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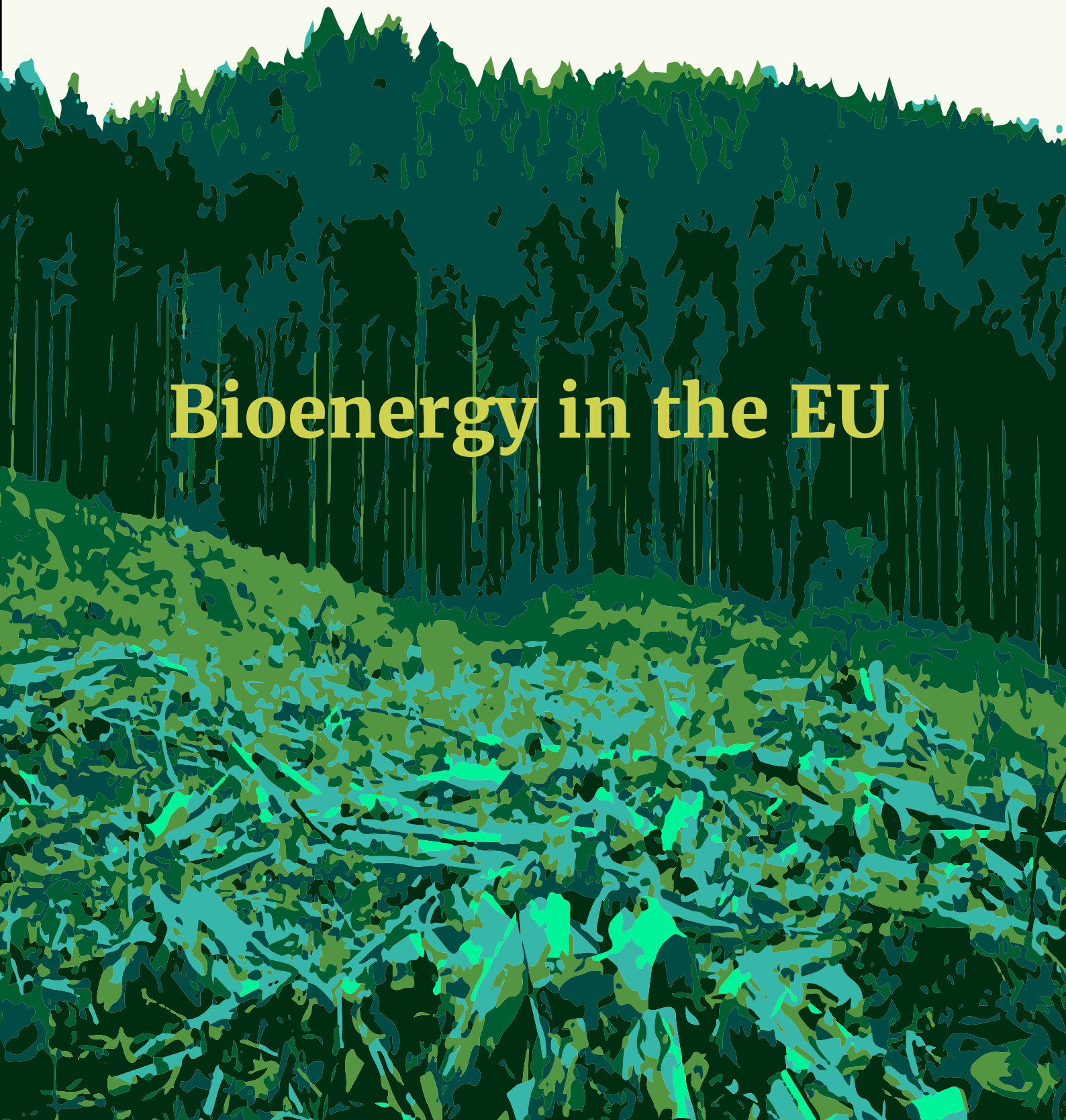

Bioenergy in the EU

A joint campaign by TNI, European Coordination Via Campesina, FIAN International, EHNE Bizkaia, Terra Nuova, Crocevia, FDCL, FIAN Germany, FIAN Belgium, FIAN Austria, FIAN Netherlands, FIAN Sweden, IGO, Ecoruralis, Za Zemiata and Védegylet

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Acknowledgements: Thanks to Jutta Kill for excellent peer review work, Brigitte Reisenberger for submitting interesting case study material, and Katie Sandwell, Lyda Fernanda and Sylvia Kay for their editorial assistance.

Published by TNI for the Hands on the Land alliance

Amsterdam, December 2016

Produced with financial support from the European Commission.
The views expressed herein are those of the publisher and not of the EC.

Executive Summary

The European Union's approach to bioenergy is shaped by contradictory policies. Climate concerns are highlighted in public discourse and assure broad public support for renewable energy, including bioenergy. Meanwhile, however, the EU's corporate growth and trade agenda promotes the use of energy that, while it might be considered 'renewable' in technological terms, actually significantly increases the EU's footprint on land elsewhere, with significant implications for environmental and social justice. This is because the EU growth and trade agenda is geared towards renewable energy generation that, in the case of bioenergy, relies on large-scale imports of biomass produced in monoculture plantations for the sole purpose of energy consumption in the EU. What is lacking in the policy mix is a focus on reducing total energy consumption in the EU. In the absence of such a commitment, support for renewable energy tends to perpetuate the kind of corporate control over energy production and consumption that has brought about the climate, biodiversity, water and environmental crises we face today. A key flaw of EU bioenergy policy is, thus, that it fails to ask what kind of energy, and what kind of energy consumption, would be needed to make EU energy consumption truly sustainable. Instead, it is fixated on numerical targets and advancing energy technologies 'at scale' within the existing framework of corporate control.

As a consequence of these conflicting policy priorities, EU bioenergy production is leading to increased, not reduced, greenhouse gas emissions compared to fossil fuel burning. In addition the reliance on large-scale monoculture plantations to produce biomass for energy generation is damaging biological diversity and increasing pressure on scarce land and water resources. EU bioenergy targets have led to a significant and growing share of biomass for energy being imported to the EU from countries in the global South, as well as from regions rich in natural forests, such as Canada, the United States and Russia. The targets have triggered large-scale acquisition of land for the production of bioenergy to be consumed in the EU. This not only increases the EU's ecological footprint abroad but also heightens the risk of human rights abuses, land and resource grabbing, poverty, and erosion of food sovereignty, particularly in fragile and biologically rich habitats and in disputed territories marked by competing claims over access rights and ownership.

Experience with EU bioenergy targets has shown that, in order to contribute to a just energy transition, renewable energy development needs to be guided less by blanket endorsement of specific technologies and more by policies that consider social and environmental conflicts throughout the production chain and ask who controls the production of both the raw materials and the technologies that produce energy marketed as renewable.

Glossary

Agricultural residues

Biomass unsuitable for direct human food use such as straw, stalks, leaves, husks etc. from e.g. maize, wheat and rice or other agricultural crops. Agricultural residues can be used for bioenergy production but, as with use of *forestry residues* and *forest thinnings*, this reduces the amount of organic matter left to decay in the soil and enhance soil structure and fertility. Across the globe, soil organic matter is decreasing on agricultural land, which contributes to climate change and increases the risk of soil erosion and depletion.

Agrofuel (Biofuel)

Liquid fuels derived from agricultural or forestry biomass, either fresh biomass or organic waste. Although fossil fuels have their origin in ancient biomass, they are not considered agrofuels by the generally accepted definition because they contain carbon that has been out of the carbon cycle for a very long time. Agrofuels are mainly used in the transport sector, especially *agrodiesel* and *agroethanol*.

In EU policy documents, and elsewhere, these fuels are often referred to as 'biofuels'. The replacement of the usual prefix 'bio' with 'agro' has been promoted by La Via Campesina Internacional. As Joao Pedro Stedile said 'there is a big manipulation by the capital, by adding the prefix 'bio' to the fuels from vegetable sources. The 'bio' prefix means life. Therefore, in La Via Campesina Internacional, we agreed to use the real concept: fuels or energy, produced from agriculture.'[1] This paper follows the usage suggested by La Via Campesina.

Agrodiesel (Biodiesel)

Diesel made from vegetable oils extracted from rapeseed, soy, oil palm, sunflower and algae, among others. Animal fats from the meat industry as well as used cooking oil from restaurants and the by-products of the production of Omega-3 fatty acids from fish oil can also be used as feedstock for agrodiesel. In order to avoid competition with food production, Pongamia and Jatropha have been promoted as they produce non-edible oils and can grow on marginal land. However, the yields of these two plant species have been shown to be considerably higher when they are grown on fertile soils, in which case they compete with food production. Agrodiesel can be used as a fuel for vehicles in its pure form, but is usually blended with fossil diesel. Agrodiesel is the most common liquid agrofuel in Europe, where it is used to meet the mandatory targets for renewable energy in the transport sector. It is also used in heat and power plants as a substitute for fossil oil. Rape seed, soy and oil palm are the most widely used crops to produce agrodiesel at an industrial scale.

Agroethanol (Bioethanol)

Ethanol (as well as propanol and butanol) produced by fermenting sugar into alcohols that can be used as fuel, mainly in vehicles. Agroethanol is the most widely used. A range of crops with a high sugar and/or starch content such as sugarcane, maize, sugar beet, wheat, cassava and sweet sorghum are used as raw material for producing agroethanol, with sugar and maize being the most popular for industrial use. Sometimes by-products such as molasses, a by-product in sugar production, are fermented to produce agroethanol. Agroethanol produced from easily degradable sugars and starches is referred to as first generation. This is usually derived from food crops and therefore competes directly with food production. In order to avoid the competition with food, many experiments have been carried out to produce enzymes able to break down the cell walls of lignin, cellulose or hemi-cellulose from e.g. trees or straw. Agroethanol based on these non-food sources is referred to as second generation. This is not economically viable at present although the industry has claimed to be (nearly) ready to produce it for the last decade.

