



# DRIVING TO DESTRUCTION

## The impacts of Europe's biofuel plans on carbon emissions and land

### Summary

A new study by the Institute for European Environmental Policy (IEEP) analyses the likely impacts on land use and greenhouse gas (GHG) emissions of biofuel use by 2020, as projected in recently published National Renewable Energy Action Plans (NREAPs) in 23 EU member states<sup>[1]</sup>. The analysis includes evidence on size and impacts of 'indirect land use change' (ILUC) resulting from biofuel use.

It is the most comprehensive study to date to quantify these effects. Previous attempts were not based on projections from NREAPs and in most cases excluded the effects of indirect land use change. The assessment comes at a key time

for EU biofuel policy, with the European Commission due to report on how to address and minimise these emissions by the end of this year<sup>[2]</sup>.

The study reveals that the EU's plans for biofuels will result in the conversion of up to 69 000 square kilometres (km<sup>2</sup>) of land to agricultural use due to ILUC. This will potentially put forests, other natural ecosystems, and poor communities at risk. Land conversion on such a scale will lead to the release of carbon emissions from vegetation and soil, making biofuels more damaging to the climate than the fossil fuels they are designed to replace.

### KEY FINDINGS

- National plans for energy and transport show Europe is set to increase significantly biofuel use. By 2020, biofuels will provide 9.5% of total energy in transport; 92% of these fuels will come from food crops (such as oil seeds, palm oil, sugar cane, sugar beet, wheat).
- This will require an expansion of cultivated agricultural land globally, converting forests, grasslands and peat lands into crop fields. Up to 69 000 km<sup>2</sup> will be affected – an area over twice the size of Belgium.
- Total net GHG emissions from biofuels could be as much as 56 million tonnes of extra CO<sub>2</sub> per year, the equivalent of an extra 12 to 26 million cars on Europe's roads by 2020. This means that instead of being 35 to 50% less polluting than fossil fuels (as required by the Renewable Energy Directive (RED)), once land use impacts are included, the extra biofuels that will come to the EU market will be on average 81% to 167% worse for the climate than fossil fuels.

## Methodology

The report bases its calculations on:

- The plans for biofuels in transport and bioliquids (for electricity generation and heating) given in recently submitted NREAPs for 23 member states;
- Recently released European Commission studies of ILUC – specifically European Commission Joint Research Centre (JRC) modelling to project ILUC and GHG emission consequences associated with expanded biofuel use;
- Data from the Intergovernmental Panel on Climate Change regarding GHG emissions from land use change.

It does not include waste or other biofuels produced from non-food crops (which can also lead to land use change). The report is likely a conservative estimate of resulting emissions.

## Biofuels and EU climate policy

Biofuels form an important pillar of the EU's climate policy. Under the EU's RED, member states are required to source 10% of transport energy from renewable sources, including from biofuels, by 2020. Member states were required to submit NREAPs setting out how they would achieve this by the end of June 2010<sup>[3]</sup>.

RED includes 'sustainability criteria' that account for emissions from direct land use change associated with growing biofuels, stipulating that member states only actively encourage biofuels which save significant GHG emissions. However it does not currently contain measures to calculate indirect land use change. Under the RED, the European Commission must report on the effects of ILUC and how to minimise them by 31 December 2010.

## What is indirect land use change?

The production of biofuels can indirectly cause additional deforestation and land conversion, including of fragile ecosystems. When existing agricultural land is turned over to biofuel production, agriculture has to expand elsewhere to meet the previous and ever-growing demand for crops for food and feed – often at the expense of forests, grasslands, peat lands, wetlands, and other carbon rich ecosystems. This results in substantial increases in GHG emissions from the soil and removed vegetation.

*“Indirect land use change could potentially release enough greenhouse gas to negate the savings from conventional EU biofuels”*

(Joint Research Centre of the European Commission (JRC), 2008)

As well as significantly increasing levels of GHG emissions, ILUC has devastating impacts on food security, land rights and people dependent on this land, and biodiversity worldwide. These effects were not quantified in this study.<sup>[4]</sup>

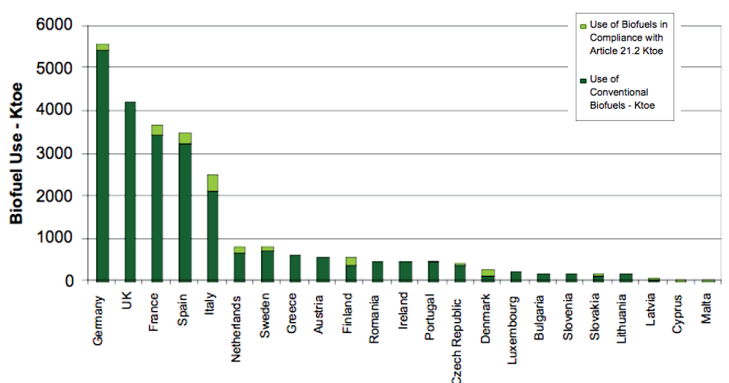
## The findings

IEEP's analysis of EU member states' plans for biofuel use found that:

