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Bioenergy Out: Why bioenergy should not be included in the next EU Renewable Energy Directive

By NOAH (Friends of the Earth Denmark), Biofuelwatch, Econexus, Global Forest Coalition, World Rainforest Movement, Rettet den Regenwald/ Rainforest Rescue, and Corporate Europe Observatory

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- Dogwood Alliance (Enviva Pellet Plant in North Caolina)
- Global Forest Coalition (Soya Plantation in Paraguay)
- Rettet den Regenwald e.V.

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Renewable energy legislation such as the EU Renewable Energy Directive (RED) aims to significantly scale up forms of energy classed as renewable, with the stated aim of reducing greenhouse gas emissions. There has been a lack of critical debate about the definition of renewable energy to date. According to the International Energy Agency, renewable energy is "energy derived from natural processes (e.g. sunlight and wind) that are replenished at a faster rate than they are consumed" (1)

Large-scale industrial bioenergy does not meet this definition because it relies on a major expansion of industrial agriculture, monoculture tree plantations, and industrial logging, which deplete and pollute soils and water, destroy natural ecosystems and biodiversity, and destroy the livelihoods of many millions of people, particularly in the global South.

Furthermore, large-scale industrial bioenergy cannot meet the EU's stated aim of reducing emissions of greenhouse gases (GHG) because it leads to emissions of carbon and other greenhouse gases that are commonly greater than those from the use of fossil fuels.

Nevertheless, within the EU's overall renewable energy target, bioenergy competes with more sustainable and climate-friendly renewable energy rather than with fossil fuels.

This briefing makes the case for taking bioenergy out the new EU Renewable Energy Directive for 2020-230.

1. Bioenergy in the EU: large-scale, and dependent on subsidies

Misguided EU attempts to reduce fossil energy use without addressing its energy model have led to a renewable energy policy with perverse outcomes. The EU is currently leading a global expansion in industrial bioenergy use and the

What is bioenergy?

In the EU and in various other countries, including in the US, most energy classed as renewable comes from bioenergy. Bioenergy includes biofuels, used mainly in cars, such as ethanol from corn, sugar cane or wheat, or biodiesel from rapeseed oil, soya or palm oil. It also includes burning wood in power stations to produce electricity, in combined heat and power plants, which produce both heat and electricity, and in boilers and stoves to provide heat. Whilst wood accounts for most of the biomass burned for heat and electricity, smaller quantities of agricultural residues such as straw or chicken manure or, in tropical countries, residues from sugar cane or palm oil residues are also burned for electricity and heat. 'Energy crops' such as miscanthus and switchgrass are being promoted as another source of large-scale bioenergy, but have not yet been grown and burned in significant quantities. Finally, some bioenergy comes from anaerobic digestion of biomass to produce biogas, which can be used in some cars but is mainly for heat and electricity. Biogas can be produced from manure, food waste and other waste and residues and from grasses (silage), but in the EU, most of it comes from maize, grown in monocultures.

In the global South, around 2 billion people depend on biomass, mainly wood, for meeting basic energy needs - particularly for cooking. This form of bioenergy is classed as 'traditional biomass'. This briefing, on the other hand, focuses entirely on the large-scale use of industrial bioenergy, as described above.

rapid development of a global trade in biofuels and wood-based bioenergy. Bioenergy and 'waste' accounted for two-thirds of all energy classed as renewable in the EU in 2012 (2).

The EU is the world's largest producer and consumer of wood pellets (burned for heat and for electricity) and imports well over 90% of all globally traded wood pellets (3). The EU is also the world's biggest producer of biodiesel (including biodiesel made from imported soya and palm oil) and EU ethanol use is also expanding rapidly, having grown more than threefold from 2006 to 2012 (4).

EU demand for biofuels, and increasingly for wood-based bioenergy, is driving a large share of land-grabs in the global South (5). ActionAid reported that by May 2013, 98 European investors had acquired 6 million hectares of land in sub-Saharan Africa ostensibly for biofuel production for the EU (6). The EU's growing demand for biofuels and biomass is being used by land-grabbing companies to secure land for investment and to procure long, cheap leases, whether or not there is any realistic prospect of biofuels production. Many supposed 'biofuels land-grabs' have been of a purely speculative nature. Indeed, no significant amounts of biofuels or biofuel feedstocks from Africa have been imported by the EU.

