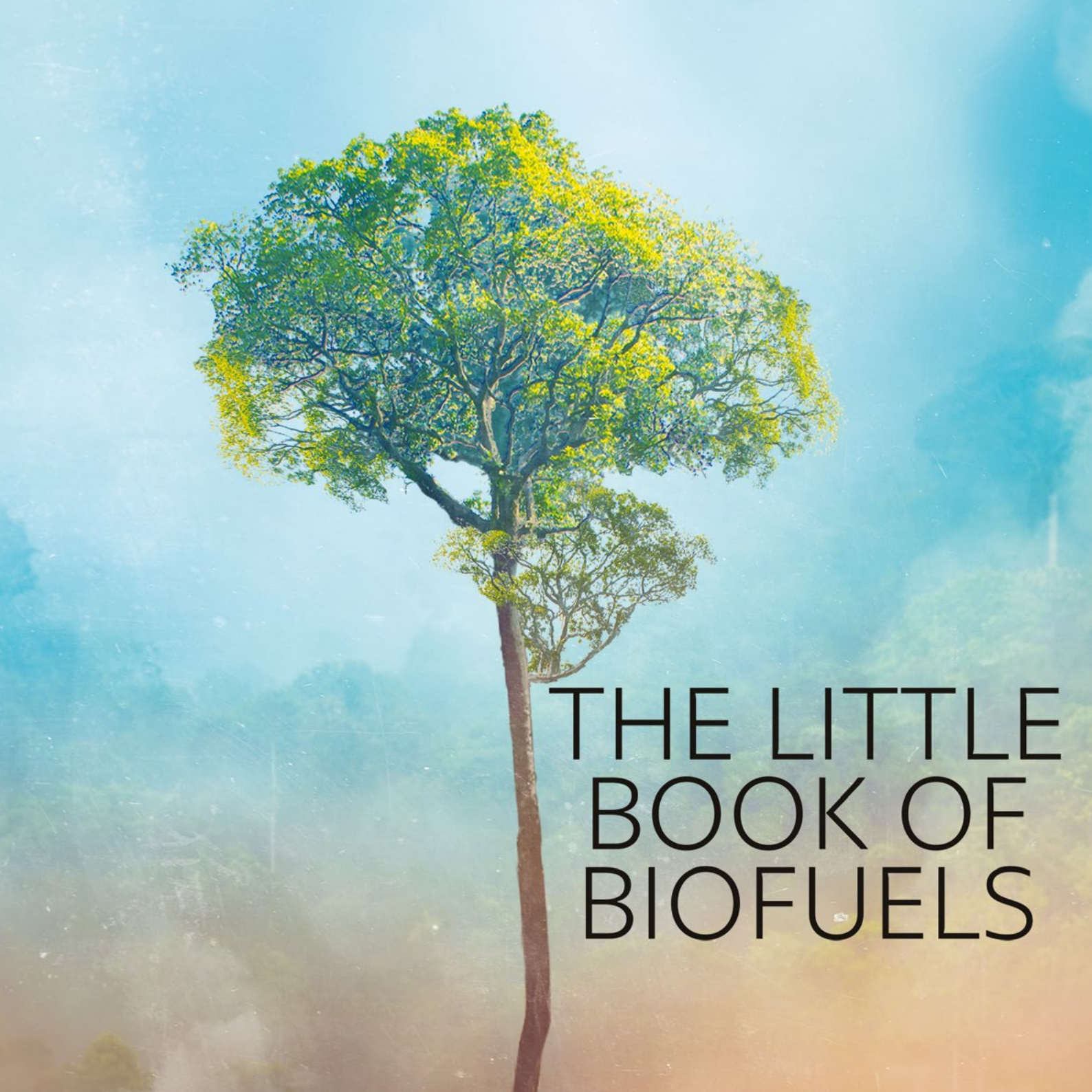
THE LITTLE
BOOK OF
BIOFUELS

Stichting BirdLife Europe | BirdLife International
Avenue de la Toison d'Or 67 | B – 1060 Brussels
Belgium
www.birdlife.org/europe-and-central-asia
Twitter: @BirdLifeEurope