### Use of biofuel:

- Crop-based biofuels are anticipated to account for 24.3 million tonnes of oil equivalent (Mtoe), with a split of 72% biodiesel and 28% bioethanol.
- 9.5% of transport energy will come from biofuels in 2020. 92% of these will be from crop-based feedstocks.
- Germany will be the biggest overall user of biofuels in 2020; the UK will be responsible for the biggest increase in biofuel use between now and 2020.
- The UK, Spain, Germany, Italy and France account for 72% of the expected additional biofuel demand between 2008-2020.
- In addition to biofuels for transport, 8 of the 23 member states anticipate using bioliquids for heating and electricity production. This will require an expansion in the same crops and resources as for biofuels – with a total additional 4.4 Mtoe of conventionally produced fuels.

Member state usage of Biofuels in 2020 based on NREAP figures – comparing total volume usage of conventional and advanced fuels (Ktoe = kilo tonnes of oil equivalent):



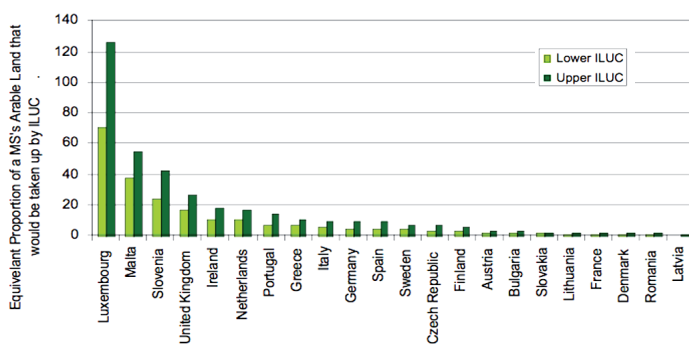
### The dependence on imports:

- On average the 23 member states are anticipating importing 50% of bioethanol and 41% of biodiesel in 2020, equating to imports of 3.1 and 7.7 Mtoe respectively.
- In total the UK will be by far the highest importer of biofuels by volume with a target of 3.7 Mtoe of imported fuels in 2020.

### The impacts on ILUC:

- For the 23 countries analysed, the ILUC impacts of these new biofuels by 2020 will be between 41 000 to 69 000 km<sup>2</sup> of natural ecosystems that will be converted to cropland.
- At the upper end of the estimates, this is equivalent to an area over twice the size of Belgium, or approximately the size of the Republic of Ireland or Latvia, or equivalent to the total area of arable land in the UK or half the arable land in Spain.
- For comparison, this would be equivalent to 82% to 138% of the land used for palm oil production in Indonesia in 2008.
- When bioliquids for electricity and heat production are included, an additional 18 900 km<sup>2</sup> of land is required.

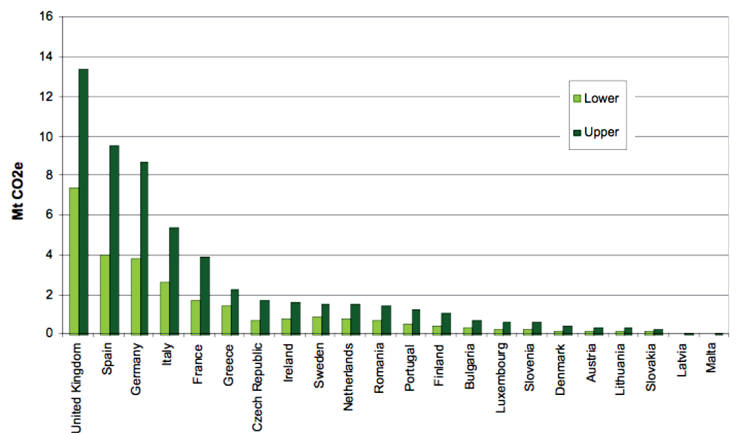
Member states' proportionate ILUC impact – comparing the area of ILUC from conventional biofuels to the area of arable land available in each Member State:



### The GHG emissions from converting this land to agricultural uses:

- Converting this area of land will mean a one-off release of 876 to 1459 million tonnes of CO<sub>2</sub> equivalent from vegetation and soil (this rises to up to 400 million tonnes extra for bioliquids).
- This means Europe's biofuels alone will be responsible for an extra 27 to 56 million tonnes of CO<sub>2</sub> equivalent per year (based on the 20 year time horizon specified in the RED, and taking into account the anticipated GHG savings of biofuels).
- At the upper end this is the equivalent to approximately 6% of total EU transport emissions in 2007, or around 12% of EU emissions from agriculture.
- This is equivalent to adding an extra 12 to 26 million cars on Europe's roads by 2020.
- These additional emissions associated with ILUC would mean that instead of being 35 to 50% less polluting than fossil fuels (as required by the RED), once land use impacts are included, the extra biofuels that will come to the EU market will be on average 81% to 167% worse for the climate than fossil fuels.