Bioenergy

Energy released when recently grown *biomass* (e.g. wood or agricultural crops) or biomass products (e.g. *wood pellets*, *agroethanol*, *agrodiesel* or *biogas*) are burned. Although bioenergy has been the primary source of energy since man discovered fire, industrialisation as we know it could never have happened if coal had not been introduced as the new primary source of energy for industry in the beginning of the 17th century, at a time when trees and forests had become scarce across Europe due to overconsumption. There is a contradiction in the fact that wood is once

again being substituted for coal in large quantities, promoted especially in Europe as a 'renewable' source of energy, at a time when energy consumption is many times higher than the rates which caused serious continental shortages in the 17th century. Proponents claim that 'modern' use is much more efficient than 'traditional' use and can therefore be justified. However, the efficiency is debatable and it is beyond doubt that biomass resources globally are very limited relative to the huge demand for this resource.

Biofuel (see Agrofuels above)

Biogas

Gas produced when microorganisms digest organic material in anaerobic conditions (i.e. in the absence of oxygen). Biogas is made up of approximately 2/3 methane and 1/3 carbon dioxide and possibly small amounts of other gases. Animal manure, slurry, organic waste from households and industry, and residues from agriculture are the primary sources for biogas production. In industrial agriculture, biogas is seen as viable way to avoid nuisance odours and reduce methane emissions from slurry tanks while at the same time producing energy and providing additional income to farmers. However, for economically viable production, plant material from waste crops or crop residues must be added. When crops such as maize are added (which is frequently the case in Europe) life cycle emission accounting has shown that the production is problematic in terms of greenhouse gas emissions. Biogas can be used as a transport fuel or as a replacement for natural gas in heat and electricity production. The by-products may be used as fertiliser on agricultural soils.

Biomass

Any organic matter that can be processed to produce energy. Biomass is defined by the EU as 'the biodegradable fraction of products, waste and residues from biological origin from agriculture (including vegetal and animal substances), forestry and related industries including fisheries and aquaculture, as well as the biodegradable fraction of industrial and municipal waste'.[2]

Bio-plastics

Plastics made from biomass, rather than petroleum. They are produced through different processes; some use microorganisms to process vegetable oils, cellulose, starches, acids and alcohols into bio-plastics. Bio-plastics release carbon dioxide or monoxide when degrading. Some bio-plastics can break down in as few as 180 days, given the right conditions, while others are not biodegradable at all.

Energy crops

Plants grown to be used for energy production. They are processed into agrofuels, or are burnt directly to generate electricity or heat. Monocultures of willow, eucalyptus, acacia, pine, miscanthus or switchgrass are examples of energy crops grown in different parts of the world where they often occupy land that used to be natural grass-land, forest, or agricultural land for food production.

First-generation agrofuels

First-generation agrofuels are made from the sugars, starches and vegetable oils found in edible arable crops (see also agroethanol and agrodiesel for commonly used crops). Conventional technologies are used to extract the sugars and oils. When taking all emissions from production (including from the intensive agricultural production, from *Land Use Changes* and *Indirect Land Use Changes*) and transport into account, life-cycle emissions from first-generation agrofuels in many cases exceed those of traditional fossil fuels. See also *Second-generation agrofuels*.

Flex crops

Flex crops are commodities with multiple and/or flexible uses: as food, animal feed, fuel, or for other commercial-industrial uses. Flexibility increases as new technologies and industrial pathways are developed. 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 agrofuels and their use can be changed according to needs and profitability. 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 maintain the others. Large-scale monoculture plantations of soya, sugarcane, palm oil, corn, cassava, and trees are increasingly grown as flex crops. The fact that these crops have multiple uses makes it less economically risky to produce, or invest in the production of, these crops.

Forestry residues

When trees are felled e.g. for timber production, it was common practice to leave the top and branches to decompose on the forest floor, thereby contributing to biodiversity as well as to carbon sequestration in the soils below the forests (thereby creating a carbon sink). Some residues are used for e.g. chipboard production. When residues are used for energy-production in the form of wood chips or wood pellets, as is increasingly the case, the positive impacts of decaying wood are lost.

Forest thinning

The practice of cutting some trees within a managed forest or tree plantation; originally aimed at increasing timber yields. With increased focus on reducing the ecological impact of forest management for timber extraction, forest thinnings have also been used for various other reasons such as removing non-native species. Since the 1970s, leaving thinned trees on the forest floor had become increasingly common, allowing wood to decompose in the forest and play an important role in biodiversity protection, forest soil fertility maintenance and carbon sequestration. Increased use of forest thinnings for energy production tends to lead to less wood being left to decompose in the forest.

Land Use Changes

An example of direct Land Use Change (LUC) is the conversion of grassland or forest to cropland or monoculture tree plantations for bioenergy production. Indirect Land Use Change (ILUC) occurs when, for example, land previously used for food production is used to grow energy crops – and food production therefore moves elsewhere. This may result in deforestation and land use changes in other regions. Such indirect land use change is rarely fully tracked and 'indirect' carbon emissions that result from such indirect land use change are usually not considered in greenhouse gas emission balances of bioenergy production.

Residues

See: Agricultural residues or Forest residues.

Second-generation agrofuels

Second generation agrofuels, by proponents referred to as 'advanced biofuels', are made from lingo-cellulosic biomass, algae or waste. Extracting *Agroethanol* from the lingo-cellulose part of plants is more difficult than extracting sugars for processing into so-called first-generation agrofuels. For second-generation fuels, a series of physical and chemical treatments, facilitated by special enzymes, is required to convert lingo-cellulosic biomass to liquid fuels. Feedstock for the lingo-cellulosic biomass include agricultural residues such as straw, by-products such as bagasse, *forest residues*, and dedicated *energy crops* such as vegetative grasses and short rotation plantation trees. It is claimed that the problems associated with first generation agroethanol derived from food crops can be addressed by using these second generation agrofuels derived from non-food feedstocks. However, these uses exacerbate the depletion of soil organic matter and, where specialist energy crops are grown on arable land, fail to address the issue of competition for land. Moreover, questions of energy efficiency, economic viability and technological challenges remain. When talking about second generation *agrodiesel*, organic industrial waste e.g. from the meat industry, as well as the collection of used cooking oil, are often highlighted as sustainable examples. However these sources are quite limited. Future production of oil from algae has been proposed, but has not been shown to work at scale.

Wood pellets and wood chips

Wood pellets and wood chips can be made from wood waste (such as sawdust and shavings) but are increasingly produced from trees specifically cut for the production of pellets. The wood is dried, mechanically shredded to size, and, in the case of wood pellets, compressed under high pressure.

Note: terms that are italicized are described in the glossary above.

Introduction

Renewable energy, generally speaking, enjoys broad public support within the EU. This support, however, should be understood in the context of a government-led public dialogue about renewable energy in Europe which has portrayed solar panels and wind turbines, rather than *bioenergy,*[3] as the main sources of renewable energy in Europe, supplemented by bioenergy from *agricultural* and *forestry residues*, wood from *forest thinnings* and waste from e.g. sawmills or paper production. The role of bioenergy, and therefore its potential impacts, has been dramatically under-addressed in public discussion. The portrayal of wind and solar power as the central drivers of renewable energy in Europe has contributed to the broad public support renewable energy on the whole currently enjoys. However, this image does not reflect the reality of 'renewable' energy generation in the EU today.

Within this context, bioenergy was presented to EU citizens as better for the climate than energy produced from burning fossil fuel. It was said to be 'carbon neutral', because, while trees and agricultural crops release carbon when they are burned, they also absorb carbon while they are growing (as opposed to fossil fuels, which release carbon that was removed from the atmosphere centuries or millennia ago). It was also said to make an important contribution to increased energy self-sufficiency through reduced dependency on imported fuels. In addition it was highlighted that increased use of *agricultural residues*, *energy crops,* and wood from forests and tree plantations would provide an additional source of income to primary producers in rural areas. With these expectations and assumptions, combined with the ready availability of technology easily converted for large-scale biomass burning (e.g. in existing coal-fired power plants) it is perhaps no surprise that bioenergy came to play a much bigger role in the actual implementation of EU climate and energy policies than in public perception.

In 1995 'renewable energy' (e.g.. bioenergy, wind, solar, etc.) made up 5% of total energy consumption in the EU. In 2013, this proportion had increased to approximately 12%, of which 7.7% came from *biomass* and renewable waste; 1.9% from hydro; 1.2% from wind; 0.6% from solar; 0.4% from geothermal; and 0.0% from tide, wave and ocean. Thus, almost two thirds of the 'renewable energy' consisted of bioenergy in 2013.[4]

Residues from agriculture and forestry, manure and organic waste from households and industry are often highlighted by bioenergy advocates but in reality they make up a and decreasing portion of bioenergy source material. In spite of this, EU bioenergy policy continues to rest on the assumption that most biomass for future energy production will be sourced from within the EU and be made up of waste, residues and wood from thinnings. In fact, and contrary to policy goals of reducing reliance on energy imports and strengthening rural development, an increasing proportion of bioenergy consumed in the EU is produced from imported biomass.[5]

Imported biomass is usually extracted at a large scale and often from biodiversity-rich forests or from areas subject to land rights disputes. It has become evident that bioenergy, when produced on such large scale, does not contribute to reducing greenhouse gas emissions. On the contrary, burning biomass at a large scale has been shown to often cause more emissions than burning fossil fuels.[6] Yet, despite the mounting evidence of false assumptions and unmet expectations, the European Commission and EU Member State governments continue to ignore the major conflicts between EU policies promoting bioenergy and the goals proposed in EU policies and international agreements on sustainability, biodiversity, climate and food security. Instead of taking into account the experience of the past ten years of bioenergy promotion, which has led to large-scale devastation, the EU continues to subsidise bioenergy production that falls short on nearly all the aspirations on which its bioenergy policy was based in the first place.