European Environmental Bureau (EEB)
Boulevard Waterloo 34 | B – 1000 Brussels
Belgium
www.eeb.org
Twitter: @Green_Europe

Transport & Environment (T&E)
2nd floor, Square de Meeûs 18 | B – 1050 Brussels
Belgium
www.transportenvironment.org
Twitter: @Transenv

Norad
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October 2014

The Butterfly Effect: How Europe's decisions impact the world

With the launch of the Renewable Energy Directive (RED) in 2009, Europe's demand for biofuels has skyrocketed.

To meet this new demand, the global production of biofuels has also increased significantly.

In fact, did you know that every car in Europe uses a blend of biofuels? That's how common this product has become.

Biofuels use vegetable oils, cereals, sugars and waste fats – mainly extracted from rapeseed, soy, palm trees, corn and wheat – to create energy.

Because biofuels are derived from plant products, any increase or decrease in their use has a direct impact on agriculture worldwide.

THIS IS THE BUTTERFLY EFFECT.

A decision in Europe to mandate the use of biofuels means 500 million consumers now use these types of fuels. This demand triggers an increase in agricultural production worldwide, which causes drastic changes in land use – including deforestation.

DEFORESTATION

The Butterfly Effect in action

A rainforest is a carbon sink. It stores carbon dioxide in the form of organic material like trees, plants and carbon found in the soil.

When a part of this rainforest is cleared for agricultural use, all of this stored up carbon – some of which has been stored for hundreds of years – is suddenly released into the air.

We call this clearing of rainforest for agricultural use Indirect Land-Use Change (ILUC), and it is a consequence of Europe's increased demand for biofuels. Although ILUC is not directly linked to biofuel production, new land is needed to accommodate the growing demand for food and animal feed – and the increasing demand for biofuels displaces food production to new land.

But this deforestation has an even greater global impact that goes beyond the loss of the world's rainforest. When forests are cleared, the released greenhouse gasses contribute to global warming.

When you step back and look at the big picture, the use of biofuels can actually be worse for the environment than the use of conventional petrol and diesel!

1 car = 1 million cars

Due to additional biofuels demand to meet the EU 2020 targets, the carbon emissions released in the atmosphere could amount up to 313-646 million metric tonnes of CO2 by 2020. It is equivalent to adding 14 to 29 millions extra cars to Europe's roads.

IEEP (2011) Anticipated Indirect Land Use Change Associated with Expanded Use of Biofuels and Bioliquids in the EU

THE CLEARING OF RAINFOREST

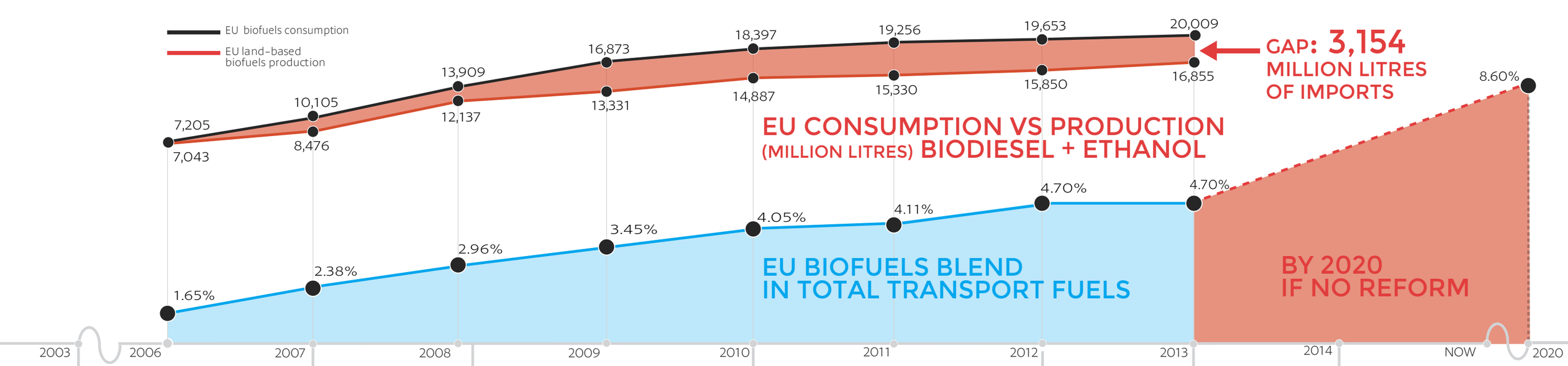
The clearing of rainforest to make room for planting crops typically happens in the world's most tropical areas.

