# ActionAid UK's submission to the European Commission's consultation on Indirect Land Use Change from biofuels[1]

October 2010

## Summary

The European Commission (EC) is due to report on the impact of indirect land use change (ILUC) and greenhouse gas (GHG) emissions by 31st December 2010. The EC's own studies show that GHG emissions released through ILUC from increasing demand for biofuels in the EU are substantial. In many cases, biofuels will actually increase GHG emissions compared to the fossil fuels they are replacing. The evidence is compelling and confirms that the European Commission, supported by member states should come forward urgently with feedstock-differentiated ILUC factors.

It is also appropriate for the EC report to be supported by a legislative proposal based on the best available scientific evidence. The EC studies produce reliable values down to the feedstock level - this represents the best available scientific evidence indicating that the unavailability of additional scientific evidence should not be used to justify Commission inaction or delay.

In ActionAid's view almost all crop-based biofuels are already unsustainable. This is largely due to the increasing level of demand for biofuels, driven by biofuel targets in member states and the EU's 10% renewable energy transport target. These biofuels are being produced from intensive agriculture on an industrial scale which is having a negative impact on people, on the environment and on development. But the fact that the EC studies also show that targets will end up increasing carbon emissions from the transport sector completely undermines both EU biofuel policy and the Renewable Energy Directive which has, as a primary objective, the reduction in GHG emissions.

In light of these findings, biofuel targets in member states should be scrapped and the EU's 10% transport target should be reviewed and reformed. Priority must be given, for example, to more fuel efficient cars, energy efficiency, increased use of public transport and renewable electricity in trains, buses and cars to contribute to the EU's renewable target in transport.

### ActionAid

ActionAid welcomes this opportunity to input into the EC's consultation on 'Indirect Land Use Change Impacts of Biofuels' with a specific focus on GHG emissions and ways to minimize them.

ActionAid is an international development agency whose aim is to fight poverty worldwide. Formed in 1972, we work with local partners to fight poverty and injustice in 42 countries worldwide.

35 years of experience in child sponsorship has rooted ActionAid firmly in the world's poorest communities. Over 80% of our staff is from poor countries and we are the only international development organization to be run from one - our head office is in Johannesburg.

ActionAid believes that food, water, shelter, education and access to land are not just basic needs, but many are also human rights. We therefore work with people in poor communities and decision-makers at all levels to make sure their rights are met. But in the rush to meet the increasing demand for biofuels, many of these rights are being undermined. ActionAid has witnessed this through our work on biofuels in many developing countries but, in particular, in Brazil, Guatemala, Kenya, Ghana, Senegal, Tanzania, Mozambique and India.

[1] This submission was compiled by Tim Rice who can be contactable on tim.rice@actionaid.org

## INTRODUCTION

In April 2009, the EU legislature adopted the Renewable Energy Directive (RED), requiring Member States to use renewable energy so urces to meet 10% of their transport needs by 2020. Upon adopting the RED (and the Fuel Quality Directive), the EU legislature omitted an ILUC factor, postponing its inclusion to a later date after additional analysis. This was largely justified on the nee d to clarify ILUC impacts. Article 19(6) of the RED reads:

> "The Commission shall, by 31 December 2010, submit a report to the European Parliament and to the Council reviewing the impact of indirect land -use change on greenhouse gas emissions and addressin g ways to minimise that impact. The report shall, if appropriate, be accompanied by a proposal, based on the best available scientific evidence, containing a concrete methodology for emissions from carbon stock changes caused by indirect land -use changes, ensuring compliance with this Directive, in particular Article 17(2)."

Both Directives therefore contain a legislative mandate to the Commission to produce a proposal, if appropriate, on ILUC to address known sources of unaccounted GHG emissions. The prop osal must be based on the "*best available scientific evidence* ," indicating that the unavailability of additional scientific evidence should not be used to justify Commission inaction or delay. This submission will argue that a proposal is indeed appropriat e.

ILUC must be carefully determined to ensure compliance with RED, in particular Article 17(2) of the sustainability criteria for biofuels. Article 17(2) outlines the GHG -saving thresholds under the GHG -saving criterion, which is a sustainability criteri on requiring biofuels to meet certain GHG savings compared to fossil fuels. The GHG -saving criterion serves as a filter, promoting biofuels that achieve greater GHG savings over those that achieve less or none. Under RED, the required GHG -saving threshold increases over time, starting at 35% in 2009 before increasing to 50% in 2017 and to 60% in 2018 for new installations.