Public support played a key role in establishing common policies for increased use of renewable energy. Public education is therefore indispensable in efforts to stop misguided policies that lead to exploitation of land and peoples' livelihoods in the global South as well as destruction of forests rich in biological diversity in key biomass-exporting countries such as Canada, Russia and the USA.

TABLE 1

Sources for production of renewable energy and the energy forms they contribute to.

Sources	Energy forms
Hydropower	Electricity
Wind	Electricity
Solar (thermal)	Heat
Solar (photovoltaic)	Electricity
Wave	Electricity
Geothermal	Heat
Organic waste	Gas, fuel
Biomass	Electricity, heat, gas, fuel

In this context it is worth noting that the total combined energy consumption of the 28 EU Member States has remained almost constant since 1995 despite insistence by policy-makers on the importance of saving energy. Sufficient determined action has not taken place to make the vision of reduced energy consumption a reality. In addition, EU countries have outsourced a large share of their energy consumption – and the related greenhouse gas emissions – by shifting industrial manufacturing to other regions. In 2012, the EU27 were responsible for 11% of global CO_2 emissions when considered on a territorial basis (i.e. emissions happening within the EU area).[7] However, it has been documented by The Global Carbon Project that, when looking at emissions related to all goods consumed in the EU, rather than on a territorial basis, the EU27 were responsible for 13% of global emissions in the same year.[8] The IPCC therefore, refers to a gap between produced and consumed GHG emissions: 'The data shows that the reduction in territorial emissions that has been achieved in the OECD 1990 countries has been more than negated by an increase in emissions in other countries, but related with consumption in OECD 1990 countries. Furthermore, while countries with a Kyoto Protocol commitment did reduce emissions over the accounting period by 7%, their share of imported over domestic emissions increased by 14%.'[9] The increased use of imported biomass for energy can be expected to further exacerbate this trend.

FIGURE 1

Different categories of biomass used for energy generation. A large number of different technologies turn materials into solid, gas, or liquid forms of energy. Direct burning is the simplest process.

Biomass Feedstock	Examples	Primary Energy Forms
Food Crops:		
"Sugar" crops	· Sugar cane · Maize	· 1st generation agroethanol · Biogas
"Oil" crops	· Rape seed · Oil palm · Soy	· 1st generation agrodiesel
Energy Crops		
Monoculture production for energy use	· Willow · Eucalyptus · Grasses	· 2nd generation agroethanol · Heat · Electricity
Plant Residues:		
Agricultural residues	· Straw, husks, leaves,	· Heat · Electricity · 2nd generation agroethanol · Biogas
Forestry residues	· Branches + tree tops · Thinning trees	
Industrial Residues		
From food industry	· Molasses, Bagasse	· 2nd generation agroethanol
	· Animal fats · Used Cooking Oil	· 2nd generation agrodiesel
From wood industry	. Wood chips & wood pellets (from saw mills, furniture production etc.)	· Heat · Electricity
Waste		
From industrial agriculture	· Slurry/animal manure	· Biogas
From households	· Sewage sludge	

Part 1
Policy Context

Origins of bioenergy policy within the EU

EU and Member State policies in support of alternative energy sources can be traced back to the 'oil crisis' in the 1970s and concerns over acid rain related to coal burning in the 1980s. Policies emphasized the need to reduce dependency on imported oil and the switch to fuels that were less environmentally damaging than coal. In the 1990s, reducing CO_2 emissions by promoting the development of renewable energy sources became the central stated goal. Policies introduced in this context were aimed at stabilizing carbon dioxide emissions at 1990 levels by the year 2000, a target the EU adopted when signing the Kyoto Protocol under the UN Framework Convention on Climate Change (UNFCCC) in 1997. The policy documents defined renewable energies as 'non-depletable forms of energy, including, in particular, hydropower, wind and solar energy (both thermal and photovoltaic), biomass and geothermal energy. Municipal and other organic waste, although depletable, is normally also classified as renewable sources of energy.'[10]

During this early phase of the renewable energy debate, a set of themes were repeated in policy papers, resolutions and directives.[11] Renewable energy was argued to be favoured by the general public. In addition it was expected to:

- Help increase self-sufficiency and reduce dependency on imported fossil fuels;
- Have a positive impact on regional development and employment;
- Help to improve the overall competitiveness of European companies;
- Contribute to achieving the overall strategy for sustainable development;
- Help reduce greenhouse gases emissions.

Policy documents from this period indicate that bioenergy was intended to play a prominent role in the transition to renewable energy.[12] However, this was not clearly articulated in the public discourse, where the emphasis remained on solar and wind power. Furthermore, until the late 1990s it was taken for granted that biomass used in energy production would come from within the EU.

EU policies driving consumption

The following section outlines some key EU policies that undermine the efforts to address climate change and dependence on energy imports. With their focus on growth, trade and competitiveness of the corporate sector, these interact with the EU's bioenergy policies in a way that incentivises corporate control of bioenergy technologies and large-scale production of biomass feedstocks, rather than more genuinely sustainable solutions.

a) Growth and competitiveness – leading to subsidies for European bioenergy industries

The Treaty of the European Union has a strong focus on growth and competitiveness. Growth is also strongly expressed in the EUROPE 2020 strategy,[13] which is a 'strategy for smart, sustainable and inclusive growth'. The strategy explains 'sustainable growth' as 'promoting a more resource efficient, greener and more competitive economy.' It is striking that competitiveness is included in the explanation of sustainability.

In relation to renewable energy, the growth and competitiveness agenda aims at ensuring favourable conditions for European industries to compete at the global scale. In this context, taxes on energy use or higher prices for energy as a result of increased use of renewable sources are seen as disadvantages. However, positioning European industries as leaders in the area of renewable energy is highly desirable. For this reason, the European Commission and national governments support research and development, and practical implementation, of various renewable energy technologies. This is part of the Green Growth agenda, which has broad support amongst the Member States. A more general bio-economy agenda, which aims to develop biomass-derived sources for plastics, chemicals, etc. currently derived from petro-chemicals, complements the focus on bioenergy in renewable energy production.

Mandatory targets for renewable energy introduced by the EU in 2009 are currently the most important policy support for the bioenergy industry (see below). In addition, a range of subsidies were introduced to further support bioenergy production and consumption. These include:

- Direct subsidies for research;
- Tax-exemptions, based on the assumption of carbon neutrality of energy generated by burning *biomass*;[14]
- Support programs for establishing 'bio-plants' (e.g. for *biogas*, biomass co-generation of heat and power, *agrofuels*) and for running these plants;
- A steady flow of research and development funds, for example through the EU ALTENER program or through national programs;
- Support programs for production of raw material for bioenergy in agriculture and forestry (e.g. through EU rural development programs).

Promotion of bioenergy as a key plank in the EU's renewable energy framework thus created a new industry that also absorbed older industries, giving them the opportunity to re-brand themselves as environmentally friendly. Biotech companies, manufacturing industries (e.g. those producing boilers for biomass), and energy companies converting coal fired power plants to biomass all benefit from bioenergy subsidies. Binding targets for renewable energy, which are currently met by burning large quantities of biomass for energy, have caused widespread damage globally, but strong industry lobbies, who stand to benefit from current policies, support the continuation of the existing subsidy regime.

Already in the 1990s, the agriculture and forestry sectors and related industries were particularly vocal in demanding binding targets at the EU level as an additional stimulus for bioenergy. Targets and support schemes for renewable energy that were in place in different member states were considered too unpredictable a policy context and thus, an obstacle to industry interests. Soon this view was adopted by the European Commission, which emphasized that predictability was 'insufficient for the renewable energy industry'.[15] It made specific reference to a round-table where the main message from participating private sector actors had been that 'a long-term stable framework for the development of renewable sources of energy, covering the political legislative, administrative, economic and marketing aspects of renewables is in fact the top priority for the economic operators involved in development of renewables.'[16]

The proclaimed private sector need for 'predictability' led the EU to introduce legislation requiring Member States to set indicative (i.e. non-binding) targets for the use of renewable energy by 2010. These targets were to include a specific share of electricity to be produced from renewable technologies as well as a target for the use of agrofuels and other renewable fuels for transport.[17,18] When indicative targets did not provide the predictability requested by the private sector, stronger EU legislation was put in place in 2009: The Renewable Energy Directive (RED)[19] introduced binding targets in the transport, heating and electricity sectors across the EU.

The RED thus put in place mandatory targets of the kind requested by the industries which stood to benefit from support for bioenergy:

- An overall goal of generating 20% of energy from renewable resources by 2020 (the relative ease and cheapness of upgrading ageing coal-fired power plants to burn biomass quickly made bioenergy the technology of choice in this sector)
- A binding target of 10% of energy consumed in the transport sector to come from renewable sources by 2020 (with up to 7% allowed from *first-generation agrofuels* based on food crops).

A coalition of NGOs warned early on that these targets could only be met through use of large quantities of (imported) biomass and therefore made a 'Call for an immediate moratorium on EU incentives for agrofuels, EU imports of agrofuels and EU agroenergy monocultures' arguing that 'Despite an increasing number of civil society statements and evidence-based reports expressing concern about the unintended but foreseeable negative impacts of agrofuels and calls to halt their expansion, the agrofuel rush is accelerating.'[20]

The early fears of civil society groups have been largely substantiated. Member States have developed National Renewable Energy Action Plans (NREAPs) that spell out how the renewable energy targets in electricity, heating and transport will be met. According to their 2010 NREAPs, EU Member States expect that, by 2020, bioenergy will contribute 54% to the 'renewable' energy target, with solid biomass for heat and electricity expected to constitute the largest portion.[21] According to an analysis by EU campaign group FERN, fulfilling the plans for electricity and heat production alone would increase the use of wood for energy production by between 50 and 100%. Such an increase will not be achieved solely by using wood from EU forests.[22] Imports from outside the EU, especially of wood pellets, are expected to grow if subsidies and requirements remain unchanged.[23]

BOX 1

Imported bioenergy – where does it come from?