To illustrate, look at Indonesia. Once home to the world's third largest rainforest, today the country has the not-so-proud distinction of being a world leader in the emission of greenhouse gases. This is because over the past few years Indonesia has cleared nearly half of its rainforests.

Zooming in on Borneo, we see an island that has been particularly affected by the expansion of the palm oil industry. According to some estimates, by 2020 Borneo will release 558 million metric tonnes of harmful CO2 gases into our atmosphere.

In other words, the island will be releasing the same amount of carbon as Canada – *which is 12 times bigger.*

Stanford Woods Institute for the Environment (2012) Carbon Emissions from Forest Conversion by Kalimantan Oil Palm Plantations.



May 2003

BIOFUELS DIRECTIVE

aimed at promoting the use of biofuels for EU transport, puts in place

5.75% indicative target **for biofuels** in all transport fuels by 2010

January 2007

THE COMMISSION

proposes to revise the Fuel Quality Directive (FQD) to include a

10% decarbonisation target for transport fuels by 2020

March 2007

EUROPEAN COUNCIL

puts in place a target for biofuels provided that they are sustainable and that second generation is commercially available

10% target for biofuels by 2020

January 2008

PUBLICATION OF EC PROPOSAL

of the Renewable Energy Directive (RED). The EP decided to have consistent sustainability criteria in both the RED and the FQD

10% target by 2020 and sustainability criteria for biofuels, but no ILUC (just direct land-use change emissions are part of the sustainability criteria)

April 2009

RED AND FQD BECOME EU LAWS

EP loses most of its demands, but it gets a legislative mandate for the Commission to look into the ILUC issue and if necessary include it in the sustainability criteria

The deadline for that is 31 December 2010

June / September 2008

PARLIAMENT VOTES

and both ENVI (June) and ITRE (September) commitees vote for ILUC to be included in the sustainability criteria

Both committees also voted to lower the share of land-based (also known as first generation) biofuels that can count towards the mandatory target

December 2010

THE COMMISSION

comes out with a report saying that ILUC is a real issue and that they need to look into it in detail

October2012

THE COMMISSION

publishes a proposal to reform EU biofuels policy (RED and FQD): for the first time it assigns ILUC factors to different types of biofuels, but falls short of accounting them for the climate performance of biofuels. Instead, it keeps ILUC factors only for reporting purposes

The proposal caps food-based biofuels (not all land-based biofuels) at current levels of 5% of blending

July 2013

The Environment Committee of

THE EUROPEAN PARLIAMENT

leading committee on the biofuels file, votes to include ILUC in sustainability criteria of the RED

and to cap all land-based biofuels at 5.5% of the target

September 2013

THE PLENARY OF THE EP

votes to cap all land-based biofuels at 6% and to include ILUC in the Fuel Quality Directive after 2020

June 2014

EUROPEAN COUNCIL

comes to a common position on biofuels and ILUC. Europe's energy ministers decides to cap the use of land-based biofuels to 7% of transport fuel - higher than the original 5% cap as proposed by the Commission in 2012

Cap is also higher than the full Parliament's compromise of 6%. ILUC reporting gets water-downed even further