Industrial bioenergy use is now growing significantly in other regions, too - especially in North America, but to a smaller extent also in countries such as South Korea and Brazil. Policies to promote its large-scale expansion are being promoted in Australia, Japan and elsewhere (7). EU renewable energy policies are frequently cited as an example by those promoting industrial bioenergy worldwide.

The EU and many other countries include bioenergy in definitions of renewable energy, and thus make it eligible for subsidies. These include feed-in tariffs, tradable renewable energy certificates, tax reductions and exemptions, and blending and co-firing obligations. In addition, many energy and environmental organisations do not distinguish between different forms of energy classed as renewable when calling for a transition towards a fossil fuel-free society. This further legitimises government support for bioenergy, even though the classification as renewable is misleading. From the point of view of energy companies, bioenergy, once eligible for renewables subsidies, has significant advantages over more sustainable and lower-carbon forms of renewable energy: It fits into existing fossil fuel infrastructure, can be burned in the same power stations as coal or blended with fossil transport fuels and it allows energy companies to enter into new corporate partnerships and to even profit directly from land investments, including land -grabs.

In its support for large-scale bioenergy, the EU continues to use flawed UNFCCC greenhouse gas accounting rules, under which emissions from burning biofuels or biomass are ignored entirely. Emissions from 'land use change' and forest degradation are supposed to be accounted for by the countries where they happen - but that means that all biofuels and wood pellets imported into the EU are falsely classed as carbon neutral.

2. The need for System Change

The societal model of the EU (and other regions) relies on unsustainably high levels of energy use, based on the depletion and destruction of natural resources, both for fossil fuels and for bioenergy, for which soils, forests and freshwater are effectively 'mined'. It relies on large-scale land and resource-grabbing, the impacts of which are increasingly felt in the global South.

The EU's unsustainably high energy use goes hand in hand with an economic model that

relies on economic growth at all costs - and with unsustainably high use of natural resources for other purposes, including excessive demand for wood (e.g. for paper) and for agricultural commodities, especially for meat and dairy.

There is an urgent need to fundamentally change the existing energy and resource intensive and growth-oriented economic model - rather than for finding new ways of avoiding change by supplementing fossil fuels with new forms of destructive energy whilst manipulating definitions and figures. The EU has clear responsibilities to other parts of the world and must respect people's rights by ensuring that it does not incentivise land and resource grabbing and that it shrinks rather than increases its land footprint. Bioenergy has the potential to be particularly pernicious in this respect. To establish targets and incentives for an energy source that is not genuinely renewable and that has serious impacts on land, soil, water, climate and people in other parts of the world is unacceptable.

Furthermore, EU policy makers and many key players in the bioenergy sector are looking towards a much broader future bio-economy strategy. As part of this, biomass would be used not just in power stations, for heating and to fuel cars, but also to supplement fossil fuel use in the production of chemicals and other commodities and products. As with biofuels and wood-based bioenergy, the underlying premise is that endless economic growth can and must be sustained, and that we can resolve the climate crisis by simply substituting biological for fossil energy sources. This misguided approach distracts attention from real solutions, which must address the grossly unsustainable over-consumption of energy and resources by industrialised countries.

3. The Impacts: How industrial scale bioenergy is harming communities and ecosystems as well as the climate

Bioenergy, especially biofuels for transport and biomass used for electricity, has by far the greatest land footprint per unit of any energy source (8). For example, well over 30 million hectares of land worldwide (9) are used to grow feedstock for biofuels for transport, but biofuels still only account for 2% of global transport fuel (10). As well as a large land footprint, bioenergy puts a particular strain on freshwater and soils fertility. This is leading to soil depletion and erosion, increasing use of agro-chemicals, which pollute waters, damage ecosystems and biodiversity and often poison communities. On top of this, the climate impacts of bioenergy are often worse than the fossil fuels they are meant to replace.

Due to its disproportionately large land footprint, the impacts of large-scale bioenergy on communities are also particularly grave.

Land-grabbing, displacement and other injustices suffered by communities in 'producer' countries:

The inherently large land footprint of bioenergy makes it a prime driver and justification for land-grabbing and for the abuse of communities' rights to land, food and water worldwide, and especially in the global South.