The GHG balance of biofuels is a very important issue in determining whether biofuels are sustainable under EU policy or not. But it i s not the only issue, far from it. ActionAid has strongly argued that the sustainability criteria overall under Article 17(2) are fundamentally flawed and will not afford anything like the level of guarantee of sustainability that is required, not least be cause they are woefully inadequate on social and developmental issues. Even without ILUC and GHG emissions, almost all EU crop -based biofuels are already unsustainable largely because they are produced intensively - from direct impacts on people and commun ities, the use of chemicals, land grabbing, the depletion and pollution of water courses, soil erosion, loss of biodiversity and habitats, poor working conditions on plantations and so on.

And this does not take into consideration other indirect impacts such as adverse effects on food prices and hunger. Independent analysis of the food price spike in 2007/08 suggests that biofuels were responsible for between 30 -75% of the rise. The European Commission originally forecast in 2008 that its own target would increase word cereal prices by 3 -6%.[2] Following the argument that the number of hungry people could increase by 16 million for every 1% rise in food prices, the EU alone could be responsible for up to 100 million more people going hungry by 2020. But even the 3-6% price rise could be conservative. Recent studies by the EC reveal that EU biofuel policies (but only a 7% share of transport fuels) could increase cereal prices by up to 20%. [3] Therefore, the EU should refine its modeling to adequately cover other indirect impacts such as food prices, food security and on biodiversity, not just carbon.[4]

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[2] Impacts of the EU biofuel target on agricultural markets and land use: a comparative modelling assessment. Joint Research Centre, Institute for Prospective Technological studies, Seville, July 2010, commissioned by DG AGRI of the European Commis sion (referred to as "IPTS study "); See page 14

[3] IPTS study, 2010. *Ibid.* Page 70

[4] Some of the EC modeling did cover the impact on food prices but this needs to be conducted much more comprehensively.

That said, this consultation response will focus on the impact of ILUC on GHG emission from biofuels and ways to minimize that impact (Article 19(6) of the RED).

## WHAT DOES THE ILUC EVIDENCE SHOW ?

Many previous reports have argued that ILUC will be very important in the greenhouse gas balance of biofuels. Even the European Commission's (EC) own Joint Research Centre (JRC) warned in 2008 that *"Indirect land use change could potentially release enough greenhouse gas to negate the savings from conventional EU biofuels."* [5] A year later, the German Advisory Council on Global Change was advising that: "*When emissions from indirect land -use changes* [caused by biofuels] *are taken into account, they frequently result in higher emissions than would arise from the use of fossil fuels."* [6]

## What does the European Commission's ILUC evidence show ?

The studies published by the Commission [7] for the purposes of its report confirmed previous existing scientific knowledge. All studies show that ILUC emissions are substantial and will lead to an increase of GHG emissions if ILUC is not appropriately accounted for. In answer to Question 1 of the consultation document, **these studies, and other analytical work, provide a good basis for determining the significance of ILUC from the production of biofuels. Action is urgently need** (Question 2 of the consultation document).

The unavoidable conclusion from the Commission studies is that the presentation of a proposal to address ILUC is not only appropriate but of paramount importance to ensure compliance with EU climate policy. The studies also provide an indication of marginal GHG emissions from different biofuels feedstocks, which can guide the Commission, when drafting its proposal.

This consultation response focuses on three areas

1. The estimated aggregate emissions impacts from EU biofuel policies
2. The estimated marginal emissions impacts from EU biofuel policies for different biofuel feedstocks

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[5] De Santi et al., 2008. Biofuels in the European Context: Facts and Uncertainties. Joint Research Centre, European Commission.