The Environment Committee of

THE EUROPEAN PARLIAMENT

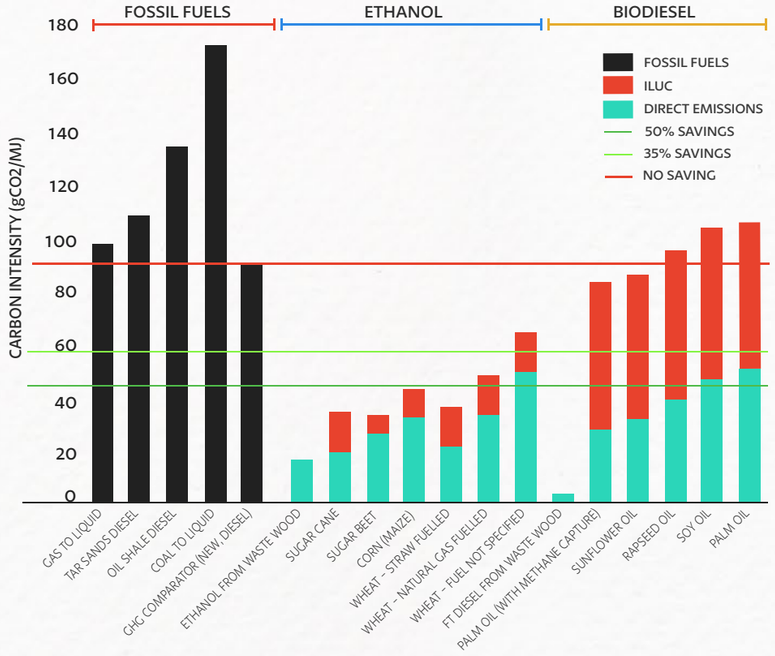
needs to give its verdict on Council's position on biofuels reform

Sources:

EU Biofuels Blend in TOTAL TRANSPORT FUELS: **EurObserv'ER, Annual Biofuels Barometer (2007-2014)**
EU Biofuels Consumption: **EurObserv'ER, Annual Biofuels Barometer (2007-2014)**
EU Biofuels Production: **EurObserv'ER, Annual Biofuels Barometer (2007-2014)**

BIOFUELS vs FOSSIL FUELS EMISSIONS

European Commission (2012) Impact Assessment accompanying ILUC proposal



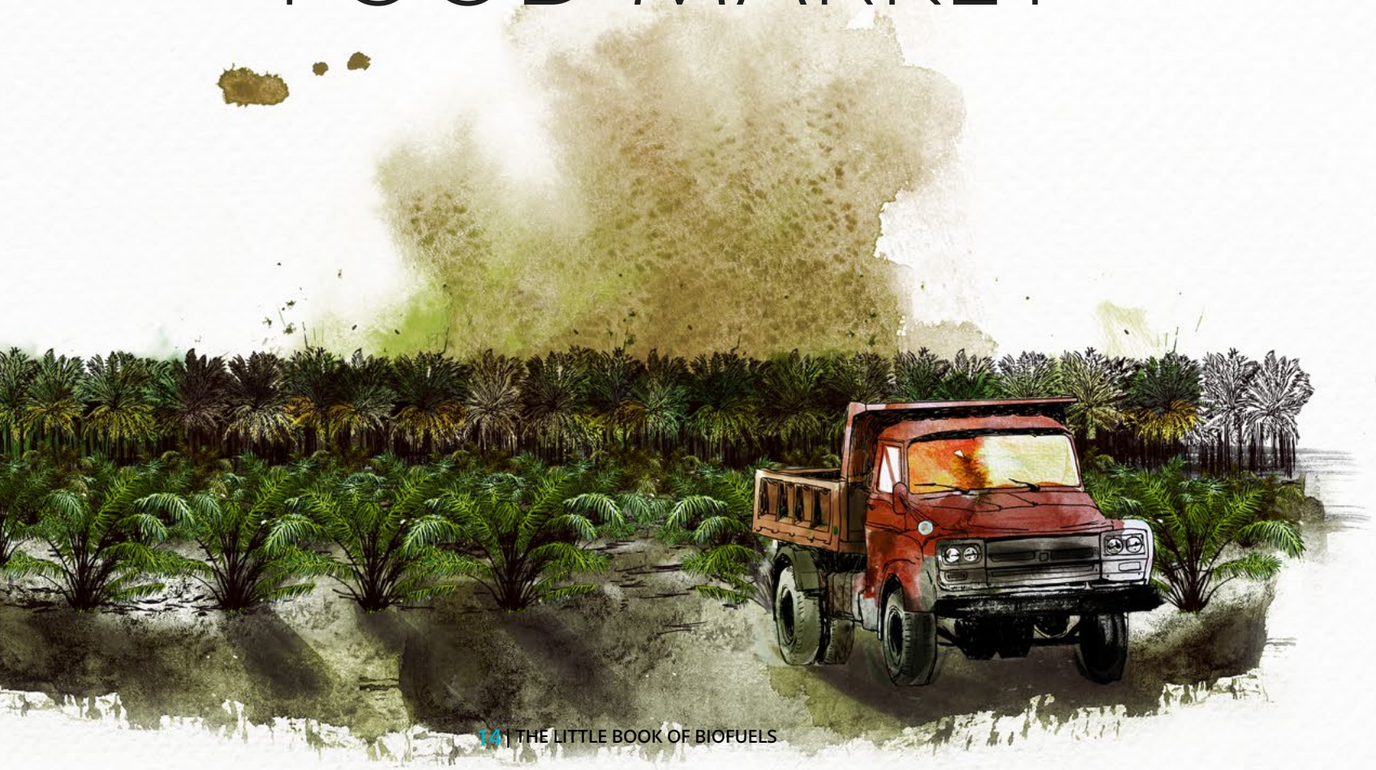
When we take into account the effects of ILUC, we get a clear picture of the actual impact of biofuels on our climate.

