



European Federation for
TRANSPORT and ENVIRONMENT

FACTSHEET Biofuels and land use change: further reading

November 2008

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Several respected international institutions, national technical agencies and scientific organisations have released major reviews of biofuels policies in 2008.

Among other things, they have warned that direct and indirect land use change (LUC) due to increased biofuel production has a high potential to outweigh greenhouse gas (GHG) benefits.

They have called for a more cautious policy approach to biofuels until indirect impacts are properly assessed and safeguards implemented.

The American government has passed a law that requires direct and indirect emissions from LUC to be included in calculations of lifecycle greenhouse gas emissions from biofuels. Europe is still lagging behind with a proposal to increase its volume target without accounting for indirect impacts in any way.

The European Parliament's Industry and Environment committees have both wisely voted to reverse this stance and include a conservative correction factor that would apply in 2011, if a comprehensive methodology is not developed before. That approach follows the precautionary principle, which is a fundamental element of European law.

The European Commission and the majority of national governments have so far ignored these warnings, insisting on mandatory targets that would boost the use of biofuels while refusing to make any commitment to develop a methodology for the inclusion of indirect land use change at a later stage.

The stated purpose of EU biofuels policy is to reduce GHG emissions from the transport sector by substituting fossil fuels. Therefore, it is essential that the emissions from land use change are adequately incorporated in the full life cycle analysis.

Below is the list of major reports on biofuels that call for further assessment of indirect land use change, together with summaries of their major findings on this topic.

Renewable Fuels Agency, UK

"Current evidence suggests that the proposed EU biofuels target for 2020 of 10% by energy is unlikely to be met sustainably and the introduction of biofuels should therefore be slowed while we improve our understanding of indirect land-use change and effective systems are implemented to manage risks. The immediate focus for

policy should be on implementing the necessary controls and conditions that will enable the industry to develop sustainably."

"...current greenhouse gas lifecycle analysis fails to take account of either indirect land change or avoided land use from co-products. Failing to include these factors may create perverse incentives which lead to higher greenhouse gas emissions by encouraging feedstocks that lead to higher net land use."

"The balance of evidence shows a significant risk that current [biofuel] policies will lead to net greenhouse gas emissions."

Gallagher, Ed et al (2008): The Gallagher Review of the Indirect Effects of Biofuel Production, Renewable Fuels Agency -

www.dft.gov.uk/rfa/db/documents/Report_of_the_Gallagher_review.pdf

Joint Research Centre, European Commission

"Indirect land use change could potentially release enough greenhouse gas to negate the savings from conventional EU biofuels."

De Santi, Giovanni et al (2008): Biofuels in the European Context: Facts and Uncertainties, Joint Research Centre, European Commission -

ec.europa.eu/dgs/jrc/downloads/jrc_biofuels_report.pdf

European Environment Agency

"Further expansion of bioenergy production may cause direct adverse effects on the environment and indirect effects due to displacement effects (changes and shifts in land-use, e.g. from grassland to arable land). These direct and indirect effects may undermine an important goal society is trying to achieve with the use of bioenergy — reducing greenhouse gas emissions — and jeopardise the achievement of other environmental goals, such as the protection of biodiversity and water resources."

"This matters as indirect land-use change, in particular deforestation, affects the overall greenhouse balance of bioenergy production (Fargione et al., 2008; MNP, 2008). Deforestation and associated land-use change were responsible for about 17 % of global greenhouse gas emissions in 2004 (IPCC, 2007). In fact, deforestation is a more important factor at the global level than emissions from transport (Stern, 2006)."

“Future revisions of the EEA 2006 modelling work should therefore address potential indirect effects of EU bioenergy production and consumption, in particular on land use.”

EEA Technical Report (2008): Maximising the environmental benefits of Europe's bioenergy potential, European Environment Agency - reports.eea.europa.eu/technical_report_2008_10/en/Bioenergy_Potential.pdf

Food and Agriculture Organization of United Nations

“Some biofuels may, under certain conditions, help reduce greenhouse gas emissions. In practice, however, the global effects of an expansion of biofuel production will depend crucially on where and how the feedstocks are produced. Land-use change resulting from increased feedstock production is a key determining factor. For many locations, emissions from land-use change – whether direct or indirect – are likely to exceed, or at least offset, much of the greenhouse gas savings obtained by using biofuels for transport. Moreover, even when biofuels are effective in reducing greenhouse gas emissions, they may not be the most cost-effective way of achieving this objective compared with other options.”