Total extra GHG emissions anticipated from EU countries' 2020 plans (MtCO<sub>2</sub>e = million tonnes of carbon dioxide equivalent):



### Comparing member states:

- Through their consumption of biofuels to 2020, the UK, Slovenia, Malta and Luxembourg would all be responsible for ILUC equivalent to more than 20% of their own arable land area (though the impacts will be located elsewhere in the world).
- Five countries will be responsible for over two thirds of the increase in emissions. The UK, Spain, Germany, Italy and France are projected to produce the most extra GHG emissions from biofuels – with up to 13.3, 9.5, 8.6, 5.3 and 3.9 extra million tonnes of CO<sub>2</sub> per year respectively (taking into account the anticipated GHG savings of biofuels).
- As a proportion of their annual transport emissions in 2007 Ireland, Sweden, Romania, the UK and Slovenia, will all increase their annual carbon emissions from transport by more than 10% if they fulfil their 2020 targets for renewable in transport (based on upper estimates).



## The solutions

In light of this research the coalition of NGOs calls on European Union and member states to:

- ➔ **Support legislative proposals counting for the full climate impact of biofuels** – The EU must factor in known sources of unaccounted GHG emissions for biofuels. Current renewable policies in the transport sector are inadequate because they encourage biofuels that increase GHG compared to fossil fuels. The policy should be fixed by including robust and precautionary ‘factors’ that reflect emissions from ILUC for different biofuel crops.
- ➔ **Revisit and amend biofuel policies** – The sustainability of national and European biofuel targets must be reviewed to reflect the reality of biofuel expansion on total emissions, biodiversity and communities. Member states must immediately revisit their NREAP and eliminate support for biofuels that increase GHG emissions, threaten land rights and cause food insecurity. Priority must be given to energy efficiency and renewable electricity in trains and cars to contribute to the EU’s renewable target in transport.

*The EU must only accept biofuels that demonstrably reduce GHG emissions, pose no significant land use issues, do not threaten people’s food security, and do not risk conservation conflicts. For this reason, the EU should introduce ILUC factors to fully acknowledge all GHG emissions from its policies and bring forward an urgent review of the sustainability impacts of expanding biofuel use.*

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### Notes

[1] Institute for European Environmental Policy (IEEP). November 2010. ‘Anticipated Indirect Land Use Change Associated with Expanded Use of Biofuels in the EU – An Analysis of Member State Performance’. Author: Catherine Bowyer, Senior Policy Analyst. IEEP is a leading independent centre for the analysis of European policy. (www.ieep.eu). Report commissioned by ActionAid, BirdLife International, ClientEarth, European Environmental Bureau, FERN, Friends of the Earth Europe, Greenpeace, Transport & Environment, Wetlands International. www.goo.gl/8XA8

[2] For more information on the political context please see:  
• ‘Biofuels: Handle with care – an analysis of EU biofuel policy with recommendations for action’ www.goo.gl/pOV8  
• ClientEarth – ‘Legal Briefing: Legislative mandate to the Commission on Indirect Land-Use Change’ www.goo.gl/5U3u

[3] NREAPs were submitted to the European Commission on 30 June 2010 (though many were submitted late) www.goo.gl/qEmi. The study analyses the 23 plans that had been submitted by October 2010 (AT, BG, CY, CZ, DE, DK, EL, ES, FI, FR, IE, IT, LT, LU, LV, MT, NL, PT, RO, SE, SI, SK, UK).

[4] For more information about Indirect Land Use Change, please see:  
• BirdLife International, European Environmental Bureau, Transport & Environment – ‘Bioenergy: a carbon accounting time bomb’ - www.goo.gl/SV5J  
• Transport & Environment – ‘Biofuels and Land Use Change: Review of independent studies’ - www.goo.gl/yowf  
• Friends of the Earth Europe – Three case studies on indirect land use change and emissions from biofuel crops - palm oil, soy and sugar cane – www.goo.gl/HKoU  
• ActionAid – Meals Per Gallon: the impact of industrial biofuels on people and global hunger www.goo.gl/rc5X