Today, biodiesel accounts for over three-quarters of all biofuels used in Europe. Biodiesel is mainly derived from rapeseed, soy and palm oil.

When you take into account the carbon emissions released to clear the land used to grow these plants, biodiesel actually produces more emissions than the conventional diesel they were designed to replace.

It's time to make biofuels accountable.

IMPACT ON THE FOOD MARKET



As well as not helping to combat climate change, European biofuels policy increases food prices too.

Europe's biofuels policy causes food prices to go up. These price rises have less to do with the type of crops biofuels are made from than with the previous use of the land. For example, when inedible crops such as switchgrass are grown on land that was previously used to grow edible crops, less food is produced.

Less food production means scarcity, and scarcity results in prices going up.

It also encourages farmers to plant more – which causes ILUC emissions. The land cleared during this process is typically located where production costs are the lowest. In the case of biodiesel, this often means the clearing of tropical rainforests to grow more palm oil.

The end result is a new market equilibrium with more land use and higher food prices.

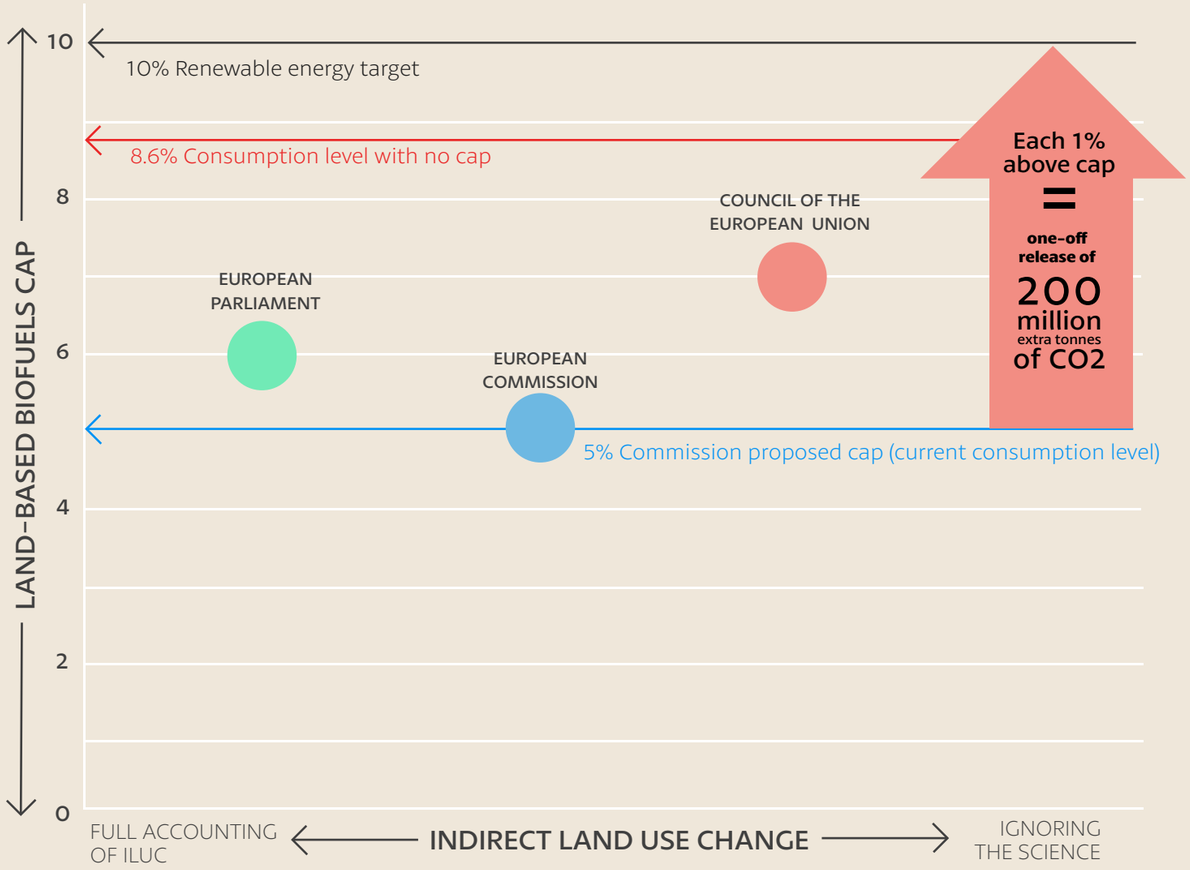
This effect is not just theoretical, it can also be seen in import figures.