The EU is the world's largest producer and consumer of *wood pellets.* These pellets are traded internationally on a large scale and are the main type of wood fuel consumed globally. EU demand for wood pellets is growing much faster than production within the EU, and imports therefore increased from less than 1.8 million tonnes in 2009, to about 4.5 million tonnes in 2012, and to more than 6 million tonnes in 2013. In 2013 EU countries consumed 85% of all internationally traded wood pellets and approximately 19 million tonnes of wood pellets were burned in the EU. Currently, the EU imports wood pellets mainly from Canada, Russia, and the southern United States.

In 2012, although a significant volume was imported, internal trade within the EU still supplied the majority of wood pellets consumed in the EU. The main exporting countries within the EU are Germany, Austria and Latvia, while the UK (importing primarily from the US and Canada), Denmark (importing mainly from Russia and the Baltic countries) and Italy (importing mainly from Austria and Germany) are the main importers. In 2013, the US exported more than 2.8 million tons to the EU (up from 0.5 million. tons in 2009). In the future, European energy companies expect to increase investment in wood pellet factories, short-rotation coppice and plantations in regions such as Brazil, Uruguay, West Africa and Mozambique.

The European Parliament's Directorate-General for External Policy stated in a 2012 report that 'Africa is likely to play a big role in feeding European demand for biomass', and that 'Brazil is often considered to be the EU's most promising potential source of wood-based fuel in the Southern hemisphere.' Various reports from civil society organizations have come to similar conclusions regarding possible countries of origin for biomass to be consumed in the EU.

In addition, EU consumption of agrofuels for transport has contributed to making Europe the world's largest producer of *agrodiesel.* Imports of soya and palm oil for agrodiesel production come especially from Argentina, Indonesia and Malaysia. The consumption of *agroethanol* - mostly imported from Brazil - has also grown rapidly, tripling between 2006 and 2012. In the global South, these trends mean increasing conversion of agricultural land, forests and grasslands to monocultures of export crops to feed the EU bioenergy market.

Sources:

Biofuelwatch: **'A new look at land grabs in the global South linked to EU biomass policies'**, May 2014

European Parliament, Directorate-General for External Policies: '**Impact of EU Bioenergy Policy on Developing Countries**', 2012

Global Forest Coalition: '**Wood-Based Bioenergy: The Green Lie**', May 2010

International Energy Agency: **'Global Wood Pellet Industry Market and Trade Study'**, December 2011

International Institute for Environment and Development: **'Biomass energy: Another driver of land acquisitions?'**, August 2011,

U.S. International Trade Commission, Office of Industries: **'Developments in the Global Trade of Wood Pellets '**, January 2015

b) EU development policy: more trade to secure imports of cheap biomass for EU consumption, less aid for energy independence and food sovereignty of communities in the global South

The expansion of the EU's land and water footprint and the diversion of land, water, and forests in the global South for the production of biomass destined for European markets is often justified by the EU through its development policy. However, EU development policies must be understood in the context of an expressed EU priority of securing access to 'raw materials'. The EU has a significant overall trade deficit in raw materials,[24] which may in part explain the focus in the EU development aid programme 'Agenda for Change' on increasing access to world markets for developing countries.[25] The EU 'Aid for Trade' programme explicitly aims to 'support partner countries' efforts to develop and expand their trade as leverage for growth and poverty reduction.' Support for transport infrastructure and investments in agriculture are a particular focus.[26]

EU renewable energy targets have triggered demand for biomass that will not be met from land within the EU alone. At the same time, EU trade and aid policies are increasingly geared towards facilitating access to biomass grown in the global South, which increases pressures on land, water, and other natural resources outside EU territory. In recent years, imports of vegetable oils and oilseeds, used in bioenergy production, have reached a record-breaking share of total imports to the EU.[27]

With its focus on promoting access to world markets, EU development aid to agricultural sectors in the global South runs the risk of incentivising commodity crop production for export over production of staple foods that could strengthen local food sovereignty. In relation to biomass production for energy generation, EU aid and trade policies facilitate the production and extraction of biomass in the global South on land that communities depend on to secure their own energy security, strengthen their food sovereignty, and to have room to adjust to a changing climate.

Aid policies also promote market access through investment in infrastructure, with contracts to build roads and harbours to facilitate the export of raw materials often awarded to EU-based companies. In many cases, such infrastructure projects do not benefit local communities and they may become a source of local social and environmental conflicts. Furthermore, EU aid support for agribusiness-led and export-focussed energy crop production sends a strong signal to European and regional investment banks to adjust their own lending priorities accordingly. For example, several European Development Banks supported the Swiss-based corporation Addax Bioenergy to establish a sugarcane plantation in Sierra Leone, producing agroethanol for the EU market. According to critics, the project lured 10, 000 hectares of productive land away from local communities and undermined their food security.[28]

The 2030 'Agenda for Sustainable Development' shows a further increasing focus on private investment in future EU development plans. A growing share of development finance is to be used to attract private funding (so-called 'blending') and to buffer the risk of corporate investment in agriculture in the global South via 'public-private-partnerships'.[29] In addition, the EU proposes to make use of climate mitigation funding through blending: 'Through climate change windows in the EU regional blending facilities and the Global Energy Efficiency and Renewable Energy Fund (GEEREF), the EU is scaling up its climate finance.'[30] The objectives of GEEREF include financing biomass for renewable energy.[31] Furthermore, many bioenergy feed-crops are so-called 'flex crops' that can be used for different purposes: food, fodder, fuel or industrial material such as *bio-plastics*. This minimizes the investment risk for large-scale producers, making these crops particularly attractive investments and increasing the risk that land will be bought up in the global South to produce biomass for the EU energy market.[32]

BOX 2

The Makeni Bioethanol Project in Sierra Leone

Addax Bioenergy (Switzerland) was, until October 2016, operating a renewable energy and agriculture project in Sierra Leone that produced sugarcane for bio-ethanol for export to Europe and for domestic use, as well as 'green' electricity from a biomass-fuelled plant. The project, which became operational in 2014, is located 15km west of Makeni in the Northern Province of Sierra Leone. It covers 14.300 hectares of land, leased from local landowners through the local chiefdom, divided between a 10,000 ha sugarcane estate and 4,300 ha of land for factory buildings and related infrastructure, fields developed for rice farming and an ecological conservation areas.

According to Addax Bioenergy, one of the primary reasons they opted for Sierra Leone was because Sierra Leone is a partner country of the European Union and benefits from duty-free access to the EU market. The project has been supported by a diverse group of development finance institutions (DFIs) which have become co-funders and/or co-shareholders, lending significant funds to the project. This includes European Development Finance Institutions such as the German Development Finance Institution (DEG), the UK-based Emerging Africa Infrastructure Fund (EAIF), the Netherlands Development Finance Company (FMO), the Belgian Development Bank (BIO) and the Swedish Swedfund International AB.

From the beginning, the project threatened the right to food and water. Local land owners and users in the Addax project area claim that both Addax and the local authorities promised that only degraded and marginal lands would be used for the project. However, the lease ended up covering the entire community land space including villages, roads, forests, etc. A significant number of community members, especially women farmers, have been largely excluded from the land lease consultation process, and claim that the rent received for the land lease agreement was fixed without consulting them. The employment opportunities offered by the company have not compensated all of those who had leased their land to the company. Many communities also risk losing access to essential water sources. A human rights impact assessment concluded that various aspects of the project pose a high risk of impeding the human right to water for the local population. According to the report, the project will extract about 26% of the water from the River Rokel during the driest months - February to April - with little consideration of the water usage of local people downstream. Moreover, the report highlights the lack of effective accountability mechanisms in cases of right to food and right to water violations.

On June 25th 2015, Addax announced on their website that they are going to scale down the Makeni project in order to conduct a review of their operations. Communities were not informed properly about this development and the sudden scale down has had severe consequences: over 1,128 permant workers were sent on garden leave and received only 45% of their monthly salaries while all 2,243 casual workers lost their jobs. Moreover, communities still did not have access to their lands as the leasing contracts with Addax were still valid and enforced, even if Addax did not cultivate the land at the current moment. As such, the scale down has (and threatens to have) severe consequences for the food security of local people: without money and land, the threat of hunger is omnipresent. This raises serious questions about the accountability of the different actors, especially the involved DFIs.

The communities were clear in their demands for a re-negotiation with a possible new owner of the project. In October 2016 it was announced that Sunbird Bioenergy and a consortium of investors had acquired a majority stake in Addax Bioenergy Sierra Leone (ABSL) from AOG. The estate leases 23,500 ha of land from the Government of Sierra Leone for the production of sugarcane and cassava for the production of ethanol and power. The company is currently developing an additional 2,000 ha of cassava production as a secondary feedstock. The ethanol produced may be sold to the domestic Sierra Leone biofuel blending program, or shipped to customers in Europe. The company is certified under the RSB Roundtable on Sustainable Biomaterials that enables export to the EU. Despite this, the economic and social situation for communities

on the ground has worsened in the last months. They face an uncertain future and their voices have been ignored during the change of ownership of the project. The Addax/Sunbird ethanol project thus appears to be a paramount example of a failed "green" and "sustainable" former flagship project facilitated by European policies and DFIs.