[6] Schubert e al., 2009. Future Bioenergy and Sustainable Land Use. Earthscan, London

[7] ***ISPRA for DG CLIMATE***
FULL TITLE: Indirect Land Use Change from increased biofuels demand - comparison of models and results for marginal biofuels production from different feedstocks. Joint Research Centre, Institute for Energy, Ispra, July 2010, commissioned by DG ENV/CLIMA, July 2010 (**referred to as "ISPRA study"**);

***IFPRI for DG TRADE***
FULL TITLE: Global Trade and Environmental Impact Study of the EU Biofuels Mandate, Final Draft Report, March 2010. International Food Policy Research Institute (IFPRI), March 2010, commissioned by DG TRADE, (**referred to as "IFPRI study"**);

***JRC ISPRA report quantifying DG AGRI IPTS and IFPRI***
FULL TITLE: Biofuels: a New Methodology to Estimate GHG Emissions Due to Global Land Use Change. A methodology involving spatial allocation of agricultural land demand, calculation of carbon stocks and estimation of N2O emissions" by R. Hiederer, F. Ramos, C. Capitani, , R. Koeble, V. Blujdea, O. Gomez, D. Mulligan and L. Marelli. EU Report 24483, 2010 ( **referred to as "ISPRA study 2"**).

The results of these three studies, taken in tandem with predicted biofuel usage in NREAPs, indicate the scale of ILUC. Two other studies were also released:

***IPTS for DG AGRI***
FULL TITLE: Impacts of the EU biofuel target on agricultural markets and land use: a comparative modelling assessment. Joint Research Centre, Institute for Prospective Technological studies, Seville, July 2010, commissioned by DG AGRI of the European Commission (**referred to as "IPTS study "**);

***DG Energy Literature Review***
FULL TITLE: The Impact of Land Use Change on Greenhouse Gas Emissions from Biofuels and Bioliquids. DG Energy, July 2010.

3. How to address ILUC - what course of action is appropriate ?

### Aggregate level of GHG emission from ILUC

The recently submitted National Renewable Energy Action Plans (NREAPs) show that EU member states plan to use an additional 15 mtoe of first gene ration (land-using) biofuels by 2020 as well as 5.4 mtoe of bioliquids. The split between biodiesel and ethanol in the transport secor is approximately 75%/25%. First generation biofuels will comprise 9% of the 10% transport target.

Using the estimates of biofuel use in the NREAPS, and combining them with land -use change from the ISPRA study, one can calculate how much land will be converted worldwide – between 5.1 and 8.4 million hectares as shown in Table 1.

Table 1: Estimated Land -Use Change Due to ILUC

| Table 1 | Increase in production from 2008 to 2020 from NREAPs (Ktoe) | Overall land increase to meet 2020 targets (thousand hectares) | |
|---|---|---|---|
| | | Minimum additional land | Maximum additional land |
| Ethanol | 4250 | 1657.5 | 2210 |
| Biodiesel | 10797 | 2483.31 | 4318.8 |
| Bio liquids | 5462 | 1000.46 | 1892.17 |
| Total | 20509 | 5141.27 | 8420.97 |

For comparison, the land area of the UK is 9.4 million hectares

Converting forests and other natural areas into croplands releases GHG emissions. Translating the hectares figure into emissions, we co me up with the one -off release of GHG emissions between 876 and 1459 Mt $CO_2$ as shown in Table 2. These emissions should be divided over 20 years as specified in RED. After incorporating approximate direct savings from the approximate aggregated use of biof uels due to displacement of fossil fuels, we still end up with a policy that will be a net emitter of up to 58 Mt $CO_2$ per year. This is the equivalent of adding an extra 12 to 25 million cars on European roads by 2020.

Table 2: Emissions from Land -Use Change[8]

| Table 2 | Emissions from land use change | | |
|---|---|---|---|
| | One-off ILUC emissions | ILUC emissions on the annual basis (divided over 20 years as specified in RED) | ILUC emissions including GHG savings from biofuel use (divided over 20 years) |
| | Mt CO2eq | Mt CO2 eq | Mt CO2 eq |
| Minimum | 875.92 | 43.8 | 29.04 |
| Maximum | 1459.34 | 72.97 | 58.21 |

[8] The use of bioliquids would result in additional one-off emissions in the range of 210 – 400 Mt CO2.