Currently 65% of Europe's home-grown rapeseed is used for biodiesel. As demand for biodiesel in Europe increases, we need to import more and more vegetable oil. Again this often means palm oil, which in turn encourages the clearing of rainforest to make room for planting palm seeds.

You can also feel the effects of this increased pressure on land and food crops in food prices. If left unchanged, EU biofuels policy is expected to raise global rapeseed prices by 11%, sunflower and palm oil prices by 5%, and wheat, maize, sugar beet and cane prices by around 1%.

IEEP (2012) EU Biofuel Use and Agricultural Commodity Prices: A Review of the Evidence Base.

CURRENT POSITIONS OF THE THREE EUROPEAN INSTITUTIONS



EU Commission 2012

5% cap on food-based biofuels ONLY
ILUC accounting ONLY as of 2021 in RED
No sub-target for advanced biofuels

EU Parliament Plenary 2013

6% cap on ALL land-based biofuels
ILUC accounting in FQD as of 2021
2.5% sub-target for advanced biofuels by 2020

EU Council 2014

7% cap on food-based biofuels ONLY
ILUC reporting in RED & FQD but with broad ranges that add uncertainty
0.5% indicative sub-target for advanced biofuels

Source : Each 1% above cap = one-off release of 200 million extra tonnes of CO2: Own calculation based on figures from IEEP (2011) Anticipated Indirect Land Use Change Associated with Expanded Use of Biofuels and Bioliquids in the EU