Palm oil and soybean oil are major biofuel feed -stocks imported by the EU. Oil palm expansion is responsible for large-scale land-grabs and the destruction of livelihoods of Indigenous Peoples, other forest-dependent peoples and small farmers in a growing number of countries, including Indonesia, Malaysia, Papua New Guinea, Philippines, Cameroon, DR Congo, Liberia, Nigeria, Sierra Leone, Colombia, Ecuador, Honduras, Guatemala, and Mexico. Soya expansion, supported in part by the growing use of soya oil for biofuels, is responsible for the displacement of Indigenous Peoples, traditional communities

and peasant farmers in several South American countries.

Other injustices associated with large-scale tree and crop monocultures, including those used for bioenergy generation or justified by bioenergy policies, include:

- Poisoning of workers and neighbouring communities with pesticides and other agro-toxins;
- Adverse effects on the local climate, lack of shade, changes in rainfall and increase in zoonotic diseases due to the alterations in vegetation and human population patterns when forests are transformed to plantations and other monocultures;
- Abuse of labour rights and harmful and exploitative working conditions on plantations;
- Small farmers being pressurised into contract-farming agreements, incurring debts and losing their ability to choose what to grow on their land;
- Loss of food sovereignty, in many cases resulting in hunger and malnutrition;
- Particularly serious impacts on women: Differentiated gender impacts mean that land-grabbing and the conversion of land to monoculture plantations commonly results in an increased work load for women (e.g. having to walk longer distances to procure firewood, water and other key resources for their households' livelihoods), and also in an increase in violence against women (11).

Furthermore, land-grabs are often associated with water-grabs, where river diversion and over-extraction of freshwater to irrigate monoculture plantations further undermines food sovereignty.

Biofuels and food price volatility:

The competition for land caused by a growing demand for biofuels has been one of the major causes of food price volatility and food price spikes in recent years. Biofuels have been responsible for most of the increased global growth in demand for cereals and in particular vegetable oil, with a significant impact on prices (12). Increased production of biofuels goes hand in hand with increased production of animal feed, with the growth of one re-enforcing the other.

Food price volatility makes small farmers more vulnerable and contributes to food insecurity. This was shown to be the case in 2007/08, when spikes in food prices were linked to a steep increase in food insecurity and incidence of malnutrition

Bioenergy, air pollution and public health:

The health of communities is impacted at every stage of the production of bioenergy. Where wood is burned in power stations, resident communities are exposed to a wide-range of damaging pollutants like particulates, nitrogen dioxide, dioxins and furans and heavy metals that impact public health and reduce quality of life as well as life expectancy (13).

Forest destruction, industrial tree plantations and monocultures of crops grown for biofuels cause adverse impacts on water resources and are responsible for the pollution of environments through toxic pesticides and fertilisers.

Wood chipping and pellet production facilities, as well as other processing infrastructure, expose communities to toxic wood dust, noise, and the risk of fires and explosions.

Forest destruction/degradation and biodiversity losses due to more industrial logging for biomass:

A large proportion of wood-based bioenergy in the US comes from the logging of biodiverse forests. In 2014, 4.4 million tonnes of pellets were produced from nearly 9 million tonnes of wood from the south-eastern US, with three-quarters of those pellets going to the UK (14). US conservation organisations and scientists have documented extensively how pellet producers are sourcing wood from clear-cut hardwood wetland forests, which are some of the most biologically diverse temperate forest and freshwater ecosystems in the world (15). With more and more pellet mills opening in the region and demand from the EU growing exponentially, the scale of these impacts will multiply.

The second biggest exporter of pellets worldwide is Canada. The Wood Pellet Association of Canada has warned the EU that a prohibition on wood pellets sourced from primary forests would be 'catastrophic for Canada' - i.e. for their members, thus acknowledging that old-growth forest logging is a key source for Canadian pellets (16).

In many cases, logging, including for wood pellets, has been described as 'salvage logging' of beetle-infested forests, even though infested forests recover and sequester carbon much better and faster without logging (17).