Sources:

Addax, 2016: The Makeni Project. Accessed under: http://www.addaxbioenergy.com/en/the-makeni-project/sustainable-investment-model/transparent-land-lease-process.php

http://www.addaxbioenergy.com/en/media/faq.php

http://www.addaxbioenergy.com/en/the-makeni-project/development-partners.php

SiLNoRF/Bread for all, 2013: Annual Monitoring Report on the Operations of Addax Bioenergy by Sierra Leone Network on the Right to Food (SiLNoRF) for the Period July 2012 – July 2013. Accessed under: https://sites.google.com/site/silnorf/news-1/monitoring-report-august-2013

http://www.brotfueralle.ch/fileadmin/deutsch/2_Entwicklungpolitik_allgemein/C_Wirtschaft%20und%20MR/Landgrab/2014_Addax/20140612_Addax_Monitoring_Report_2014.pdf

Waterlex, 2012: Sugarcane-to-Ethanol Project compliance with the Human Right to Water. Accessed under: http://www.waterlex.org/resources/documents/2011-HRIA_AddaxBioenergy.pdf

http://www.brot-fuer-die-welt.de/fileadmin/mediapool/2_Downloads/Fachinformationen/Analyse/Analyse_64_en-The_Weakest_Should_not_Bear_the_Risk.pdf

https://brotfueralle.ch/content/uploads/2016/03/MonRep-Addax-2016.pdfhttp://www.sunbirdbioenergy.com/projects/sierra-leone-makeni/

Part 2
Bioenergy use in Europe responsible for environmental damage and land grabs elsewhere

The increased use of land for biomass production, triggered by EU renewable energy targets, exacerbates a manifold global ecological crisis. The targets can also incentivise land grabs where EU demand for biomass increases the monetary value of land. Increased demand for biomass exports puts land for which use and tenure rights are in dispute at particular risk of being grabbed for export commodity crop production. This is often the very land on which the most marginalised groups depend.

a) Unequal use of land

'Land footprint' describes the amount of land that is required to produce the goods and services consumed within a country or a region, including the area associated with the production of imported products. By this measurement Europe is already one of the biggest consumers of agricultural land and is heavily dependent on 'imported' land.[33]

In considering negative effects of *land use change* we often think only of direct changes when, for example, land previously used for food-production is used to produce biomass for energy generation. However, the production of biomass for energy can also cause indirect land use changes: Land use change in one location triggers another change in land use elsewhere to replace the biomass production that used to take place on the land now used for bioenergy crops. Both direct and indirect changes of land use can involve 'land grabbing'.

In 2010 Friends of the Earth Europe analysed the National Renewable Energy Action Plans of EU Member States to assess the land footprint resulting from these countries meeting their renewable energy targets.[34] They found that the total crop footprint would grow from 55,000 km^2 in 2010 to 131,000 km^2 in 2020. The total forest footprint was 390,000 km^2 in 2010, growing to 435,000 km^2 in 2020.[35] Were all biomass to be produced in the EU, biomass for energy generation would, by 2020, occupy 10.9% of all land currently cultivated for agriculture and 31.6% of the forested area in the EU. If consumption of bioenergy is to double, as expected, by 2030, an area of land and forest the size of Sweden and Poland combined will be needed to supply the raw material for the generation of bioenergy.

With regards to agrofuels, maize is expected to become the main feedstock for agroethanol, with imported sugar cane (mainly from Brazil) in second place. Rapeseed is likely to be the primary feedstock for agrodiesel, supplemented by imported soya and palm oil.[36] One study estimates that by 2020 approximately 50% of the anticipated consumption of agroethanol and approximately 41% of agrodiesel would be imported to the EU.[37] Another study assessed land types and uses prior to use for agrofuel production and found that forests, grasslands and shrub steppes are all at risk from land use change.[38]

Only a change in EU consumption patterns and, in particular, reductions in the consumption of food, fuel, fodder, textiles, paper, chipboard, timber etc. can limit direct and indirect land use changes triggered by the EU's binding renewable energy targets. Without reducing consumption, these targets will inevitably lead to more land being used globally to fulfil the EU's demand for bioenergy. These direct and indirect land use changes will often be associated with ecological devastation, social upheaval and human rights abuses.[39]

There is also evidence from many parts of the world that the transition from food production to export commodity crop production is not beneficial for small farmers. Such land use changes have neither secured a steady income for peasants nor improved health or food security for local communities.[40] Commodity crops for export are, more often than not, grown in monoculture plantations. People living close to these plantations are exposed to high levels of pesticides and to water pollution as a result of the use of pesticides and chemical fertilizers. In places where the plantation frontier moves into the forest, forest peoples' livelihoods are additionally affected by the adverse change in local climate resulting from the change in vegetation.[41]

Bioenergy proponents have argued that there is space for additional production of biomass on 'unused', 'under-utilised', 'idle' or 'marginal' land. However, this language can disguise problematic assumptions.[42] Land described in these terms is often common land or land governed by other traditional land tenure systems and providing the livelihood for peasant families, indigenous peoples or pastoralists. It also provides important habitat for a variety of plants and animals. Despite the rhetoric, biomass crops for energy production tend to further increase pressure on (prime) agriculture land rather than helping to recuperate so-called 'marginal' land.[43]

b) Undermining the emission reduction targets

There is a profound contradiction between EU climate policies' target to reduce GHG emissions and current policies promoting the use of bioenergy: emissions from bioenergy can be huge and may even be larger than the emissions generated by burning the fossil fuels they replace. Yet, this is not reflected when emissions are calculated and reported – nor is it communicated to the European public.

The guidelines of the Intergovernmental Panel on Climate Change (IPCC) allow CO_2-emissions from the combustion of biomass to be reported as zero, although the IPCC does not consider biomass used for energy to be 'carbon neutral,' mainly because direct and indirect land use changes caused by biomass production can result in substantial greenhouse gas emissions. The IPCC explains the decision to treat combustion of biomass in the energy sector as emissions-free with the fact that the emissions related to biomass production should be recorded in land use inventories, namely in the inventories of the Land-use, Land-use change and Forestry (LULUCF) sector. Counting emissions again 'at the chimney' would therefore risk double-counting the same emissions[44]. In reality, however, accounting for emissions in land use inventories is rife with methodological and technical errors and inconsistencies, leading to potentially huge errors. Therefore, the result of this IPCC guidance is that a large proportion of the emissions caused when biomass is burned for energy generation are not accounted for at all. This omission is apparently justified in the name of avoiding possible double-counting, with under-reporting of emissions considered preferable to over-reporting. This loophole in the IPCC methodology is exploited to the full by EU Member States and energy utilities, who are converting coal-fired power plants into massive biomass burners, causing equally massive emissions that go unreported.[45]

Climate scientists have repeatedly emphasized the importance of immediate climate action in order to reach the climate target of a maximum global temperature increase of 2°C. Postponing action by introducing an energy form that increases atmospheric carbon dioxide today – and that brings many uncertainties with it – is making it even more difficult for future generations to combat the adverse effects of climate change.

BOX 3

How the notion of 'carbon neutrality' passes on the problems to future generations

Energy produced from biomass is claimed to be 'carbon neutral' because the wood or crop that is burned absorbed carbon dioxide from the atmosphere (via photosynthesis) as it was growing. However, the carbon contained in biomass is released into the atmosphere during the harvesting and burning process. When land is cleared for energy production, the resulting carbon debt is only paid back if a tree or energy crop is allowed to grow for as long as the tree or crop that was used for energy production; and if soils and other vegetation destroyed or harmed during logging or harvesting are able to re-absorb all the carbon lost in the process. This may take decades and even centuries. The carbon debt may never be paid back if forests or natural grasslands are too damaged to fully recover.

The carbon accounting in plant-soil systems is complex: The reporting for the LULUCF sector includes estimates of carbon stock and carbon stock changes (above ground and below ground) related to cropland, grazing land and forested land and the management practices in these sectors. Methodologies include a number of physical measurements as well as aerial photo registrations, satellite image mapping and, for forests, registrations of plant species and age classes as well as estimations of CO_2 in the specific year (related to weather and other effects).

In the case of bioenergy based on imported biomass, the only officially tracked emissions occur where biomass is produced, and where destruction of soil and vegetation thus takes place. Therefore, the country of origin is responsible for tracking and measuring the related emissions, although most countries do not have the skills and resources to carry out these difficult measurements and calculations over the large areas that are often affected. Furthermore, according to the 'Good Practice Guidance for Land Use, Land-Use Change and Forestry' (GPG-LULUCF) only certain countries have a binding obligation to report emissions. Therefore, emissions from land-use and land-use changes related to increased use of bioenergy in the EU and elsewhere may be occurring in countries which are only 'encouraged' to report these.

The situation is further complicated by the fact that even locally produced biomass for energy can contribute to indirect land-use changes in other countries by displacement, thereby causing emissions elsewhere. The IPCC admits that there are considerable uncertainties when assessing the indirect changes in terrestrial carbon stocks related to a local production of bioenergy. Furthermore, the claim that bioenergy is carbon neutral also relies on failing to account for the costs of transporting and processing the fuel.

Nevertheless, and in spite of the clarification from the IPCC that '[t]he IPCC Guidelines do not automatically consider biomass used for energy as 'carbon neutral', even if the biomass is thought to be produced sustainably,' biomass is treated as essentially 'carbon neutral' by the EU and many governments subsidising bioenergy production. As a result, the actual carbon emissions that occur when bioenergy is produced are not acknowledged and not recorded in carbon balance sheets. As long as EU targets for use of 'renewable energy' can be fulfilled by burning biomass, this inaccurate assumption of 'carbon neutrality' will undermine efforts to reach global climate targets.

This issue is further exacerbated by the EU Emission Trading System (EU ETS). Based on the assumed carbon neutrality of bioenergy, producers of heat or electricity from biomass can sell released CO_2-quotas to other companies, which can then increase their emissions – although, in reality, emissions from the quota-sellers have been reduced by far below the declared amount, if at all.