ISSUE	EUROPEAN COMMISSION	EUROPEAN PARLIAMENT	COUNCIL
CAP ON FIRST GENERATION BIOFUELS	5% limit Applies only to biofuels produced from food crops Applies only to RED target (10% of transport energy from renewable sources by 2020)	6% limit Applies consistently to biofuels made from food crops and energy crops (all land-based biofuels) Applies to RED target and to FQD target	7% limit Applies only to biofuels produced from food crops Applies only to RED target
ILUC FACTORS	ILUC factors for reporting purposes in FQD & RED Review of ILUC factors by 31 Dec 2017 and inclusion in the RED's sustainability criteria as of 1 January 2021 if appropriate	In sustainability criteria only in FQD after 2020 Reporting in RED (as of 2021 same as European Commission)	ILUC factors only for reporting purposes ILUC factors are weakened through several changes (i.e. use of ranges instead of mean values) The inclusion of ILUC factors in the RED's sustainability criteria as of 2021 is deleted
ADVANCED BIOFUELS	Closed list of feedstocks No sustainability safeguards No sub-target for advanced biofuels Energy content of advanced biofuels counted 2x or 4x towards 10% renewable energy in transport target	Improved list of advanced feedstocks Elements of sustainability safeguards are introduced Binding sub-targets: 0.5% by 2016 2.5% by 2020	Expanded list of feedstocks and open to additions by Member States Energy content of advanced biofuels counted 2x towards 10% renewable energy in transport target and towards 20% renewable energy target Indicative sub-target for advanced biofuels: 0,5% by 2020; Member States may set lower targets.
ELECTRIFICATION IN TRANSPORT	No changes compared to the original RED text: renewable electricity used by electric vehicles is counted 2.5 times towards the achievement of the 10% target	No changes compared to the original RED text: renewable electricity used by electric vehicles is counted 2.5 times towards the achievement of the 10% target	Renewable electricity used by electric vehicles is counted 5 times toward the achievement of the 10% target Renewable electricity used in rail is also eligible and subject to multiplier (2.5)

WHAT CAN WE DO?

*First, account for ILUC via **ILUC factors**, so that better solutions get a chance.*

A more robust energy policy is needed to meet the goals set by the Renewable Energy Directive and the Fuel Quality Directive. Rather than focus on land-based biofuels, policy makers should study a variety of solutions.

*They can start by looking at the transportation sector and establish a 15-percent reduction in the energy used for transportation by 2020. This goal can be met through **improved vehicle efficiency** and a **shift from road transportation to rail**. In addition, there can be an increase of **over one percent** in the use of **renewable electricity in road and rail transport.***

*A cap can be placed on current biofuel production and a goal can be set to move towards eliminating land-based biofuel production by 2020. At the same time, there can be an increase in the consumption of **non-land-based biofuels** like biomethane from manure, straw, sewage and biodiesel from waste fats.*

*Reductions can also be achieved during the production of conventional oil. For instance, a significant amount of GHG emissions is released during **flaring and venting**. Designing more efficient processes will help reduce the amount of GHG emissions released during the production cycle.*

*When put together, this alternative vision for the transportation sector will **reduce CO2 emissions by 205 million tonnes by 2020** – a huge increase over the recent proposal of 60 million tonnes.*

*More importantly, it will allow **EU countries to meet their targets while avoiding the displacement of food production to new land, extra carbon emissions and habitat destruction caused by land-based biofuels.***

CE Delft (2012) Sustainable Alternatives for Land-based Biofuels in the European Union