Biodiversity and ecosystem destruction for bioenergy monocultures:

Between 1980 and 2000, 80% of agricultural expansion in the tropics was at the expense of forests (18), and there is no evidence that this trend has changed since. Oil palm and soya expansion have been major causes of deforestation. For example, between 2000 and 2010, at least 1.6 million hectares of Indonesian rainforest were converted to oil palm plantations, and palm oil was shown to have been the single largest cause of deforestation in Indonesia from 2009-2011 (19). Similarly, soya expansion has been a key driver of deforestation for example in the remaining Atlantic Forest of eastern Paraguay and northern Argentina, as well as in the Brazilian Cerrado ecosystem. Grasslands, peatlands and other vital ecosystems are also targeted for conversion to bioenergy crop and tree monocultures, including in Europe. Biodiversity is further diminished as current and expected future demand for bioenergy creates new incentives for further expansion of monoculture plantations.

Bad for the climate:

A growing body of evidence shows that, when bioenergy is produced and used on a large scale, it is neither 'carbon neutral' nor 'low-carbon'. Large-scale bioenergy commonly increases rather than decreases carbon emissions when compared to fossil fuels (20).

For example, burning wood generates up to 50% more upfront carbon emissions per unit of energy generated than coal. Many studies confirm that energy from burning wood often results in more carbon emitted into the atmosphere than from generating equivalent amounts of energy from fossil fuels when considered over a period of many decades (21). Furthermore, once logged for biomass and other purposes, forests are often not allowed to regenerate but are converted to monoculture plantations that are falsely classed as forests. When this happens, much of the carbon released from logging will never be reabsorbed by new forest growth. Trees and forests are a vital carbon sink, helping to buffer the impacts of climate change globally. Burning vast quantities of wood means emitting carbon to the atmosphere instead - exactly where it shouldn't be.

Similarly, biofuels from large-scale

monocultures have been shown to result in greater greenhouse gas emissions than the oil they are meant to replace. This is due to the large-scale carbon emissions from direct and indirect land use changes, as well as nitrous oxide emissions resulting from greater nitrogen fertiliser use (22).

The high carbon intensity of bioenergy is not reflected in climate talks or discussions about renewable energy legislation. Rather than drawing a line under the failed bioenergy experiment, the EU and European energy companies continue to seek ways to justify support for increased bioenergy use.

Incentivising a new high-emission industry under the guise of clean energy is not acceptable.

Local and small scale: the only way to use bioenergy without harming soils, ecosystems and freshwater

Some rural communities have found ways to sustainably use local biomass to meet limited local energy needs. However, this is no justification for including bioenergy in renewable energy policies, where scaling up is the primary objective.

4. Why greenhouse gas and sustainability standards cannot make bioenergy sustainable

Sustainability and greenhouse gas standards are the main policy tools discussed by the EU and UN for mitigating the impacts of bioenergy. They have already been introduced for liquid biofuels in the EU. However, there are many reasons why these tools are flawed:

- **Standards and certification cannot address fundamental issues: the scale of demand, and the scale of exploitation.** Instead, certification helps to legitimise such destructive models and over-exploitation by providing false reassurances.
- Scientific analysis can broadly estimate the overall climate impacts of increased fertiliser use, the conversion of land to monocultures, or the logging of forests for biomass. However, greenhouse gas standards rely on figures agreed by political rather than scientific consensus (as in the case of EU biofuel standards), or on unscientific attempts to translate highly complex, interactive and largely unpredictable indirect impacts into carbon figures for specific assignments of bioenergy feedstock.
- Under trade liberalisation rules set out by the World Trade Organisation (WTO) and existing and proposed bi- and multilateral trade agreements, renewable energy subsidies cannot 'discriminate' in favour of local biomass used to meet local needs. Furthermore, such rules mean that standards would likely be negotiated down to the lowest common denominator. Fear of possible WTO litigation was cited as a reason for the decision to exclude all social, including human rights, standards in the EU's biofuel "sustainability" standards (23).
- **No regulatory body exists in the EU or elsewhere which has the capacity to verify, audit and sanction bioenergy supply chains** and confirm their compliance with EU biofuel or future EU biomass standards (should the latter ever be introduced). Standards and certification rely on private contracts between energy companies and consultancies of their choice, a process that is highly susceptible to fraud.