The European Environment Agency Scientific Committee has warned about this and they have called the assumption that biomass is carbon neutral a *'serious accounting error'* that can result in increased carbon emissions and thereby accelerate global warming. The Committee recommended (in 2011) that governments rectify this situation as soon as possible.

c) Biodiversity destruction

The relationship between bioenergy production and biodiversity is multifaceted, but the main problem is that feedstock for large-scale bioenergy production tends to come from monocultures. Monocultures are by definition not bio-diverse and production requires heavy use of pesticides and chemical fertilizers that are harmful to ecosystems. Self-sustaining ecosystems are, by contrast, dependent on the interaction of (living and dead) plants, fungi, bacteria, insects, animals and birds etc. Therefore, the growing use of land for bioenergy crops is adding to the already severe loss of biodiversity globally. Further, the increasing intensity of biomass extraction from agriculture, as well as in forest management, leaves less plant material to decay in agricultural soils or on the forest floor[46]. This diminishes available habitat for many species that depend on decaying organic matter and reduces future soil fertility, as well as the amount of carbon sequestered in soils.

In 2011, the European Community adopted an EU biodiversity strategy which sets a headline target to 'halt the loss of biodiversity and ecosystem services by 2020, to restore ecosystems in so far as is feasible, and to step up the EU contribution to averting global biodiversity loss'. According to the Commission's 2015 mid-term review of the EU biodiversity strategy, insufficient progress had been made in some areas. In relation to forests, the review found that, while the area within the EU covered with trees had increased, 'the conservation status of forest habitats and species covered by EU nature legislation shows no significant signs of improvement'. Overall, the review concluded that no significant progress had been made and much stronger efforts are needed to meet the target to halt biodiversity loss by 2020.

In relation to the EU's role globally, the mid-term review noted that 'the EU has taken initial steps to reduce indirect drivers of global biodiversity loss [...] and to integrate biodiversity into its trade agreements' but it also warned that 'progress is insufficient in reducing the impacts of EU consumption patterns on global biodiversity'.[47] This is exactly the problem: regulation focused on symptoms such as biodiversity loss, land grabbing and water scarcity cannot solve a global ecological crisis caused by excessive consumption. Meanwhile, EU trade, aid and bioenergy policies are incentivising more, not less consumption.

Globally, the United Nations Environment Programme (UNEP) has identified the huge rise in consumption of agrofuels as placing extra pressure on land. UNEP states that large-scale commercial agriculture – including for agrofuels – has adversely affected biodiversity, and that these adverse effects relate both to forests and other natural lands (which are being converted to monocultures) and to the diversity of species used in agriculture (agro-biodiversity).[48, 49]

d) Freshwater affected by bioenergy production

Agricultural crops and plantation trees grown to produce bioenergy are often selected for their capacity for fast growth, which is dependent on an abundant water supply.[50] Thus competition for land (and the risk of land-grabbing) is accompanied by competition for water (and the risk of water-grabbing).[51]

A report by the High Level Panel of Experts on Food Security and Nutrition (HLPE) refers to research showing that the water appropriation for agrofuels is vast and that the trade-offs between water for food and water for agrofuels are felt at the local level.[52] In other words, when agrofuels are produced for export, local food production will diminish in areas of water scarcity.

The expansion and intensification of bioenergy production will inevitably add to existing pressures on fresh water. A 2011 summary report by UNEP[53] recognized that bioenergy production systems can influence both the quality and quantity of water flows, with water systems affected both in areas adjacent to bioenergy crop plantations and over long distances, with consequences for biodiversity and human needs. The freshwater quality near biomass

production sites can be affected directly through pesticide and fertiliser run-off. Tillage, ploughing and irrigation of unsuitable soils can additionally lead to sediment run-off into water bodies, causing physical and chemical impacts. Furthermore, increased removal of plant residues or cultivating trees without undergrowth can increase soil erosion and lead to reduced retention of precipitation in soils and reduced replenishing of groundwater supplies.

Given the EU's large imports of agricultural and forestry products, it is noteworthy that EU policies related to water only address waters within the EU and how they are influenced by human activity. There is no reference to how EU consumption indirectly affects freshwater resources in other regions. Some organisations have addressed these problems. For instance the Transnational Institute (TNI) has analysed the issue of water grabbing that goes hand in hand with land-grabbing in relation to large-scale agricultural and bioenergy production.[54] And the 'The Water Footprint Network' has worked to develop and spread the idea of a 'water footprint similar to the idea of a land or ecological footprint.[55]

Part 3
Recognising problems - responding with non-solutions

Policy Coherence for Development

The European Commission has repeatedly declared its commitment to Policy Coherence for Development (PCD), namely to ensuring that development objectives are taken into account when developing and assessing any policies that are likely to affect developing countries. PCD 'aims at minimising contradictions and building synergies between different EU policies to benefit developing countries and increase the effectiveness of development cooperation.' [56]

An EU self-evaluation in the context of the EU & Millennium Development Goals found that 'With regards to developing a global partnership for development, the EU's commitment to Policy Coherence for Development (PCD) makes the EU a forerunner on the international stage in this area.'[57] A review of EU implementation of its PCD aims, the Policy Coherence for Development 2015 EU Report,[58] also attests to significant progress. These conclusions appear to be in stark contrast to the findings in Part 2 of this publication. This may be explained in part by the fact that, somewhat surprisingly, the 2015 review did not consider how EU renewable energy policies do or will affect developing countries in relation to land-use, climate, biodiversity and water consumption. The only mention of any negative influence related to EU renewable energy is a reference to the fact that 'the agrofuels/food security/land use nexus were often mentioned' in country-level dialogues.

Second-generation agrofuels

Concerns about land grabbing and an increase in the EU footprint on land and water outside EU territory are often met with reference to '*second-generation*' or 'advanced' *biofuels/agrofuels* produced from cellulose or lignin in plant residues or trees. The biotech industry – which stands to profit from increased sales of enzymes needed to break down the plant material – argues that these 'second generation' agrofuels will not cause the same problems as the 'first generation' fuels produced from food crops. In reality, the EU Member States' NREAPs indicate a negligible planned contribution of second generation agrofuels to EU bioenergy production by 2020.

Many NGOs are sceptical of the industry's claim regarding lower land use for second-generation agrofuels and point out that these new technologies are still far from being economically viable and that new threats may emerge as second-generation technologies are scaled up.[59]

REDD+

The 2015 PCD review of EU policies affirms that land use changes contribute to emissions from deforestation and forest degradation in developing countries (although it fails to acknowledge the role of EU bioenergy targets in causing such land-use changes). In response, the EU and member states support pilot initiatives for REDD+ in Asia, Africa and Latin America.

REDD+ is a mechanism developed within the UNFCCC in order to reduce the emissions occurring when forests are felled or destroyed by giving governments, companies and forest owners financial compensation for preserving forests. REDD stands for 'Reducing Emissions from Deforestation and Forest Degradation'. The + has been added to allow for conservation of forests and 'enhancement' of forest carbon stocks either within existing forests or through reforestation initiatives. Both conservation and plantation projects may imply eviction and loss of rights for indigenous peoples and local communities as well as loss of biodiversity.[60]

In practice, the REDD+ mechanism allows industrialised countries to offset emissions by paying for reforestation or forest conservation projects. Since the UNFCCC relies on the FAO forest definition, which fails to distinguish between natural forests and plantations, the conversion of grass-lands or forests into monoculture plantations – described by some critics as 'green deserts' – may be considered a contribution to climate protection that can offset EU emissions. Thus, in practice, large plantation companies can, under the guise of 'reforestation', justify land-grabbing for the production of timber, paper and bioenergy as a contribution to climate protection. This has paved the way for investment in bioenergy plantations in the global South as has been documented for Tanzania in a report by the Timberwatch Coalition. In Tanzania, the 'reforestation' aspect of REDD+ was also misused to establish tree plantations on natural grassland that had never been forested. [61]

Since the flawed FAO definition is used globally and has inspired many national forest definitions as well, the international World Rainforest Movement (WRM) has campaigned to have the forest definition rectified by the FAO.[62]

Many organisations and social movements condemn REDD+ as a false solution, because it allows industrialized countries to offset their emissions – and therefore continue emitting at unsustainable levels – by paying for supposed additional forest protection or reforestation in the global South. Critics also argue that REDD+ falsely blames peasant agriculture and shifting cultivation for forest loss, restricts local communities' access to land, and destroys their livelihoods while failing to tackle the underlying causes of deforestation: industrial agriculture and logging, mining, and large-scale infrastructure development.[63]

Certification schemes

Following nearly a decade of documentation by social movements and environmental NGOs of the problems created by EU renewable energy targets,[64] EU decision makers have partly acknowledged the negative impacts caused. The main response from EU decision makers has been to require liquid agrofuels to comply with certain 'criteria for sustainability'. These criteria are meant to ensure that agrofuels will deliver 'substantial reductions' in greenhouse gas emissions and that they will not come from forests, wetlands or nature protection areas.

However, this response is far from adequate. While some advocates have welcomed these criteria as a partial victory, and campaigned for stronger criteria and the extension of sustainability criteria to woody biomass used in bioenergy production, other actors have serious reservations. Critics have raised concerns that the sustainability criteria represent an attempt at greenwashing rather than a serious attempt to address the structural issues identified in EU bioenergy policy. A coalition of NGOs argued in 2015 that: 'standards and certification cannot address fundamental issues: the scale of demand, and the scale of exploitation. Instead, certification helps to legitimize such destructive models and over exploitation by providing false reassurances.'[65]

Conclusions

Current EU targets for renewable energy use are largely met through bioenergy. Aggressive incentives through subsidy schemes, trade, and legislation aimed at promoting bioenergy have had a devastating impact on land use, livelihoods, food security, climate, biodiversity and water, particularly in countries in the global South that export biomass to the EU for energy production. Bioenergy has by far the largest land footprint of all renewable energy forms, and large-scale consumption will lead to increased greenhouse gas emissions at a time when immediate and steep emission reductions are urgently needed.