Glossary – Accronyms

ADVANCED BIOFUELS	are identified as those that can be produced from non-land based raw materials.
BIODIESEL	is made from vegetable oil (primarily rapeseed and palm oil) or animal fat and can be mixed with diesel.
CAP ON LAND-BASED BIOFUELS	(also known as first generation) the RED (Renewable Energy Directive) sets a 10% binding target on the use of renewable energy in transportation by 2020. According to the national Renewable Action Plans, this target will be largely met with the use of biofuels. Given concerns about their sustainability, the current reform of the EU's biofuels policy intends to introduce a cap that limits the contribution biofuels can make to the achievement of the 10% target.
CARBON SINK	all organic matter is made of atoms of carbon, which means trees are natural reservoirs that store carbon dioxide in their trunks and leaves. As they grow the trees store this carbon for an indefinite period, making them 'carbon sinks'.
ETHANOL	is an alcohol-based type of biofuel which can be blended with gasoline. The raw material is commonly sourced from agricultural crops such as sugar cane, sugar beets, wheat and corn. It can also be produced with forestry or agricultural residues and municipal solid waste.
FQD - FUEL QUALITY DIRECTIVE	this law requires fuel suppliers to reduce the carbon footprint of a unit of transport fuel by 6% by 2020 -using more biofuels is one permitted way for suppliers to meet that target. The same biofuels sustainability criteria agreed to in the RED also apply under the FQD – and the same failure to address emissions from ILUC.
FUEL MIX	refers to the types of fuels used in the EU market. Although biofuels can be blended in petrol and diesel in different concentrations, due to favourable taxation treatment the market tends to favour diesel.
GREENHOUSE GASES (GHG)	are gases present in the atmosphere and include carbon dioxide, methane, nitrous oxide and fluorinated gases. Human activities release increasing amounts of GHG in the atmosphere, contributing to rapid global warming.
INDIRECT LAND-USE CHANGE (ILUC)	happens when land previously used to grow crops for food is converted to grow crops for fuel. As a result, agriculture has to expand elsewhere to meet the existing (and ever-growing) demand for food and animal feed. This expansion happens at the expense of forests, grasslands, bogs, wetlands, and other carbon rich ecosystems. When these ecosystems are cleared for farming, the result is an overall increase in greenhouse gas emissions. Watch a short video about biofuels at *http://bit.ly/videobiofuels*
LAND-BASED BIOFUELS	a large part of the biofuels consumed in the EU today, referred to as first generation biofuels, are produced with crops. These biofuels are called land-based biofuels.
PALM OIL	is derived from palm seeds and is the most produced vegetable oil in the world. Palm trees are widely cultivated in Southeast Asia, including Indonesia, Malaysia and Thailand. Besides biodiesel, it is also widely used in the production of food and cosmetics.
PEAT LAND	which include moors, bogs, mires, swamps and permafrost forest are extremely dense, carbon rich ecosystems. They cover 3% of the total land of our planet, and accumulate and store dead organic matter in an almost perfect way.
RAPESEED	is typically used for animal feed, vegetable oil and biodiesel. The leading producers are the EU, Canada, the US, Australia, China and India. After soybean and palm oil, it is the third largest source of vegetable oil in the world.
RED – RENEWABLE ENERGY DIRECTIVE	EU member states are required to source 10% of transport energy from renewable sources, mainly biofuels, by 2020. The RED dictates sustainability criteria that prevent some direct land-use change and dictates the minimum CO2 savings biofuels should achieve relative to fossil fuels in order to qualify for the scheme (and receive state subsidies). These criteria do not currently contain measures to calculate the massive carbon emissions caused by expanding agriculture to accommodate new biofuels demand, so-called 'Indirect Land-Use Change' (ILUC).
SOYBEAN OIL	is a vegetable oil extracted from soybean seeds and is one of the most consumed cooking oils. It represents half of the world's edible vegetable oil production and a third of all fats and oils produced.

Faustine Defossez
Senior Policy Officer: Agriculture and Bioenergy
European Environmental Bureau (EEB)
T: +32 (0) 2 790 8814
M: +32 (0) 4 87 244 270
Email: faustine.defossez@eeb.org

Nusa Urbancic
Programme Manager Fuels
Transport & Environment (T&E)
T: +32 (0)2 851 02 10
M: +32 (0)488 57 44 18
Email: nusa.urbancic@transportenvironment.org

Pietro Caloprisco
Policy Officer
Transport & Environment (T&E)
T: +32 (0)2 851 02 11
M: +32 (0)485 726 533
Email: pietro.caloprisco@transportenvironment.org

Laura Buffet
Policy Officer
Transport & Environment (T&E)
T: +32 (0)2 851 02 12
M: +32 (0)490 645 955
Email: laura.buffet@transportenvironment.org

Trees Robijns
Senior EU Agriculture and Bioenergy Policy Officer
BirdLife Europe
T: +32 (0)2 238 50 91
M: +32 (0)478 887 302
Email: trees.robijns@birdlife.org


#stopbadbiofuels