping.

In rural areas, wind and solar energy in conjunction with biogas from nature-friendly available biomass are a viable option. For municipalities and the provision of city neighbourhoods, possible power sources could include rooftop solar cells, process and wastewater heat in conjunction with biogas as well as residues from garden and park maintenance.

**Local use - exceptional cases:** Using bioenergy to provide heating for buildings should always remain an exception and be limited to the bare minimum necessary, e.g.:

- for the heating of existing historic buildings and single buildings in remote locations as well as agricultural holdings
- when wood is locally available in small quantities and old small-scale furnaces are replaced with high-efficiency furnaces retrofitted with effective waste gas cleaning systems as an interim measure to minimise emissions and fine particulate matter pollution

# Annex

Table summarising the requirement regarding sustainable feedstocks for bioenergy production

| Biomass from agriculture and landscape conservation | Requirements |
|---|---|
| **Perennial flowering crops** | • Only when the areas get upgraded<br>• At least 10% have not to be mowed |
| **Subseeds / Intercrops** | • Humus buildup must be ensured |
| **Liquid manure** | • If it is not accompanied by an increase in livestock and originates from land-based livestock production<br>• No spreading of contaminated digestate on the field<br>• Fertilization with digestate must be adapted to the nutrient requirements of the plant |
| **Crop residues from arable farming** | • Energetic use only if humus formation is guaranteed<br>• Digestate must be spread on the field |
| **Mown material from grassland** | • No competition with extensive grazing and forage<br>• Mowing max. two times per year<br>• Rest interval of at least eight weeks<br>• No intensification of grassland |
| **Mown material from landscape maintenance** | • Priority of use by grazing and forage production or material use<br>• Timing and frequency of mowing must be aligned with the protection goal<br>• Mowing max. two times per year |
| **Mown material from fallow and flowering areas** | • Mowing September the earliest<br>• Do not mow at least 30% of the growth |
| **Paludiculture** | • Only local energetic use of surplus quantities or if no material use is possible |

Source: www.nabu.de/Hintergrund-Biomasse