Continued or expanded use of bioenergy to meet the EU's excessive energy demands will lead to further land grabbing in the global South including peasants' land, traditional commons, and nature reserves. This will further increase inequalities regarding land use as well as carbon emissions.

With the overall focus on growth and competition in the EU, attention to energy savings will largely be limited to what can be achieved through energy efficiency with limited interest in the need to reduce energy use through changes in consumption and production patterns. The risk is, therefore, that gains in energy efficiency will be offset by increased consumption (the so called Jevon's Effect or Jevon's Paradox[66]). This will continue as long as consumption patterns are not addressed and economic growth takes precedence.

The target for reduced emissions is undermined by the convention of treating bioenergy as carbon neutral. This means that, while it looks as if the EU is moving in the right direction regarding emission reductions, this progress is largely on paper. In reality, the European public is being dangerously misled by false accounting, with the perceived carbon neutrality of bioenergy hiding real emissions. Thus, public understanding of the need to drastically cut energy consumption is not consistently nurtured.

For social movements working for food-sovereignty and land-sovereignty, it is of utmost importance to expose this false accounting to the European public. We must engage to stop the destructive use of large-scale bioenergy. The need to reduce energy consumption dramatically should form a basis for the public dialogue in which we must engage in order to initiate the much-needed transition of European societies and lifestyles towards self-sufficiency and increasingly localized production and consumption chains. Simultaneously, we must confront land-grabbing and the role that European trade and aid policies play in encouraging this. We must support communities struggling to retain or regain rights to the land, waters and forests on which they depend.

This will require paying more attention to the power structures within which bioenergy is promoted. This also means informing European citizens who support renewable energy that energy targets and subsidies incentivizing large-scale corporate-dominated bioenergy production are not 'sustainable' and will not reduce greenhouse gas emissions. This is particularly important in the context of campaigning for divestment from fossil fuel extraction. In order for such calls to contribute to a just energy transition, they must ensure that divestment from fossil fuels does not go hand-in-hand with promoting investment in an alternative energy technology that, while billed as 'renewable,' may fail to live up to any true notion of 'sustainability' or 'justice'. Calls for 100% renewable energy must first and foremost be focused on a drastic reduction in energy consumption in the EU if they are to avoid promoting more land grabs and an increase of the EU's land footprint elsewhere.

The Hands on the Land for Food Sovereignty alliance is calling for large-scale bioenergy to be excluded from the renewable energy definition and for the European Union to exclude bioenergy from its next Renewable Energy Directive (RED).

Endotes

1 Fradejas, A.A., Alonzo, F. and Dürr, J. (2008) Caña de Azúcar y palma africana: combustibles para un nuevo ciclo de acumulación y dominio en Guatemala. Instituto de Estudios Agrarios y Rurales (IDEAR), Coordinación de ONG y Cooperativas (CONGCOOP); GRAIN (2007) 'Crisis o soberanía energética: Joao Pedro Stedile habla de agrocombustibles', en Biodiversidad Sustento y Culturas 53(Julio): 2-4.

2 EU (Renewable Energy Directive, Article 2(e).

3 Although these technologies receive considerable public support, hydro, solar, and wind energy projects can also have negative impacts on local communities, especially when they are corporate-driven and undertaken on a large scale. This raises questions about the real sustainability of projects that produce social and environmental conflicts. See for example: wind parks in Oaxaca, Mexico (http://www.cipamericas.org/archives/9170), Agua Zarca hydrodam in Honduras (https://www.copinh.org/) or the Solar power pland Drnis in Croatia (https://ejatlas.org/conflict/solar-power-plant-in-drnis-croatia)

4 European Commission (2015) EU energy in figures, Statistical Pocketbook 2015; http://ec.europa.eu/energy/sites/ener/files/documents/PocketBook_ENERGY_2015%20PDF%20final.pdf

5 Ibid

6 Zanchi, G., Pena, N. and Bird, N. (2010). The upfront carbon debt of bioenergy. Joanneaum Research, Graz, May.; http://www.transportenvironment.org/sites/te/files/media/The_upfront_carbon_debt_of_bioenergy_Joanneum_Research.pdf; EEA Scientific Committee (2011) Opinion of the EEA Scientific Committee on greenhouse gas accounting in relation to bioenergy. European Environment Agency Scientific Committee.: http://www.eea.europa.eu/about-us/governance/scientific-committee/sc-opinions/opinions-on-scientific-issues/sc-opinion-on-greenhouse-gas/view

7 Olivier, J.G., Peters, J.A. and Janssens-Maenhout, G.(2013) TRENDS IN GLOBAL CO_2 EMISSIONS, 2013 REPORT, Background Studies PBL Netherlands Environmental Assessment Agency and Joint Research Center; http://edgar.jrc.ec.europa.eu/news_docs/pbl-2013-trends-in-global-co2-emissions-2013-report-1148.pdf

8 Global Carbon Project (2015), The Global Carbon budget, 2015 Highlights (full); http://www.globalcarbonproject.org/carbonbudget/15/hl-full.htm

9 IPCC. (2014) Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK and New York, NY. Chapter 5. Drivers, trends and mitigation. Page 30 https://www.ipcc.ch/report/ar5/wg3/

10 European Commission (1996) ENERGY FOR THE FUTURE: RENEW ABLE SOURCES OF ENERGY. Green Paper for a Community Strategy. Brussels, 20. 11. 1996 COM(96) 576 final; http://aei.pitt.edu/1280/1/renewalbe_energy_gp_COM_96_576.pdf

11 E.g. ibid

12 ibid

13 European Commission (2010) EUROPE 2020. A strategy for smart, sustainable and inclusive growth. 2020 final. Brussels 3.3.2010 COM(2010); http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:EN:PDF

14 It is assumed the biomass burned will grow back and take up the same volume of carbon as has been burned before a tree is cut again. In reality, this is rarely the case given that trees will be cut again long before they have re-accumulated the volume of carbon previously stored over decades of growth when rotation times were longer in the absence of added pressure for wood extraction for biomass burning.

15 European Commission, (1996): ENERGY FOR THE FUTURE: RENEW ABLE SOURCES OF ENERGY. Green Paper for a Community Strategy. Brussels, 20. 11. 1996 COM(96) 576 final; http://aei.pitt.edu/1280/1/renewalbe_energy_gp_COM_96_576.pdf

16 A Milan Conference (1996) 'Renewable Energy Sources in the Internal European Market' on 17-19 June 1996.

17 The European Communities2001 DIRECTIVE 2001/77/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 September 2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market. http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32001L0077&from=EN

18 The European Communities (2003) DIRECTIVE 2003/30/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 8 May 2003 on the promotion of the use of biofuels or other renewable fuels for transport; http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32003L0030

19 The European Communities (2009) DIRECTIVE 2009/28/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC; http://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A32009L0028

20 ECONEXUS and other civil society organisations (2007) Call for an immediate moratorium on EU incentives for agrofuels, EU imports of agrofuels and EU agroenergy monocultures, http://www.econexus.info/call-immediate-moratorium-eu-incentives-agrofuels-eu-imports-agrofuels-and-eu-agroenergy-monocultur-0

21 Atanasiu, B. (2010) The role of bioenergy in the National Renewable Energy Action Plans: a first identification of issues and uncertainties. IEEP: London., http://www.ieep.eu/assets/753/bioenergy_in_NREAPs.pdf

22 Hewitt, J (2011) Flows of biomass to and from the EU: an analysis of data and trends. Fern. ; http://www.fern.org/sites/fern.org/files/Biomass%20imports%20to%20the%20EU%20final_0.pdf

23 Global Agricultural Information Network: EU-28 Biofuels Annual, 7/3/ 2014, GAIN Report Number: NL4025 http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Biofuels%20Annual_The%20Hague_EU-28_7-3-2014.pdf

24 Eurostat: Statistics Explained; http://ec.europa.eu/eurostat/statistics-explained/index.php/Extra-EU_trade_in_primary_goods

25 European Commission (2011) EU Communication on the Agenda for Change; https://ec.europa.eu/europeaid/policies/european-development-policy/agenda-change_en Accessed 14 November 2016

26 European Commission: Aid for Trade (no date) http://ec.europa.eu/trade/policy/countries-and-regions/development/aid-for-trade/, Accessed 14 November 2016

27 Eurostat: Statistics Explained; http://ec.europa.eu/eurostat/statistics-explained/index.php/Extra-EU_trade_in_primary_goods

28 See e.g. Jennifer Kennedy, CorpWatch Blog, March 5th, 2013: Sierra Leone Farmers Evicted for Sugarcane Biofuel Plantations; http://www.corpwatch.org/article.php?id=15822 with references to other documentation

29 European Commission (no date) The 2030 Agenda for Sustainable Development; https://ec.europa.eu/europeaid/policies/european-development-policy/2030-agenda-sustainable-development_en Accessed 14 November 2016

30 European Commission (no date) Financing global sustainable development after 2015; https://ec.europa.eu/europeaid/sites/devco/files/post-2015-development-infograph-final_en.pdf Accessed 14 November 2016

31 Global Energy Efficiency and Renewable Energy Fund (GEEREF) (no date) Investment Strategy; http://geeref.com/about/investment-strategy.html Accessed 14 Novemer 2016

32 Borras, S.M., Franco, J.C., Isakson, R., Levidow, L. and Vervest, P. (2014) Towards understanding the politics of flex crops and commodities: Implications for research and policy advocacy, Amsterdam: Transnational Institute. https://www.tni.org/files/download/flexcrops01.pdf

33 European Environment Agency (2013) EU bioenergy potential from a resource-efficiency perspective, EEA Report No 6/2013,

34 Liesbeth de Schutter and Stefan Diljum, University of Economics and Bussiness (for Friends of the Earth Europe) (2014) A calculation of the EU Bioenergy land footprint; https://www.foeeurope.org/sites/default/files/agrofuels/2015/foee_bioenergy_land_footprint_may2014.pdf

35 The authors used the following assumptions regarding the forest land footprint: The area of the primary forest resources is calculated to be 4.4 ton / ha / year (based on an average of the technically possible harvest rates in European forests and on the knowledge of the structure and age of the EU's forests. (4.4 ton/ha/year is not necessarily a sustainable level). It is not taken into account that harvest rates will be different for imported wood fuels.