- **The indirect impacts of bioenergy** are more extensive than the direct impacts. They include what is commonly described as Indirect Land Use Change (ILUC) as well as damage done by speculative land-grabs. In addition, infrastructure investments resulting from the enthusiasm for bioenergy include investments in roads through forests, river diversions, and new ports, all of which can increase deforestation. Other indirect impacts include policies promoted in the global South to support bioenergy and other monoculture investments that also undermine community land rights. These impacts cannot be addressed through standards.
- **Flexible crops (and trees),** suitable for a whole number of applications and purposes and increasingly prevalent with the growth of the bioeconomy, cannot be adequately addressed through bioenergy standards either. For example, soya and maize are flexible crops because they are used for animal feed, human food, and many industrial applications, as well as for biofuels. Wood from the same tree plantations can be used for pulp and paper production or for bioenergy. Each of these industries helps to support and perpetuate the others, and standards for one will not address this.

At best, sustainability standards are a distraction from the impacts of the biomass industry that are already being felt, and at worst, participating in these processes legitimises the industry and actually becomes a driver of it, by persuading the public to think that consumption of these products, commodities and utilities is sustainable.

Standards designed to apply to a specific load of biomass or biofuel, but not limiting or addressing industry expansion as a whole, cannot assure sustainability when it is the scale itself that is unsustainable.

4. What would be the effect of excluding bioenergy from the next EU Renewable Energy Directive?

The EU Renewable Energy Directive (RED) is the main driver of the current global market in biofuels and of the emerging global market in wood-based bioenergy. Excluding bioenergy from the RED after 2020 would exclude bioenergy from renewable energy subsidies, quotas and other incentives across the EU. It would make large-scale bioenergy investments, including in biofuel refineries and biomass power stations, economically unviable and lead to a major contraction in the global trade in bioenergy. EU use of biofuels and biomass on a large-scale would also contract significantly.

In turn, this would allow the EU to comply with the Convention on Biological Diversity (CBD) and its Aichi Target requirement to reduce or phase out subsidies that are harmful to biodiversity. This is important since subsidies are a major support for bioenergy, just as they are a major support for fossil fuel and since removing them could force major policy change in the EU as well as curbing the global trade in wood pellets, biofuels, and biofuel feedstock.

Excluding bioenergy from renewable energy policies would not preclude support for small-scale, rural, and local bioenergy projects. Community-scale projects are commonly disadvantaged in renewable energy policies, which tend to favour large energy companies and large-scale supply chains. Small-scale, rural bioenergy projects that have received support have often done so through different mechanisms, such as through the EU Regional

Funds and rural development funds, rather than through renewable energy subsidies.

Conclusion

This briefing outlines how the EU is promoting industrial bioenergy and supporting it with subsidies, claiming that it is a sustainable alternative to fossil energy sources even though industrial scale bioenergy is harming communities and ecosystems around the world. It is not carbon neutral as often claimed, so it is also harming the climate. It is polluting water supplies and degrading soils. It promotes land-grabbing and the destruction of forests for monoculture agriculture and plantations – and is generating land speculation at the expense of local people's rights. At industrial scale, it can generate higher carbon emissions than fossil fuel. By taking land away from food production it has the potential to increase the price of food with serious impacts as happened with biofuels in 2008.

Thus we see that the scale of industrial bioenergy is a problem in itself. This means that standards and certification cannot ensure sustainability because they apply only to specific loads of biomass or biofuel, and have no impact on scale and expansion. On the contrary, they may add to the problem by legitimising large-scale bioenergy use in the eyes of the public. In the EU, bioenergy tends to compete with less carbon-intensive renewable energy forms such as solar power, rather than with fossil fuels, because it fits into the current infrastructure for the latter, so hindering real change.

Bioenergy can only be produced and used sustainably on a local and small scale basis. This cannot be appropriately regulated under current EU legislation, but needs to be managed at local level.

EU energy policy stands at a cross roads. One path could see a major reduction in energy consumption with all the changes in current development models which that implies, and the other would mean continuing to promote the same model of energy consumption through false renewables, especially bioenergy. The first would present a genuine chance of achieving substantial emissions reductions as well as reducing the EU's impact on people and ecosystems globally. The other would mean continuing to cause all the problems described in this briefing without addressing climate issues.

As a major exploiter of resources elsewhere in the world, and as a grouping of industrialised countries that bear great responsibility for the climate and biodiversity crises currently facing the planet, EU nations must act now to radically alter the course of our energy systems.

A positive step and a good signal for the rest of the world would be to recognise the devastating impacts of large-scale bioenergy on people, ecosystems and the climate, and exclude bioenergy from definitions of renewable energy and from the next EU RED.

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