“It must be ensured that further expansion of biofuel production will provide a positive contribution to climate-change mitigation. For this purpose, there is a critical need for an improved understanding of the effects of biofuels on land-use change, which is the source of the most significant effects on greenhouse gas emissions.”

FAO (2008): The State of Food and Agriculture 2008 - ftp.fao.org/docrep/fao/011/i0100e/i0100e.pdf

“In addition, a comprehensive carbon balance assessment must take into account “indirect” land-use change which refers to emissions from land that has been put into agricultural production, because other agricultural land has been converted to bioenergy crops, or because of increased demand for food crops as a result of bioenergy cropping. Such indirect effects are difficult to attribute and measure.”

FAO Bioenergy website (2008) - www.fao.org/bioenergy/52178/en/

Netherlands Environmental Assessment Agency

“The results in chapter 4 show that a 10% target for biofuels will contribute to global land conversion, although because of the criteria not directly for biofuels for Europe. If it indirectly drives towards the conversion of land and only about half of this land would be permanent grassland or lightly forested area, then the positive effect of the biofuels on GHG emissions would already have been undone.”

“The analysis in chapter 4 shows there is a need for extra land to produce biofuels globally. To comply with European criteria, the newly converted land outside the EU is not likely to be used for biofuels for Europe, but for exports to

other nations, domestic use or for the cultivation of feed and food. Indirectly, the resulting soil emissions can be related to biofuel production for Europe, making the overall impact of biofuels on greenhouse gas emissions likely to be negative (section 5.4).”

MNP, 2008. Local and global consequences of the EU renewable directive for biofuels. Eickhout, B.; van den Born, G.J.; Notenboom, J.; van Oorschot, M.; Ros, J.P.M.; Van Vuuren, D.P.; Westhoek, H.J., MNP Report - www.rivm.nl/bibliotheek/rapporten/500143001.pdf

Scientific publications

“Our results demonstrate that the net effect of biofuel production via clearing of carbon-rich habitats is to increase CO₂ emissions for decades or centuries relative to fossil fuel use. Conversely, biofuels from perennials grown on degraded farmland and from waste streams would minimize habitat destruction, competition with food production, and carbon debts, all of which are associated with direct and indirect land clearing for biofuel production.”

Fargione, J.; Hill, J.; Tilman, D.; Polasky, S., and Hawthorne, P., 2008. Land clearing and the biofuel carbon debt. *Science*, 29/02/2008, pp. 1235–1238 - www.sciencemag.org/cgi/content/abstract/319/5867/1235

“By using a worldwide agricultural model to estimate emissions from land-use change, we found that corn-based ethanol, instead of producing a 20% savings, nearly doubles greenhouse emissions over 30 years and increases greenhouse gases for 167 years. Biofuels from switchgrass, if grown on U.S. corn lands, increase emissions by 50%. This result raises concerns about large biofuel mandates and highlights the value of using waste products.”

Searchinger, T. et al (2008): Use of U.S. Croplands for Biofuels Increases Greenhouse Gases through Emissions from Land Use Change. *Science*, 08/02/2008, pp. 1238-1240 - www.sciencemag.org/cgi/content/abstract/1151861

“We recommend a system-wide approach to model indirect land-use change in biofuels production. “

“Collaborative works is needed at international level in order to develop a common and appropriate methodology to account for ILUC. “

E. Gnansounou et al; "Summary of Methodological Approaches to Calculating the Impacts of Indirect Land Use Change"; LASEN-EPFL; March 2008 - www.bioenergywiki.net/images/b/b0/2008_LASEN-EPFL_Accounting_for_ILUC_in_biofuels_production-final_version.pdf

Further information

www.transportenvironment.org/pages/low-carbon-fuels