36 Liesbeth de Schutter and Stefan Diljum, University of Economics and Bussiness (for Friends of the Earth Europe) (2014) A calculation of the EU Bioenergy land footprint; https://www.foeeurope.org/sites/default/files/agrofuels/2015/foee_bioenergy_land_footprint_may2014.pdf

37 Institute for European Environmental Policy (2012) Anticipated Indirect Land Use Change Associated with Expanded Use of Biofuels and Bioliquids in the EU – An Analysis of the National Renewable Energy Action Plans; http://www.greenpeace.org/austria/Global/austria/dokumente/Reports/wald_IEEP-Report-agrotreibstoffe_2010.pdf

38 L. Marelli, F. Ramos, R. Hiederer, R. Koeble / Joint Research Center (2011) Estimate of GHG emissions from global land use change scenarios; http://iet.jrc.ec.europa.eu/sites/default/files/documents/scientific_publications/2011/technical_note_eu24817.pdf

39 Please see the Environmental Justice Atlas for case studies. Available at: https://ejatlas.org/

40 See e.g.: Anseeuw W., Alden Wily L., Cotula L., Taylor M. / The International Land Coalition, CIRAD and the International Institute for Environment and Development (2012) 'Land Rights and the Rush for Land'; http://www.cirad.fr/en/publications-resources/publishing/studies-and-documents/land-rights-and-the-rush-for-land or: Isis Alvarez and Rachel Smolker / Global Forest Coalition (2014) 'A GLOBAL OVERVIEW OF WOOD BASED BIOENERGY: PRODUCTION, CONSUMPTION, TRENDS AND IMPACTS'; http://globalforestcoalition.org/wp-content/uploads/2010/06/REPORT-WOOD-BASED-BIOENERGY-FINAL.pdf

41 Inge Altemeier: Lost in palm oil (Documentary film 2007): http://www.cultureunplugged.com/play/6846/Lost-in-Palm-Oil; also documented in Kurt Langbein: Land Grabbing. (Langbein & Partner Media GmbH & Co KG Documentary film 2015).

42 White, B., Borras Jr, S.M., Hall, R., Scoones, I. and Wolford, W., (2012). The new enclosures: critical perspectives on corporate land deals. Journal of Peasant Studies, 39(3-4), pp.619-647

43 Gaia Foundation, Biofuelwatch, the African Biodiversity Network, Salva La Selva, Watch Indonesia & EcoNexus (2008) Agrofuels and the Myth of the Marginal Lands; http://www.econexus.info/sites/econexus/files/Agrofuels_&_Marginal-Land-Myth_0.pdf

44 IPCC: Task Force on National Greenhouse Gas Inventories (no date) Frequently asked Questions http://www.ipcc-nggip.iges.or.jp/faq/faq.html Accessed 14 November 2016

45 The issue of upfront emissions has eventually been acknowledged by bioenergy companies but they claim that even though the initial emissions may be huge when forest or grassland is transformed into plantations for bioenergy, it will be beneficial for the climate on the long term when short rotation, fast growing plantations are continuously growing, felled and re-growing. The rationale is that when this has happened enough times the upfront emissions will be re-sequestered and, at the same time, fossil fuel burning will be reduced.

46 Kroger, M. (2014) Flex trees: political and rural dimensions in new uses of tree-based commodities. Transnational Institute, Think Piece Series on Flex Crops & Commodities, (2).

47 European Commission (2015): Report from the Commission to the European Parliament and the council the mid-term review of the EU biodiversity strategy to 2020, COM/2015/0478, http://www.ipex.eu/IPEXL-WEB/dossier/document/COM20150478.do

48 United Nations Environment Programme (2007): Global Environment Outlook GEO 4: Environment for development; http://www.unep.org/geo/geo4.asp

49 United Nations Environment Programme (2014): Global Environment Outlook GEO 5: Environment for the future we want; http://www.unep.org/geo/pdfs/geo5/GEO5_report_C5.pdf

50 Goran Berndes, Chalmers University of Technology and Goteborg University (2002): Bioenergy and water - the implications of large-scale bioenergy production for water use and supply; http://www.sciencedirect.com/science/article/pii/S0959378002000407

51 GRAIN (2012): Squeezing Africa Dry: Behind every land grab is a water grab; https://www.grain.org/article/entries/4516-squeezing-africa-dry-behind-every-land-grab-is-a-water-grab

52 High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security (HLPE) (2015) Water for food security and nutrition; http://www.fao.org/3/a-av045e.pdf

53 United Nations Environment Programme (UNEP)/ Oeko-Institut and IEA Bioenergy Task 43 (2011) The bioenergy and water nexus; http://www.unep.org/pdf/water/Water_Bioenergy_FINAL_WEB_VERSION.pdf

54 Franco, J., Feodoroff, T., Kay, S., Kishimoto, S. and Pracucci, G., (2014) The global water grab: A primer, Amsterdam: Transnational Instiute https://www.tni.org/en/publication/the-global-water-grab-a-primer

55 Water Footprint Network: http://waterfootprint.org/en/water-footprint/

56 European Commission (no date)Policy Coherence for Development https://ec.europa.eu/europeaid/policies/policy-coherence-development_en Accessed 14 November 2016

57 European Commission (2015) The EU's Contribution to the Millennium Development Goals, Luxembourg: Publications Office of the European Union http://ec.europa.eu/europeaid/sites/devco/files/brochure-mdg-2015_en.pdf

58 European Commission (2015) COMMISSION STAFF WORKING DOCUMENT Policy Coherence for Development 2015 EU Report. SWD(2015) 159 final, Brussels, 3.8.2015, https://ec.europa.eu/europeaid/sites/devco/files/policy-coherence-for-development-2015-eu-report_en.pdf

59 ECONEXUS and other civil society organisations (2007) Call for an immediate moratorium on EU incentives for agrofuels, EU imports of agrofuels and EU agroenergy monocultures. http://www.econexus.info/call-immediate-moratorium-eu-incentives-agrofuels-eu-imports-agrofuels-and-eu-agroenergy-monocultur-0

60 REDD-Monitor; www.redd-monotor.org Accessed 14 November 2016

61 Blessing Karumbidza & Wally Menne / The Timberwatch Coalition (2011) CDM Carbon Sink Tree Plantations – A case study in Tanzania. http://globaljusticeecology.org/files/CDM%20plantations%20report.pdf

62 See e.g. How does the FAO Forest Definition harm people and forest? An open letter to the FAO. Launched on the International Day of Struggle against Tree Monocultures, September 21st 2016 ;

63 See e.g. World Rainforest Movement (WRM) (2014): REDD: A collection of Conflicts, Contradictions and Lies, Montevideo: International Secretariat http://wrm.org.uy/books-and-briefings/redd-a-collection-of-conflicts-contradictions-and-lies/ Or: The Global Coalition Against REDD and the No REDD in Africa Network supported by many international organizations (2015) The Durban Declaration on REDD http://wrm.org.uy/articles-from-the-wrm-bulletin/section2/the-durban-declaration-against-redd/

64 Organisations have tried to convince politicians that climatic, environmental, social and equity issues are negatively influenced especially by the mandatory bioenergy target. They have built their arguments on scientific evidence as well as reports of land conflicts, food shortages and nature degradation from the global South. See e.g. Call for an immediate moratorium on EU incentives for agrofuels, EU imports of agrofuels and EU agroenergy monocultures (2007); http://www.econexus.info/call-immediate-moratorium-eu-incentives-agrofuels-eu-imports-agrofuels-and-eu-agroenergy-monocultur-0

65 NOAH, Biofuelwatch, Econexus, Global Forest Coalition, World Rainforest Movement, Rainforest Rescue, and Corporate Europe Observatory (2015): Bioenergy Out: Why bioenergy should not be included in the next EU Renewable Energy Directive; http://www.biofuelwatch.org.uk/wp-content/uploads/EU-Bioenergy-Briefing2.pdf

66 Alcott, B., 2005. Jevons' paradox. Ecological economics, 54(1), pp.9-21.

About this publication

This publication outlines the policy framework within which bioenergy is promoted by the EU. It identifies contradictions between the declared aims of competing policies – for example on climate, biodiversity, energy and growth – and shows how bioenergy is used to hide these contradictions from easy view.

A second part describes the negative ecological and social impacts of bioenergy production and consumption as currently pursued by the EU. It examines the environmental and agrarian justice implications of bioenergy policies that increase an already-excessive EU and corporate footprint on land, particularly in the global South. Considering the evidence, it appears that bioenergy cannot be produced 'sustainably' on the scale that is envisioned in EU bioenergy policies.

The paper concludes with an appeal to coherence in (civil society) positioning on closely linked issues often pursued in isolation– namely, energy transition, climate protection, divestment from fossil fuel extraction and promotion of renewable energies. One question in particular requires more reflection: Can large-scale use of biomass for energy, pursued within a structure of corporate power and control, really be considered sustainable from a social and ecological justice perspective? This report concludes that it cannot. This does not necessarily mean a rejection of quantitative targets for renewable energy but it does suggest that equal attention should be paid to the question of who controls the energy that is being produced and marketed as 'renewable' and 'sustainable' and for what/whom it is used.