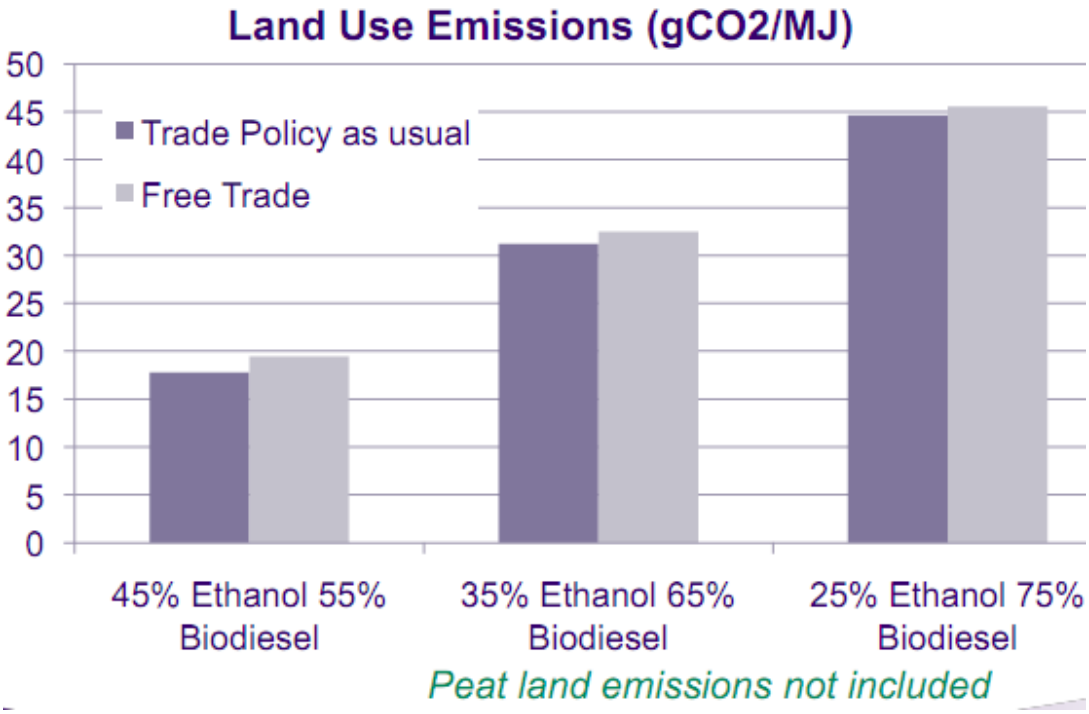
The IPTS study came up with similar results. According to a report by the JRC, which calculated the GHG impacts of the IPTS study, increasing biofuels from current shares to 7% would lead to estimated one-off GHG emissions of 1.092 Mt $CO_2$-eq.[9] Averaging this over a 20-year timeframe would yield around 54.6 Mt $CO_2$ per year (excluding GHG savings from biofuels use).

There is one Commission study that came up with net GHG savings from the policy as a whole: the IFPRI study. Its main outcome is that there is a global net balance of nearly 13 Mt $CO_2$ savings per year, over a 20-year horizon, due to an increase of biofuels from 3.3% to 5.6%. Under the 5.6% scenario, direct emission savings from biofuels are estimated at 18 Mt $CO_2$ with additional ILUC emissions at 5.3 Mt $CO_2$ (mostly in Brazil), resulting in a global net balance of nearly 13 Mt $CO_2$ savings per year over a 20-year horizon.[10] This equates to roughly 32 gCO2eq/MJ.

But there are three reasons why this outcome is too optimistic.

First, as noted above, the NREAPs indicate that predicted biofuel usage will be much higher than 5.6% and the biodiesel/ethanol split will be hugely skewed toward biodiesel (while the study looks at an almost even split), making the projections based on this assumption irrelevant for our purposes. IFPRI later made a new assessment correcting for the 45/55 split, but not for the 5.6% overall volume. Its results are presented in the graph below.

**Figure 1:** The impact of a more realistic biodiesel / bioethanol split in the IFPRI study. [11]




[9] Marelli et al. 2010.

[10] JRC ISPRA later recalculated GHG emissions from IFPRI study on the most likely land use changes occurring around the world. For the BAU scenario total GHG emissions from ILUC are estimated at 201 Mt COeq (BAU) and 248 Mt CO eq (FT) over a period of 20 years. This means that net emissions from ILUC would be between 2 and 7 MT CO2 eq over a 20 year period.

[11] See ECOFYS, 2010. http://www.theicct.org/workshops/iluc_sep10/ICCT_ILUC_workshop_IFPRI_Sep2010.pdf

This graph shows that correcting the biodiesel / bioethanol split to better reflect reality (i.e. the 25/75% split in the right two columns) increases emissions from land use change by 26 g CO2eq/MJ (from around 19 g CO2eq/MJ to around 45 gCO2eq/MJ). That reduces the benefit estimated in the IFPRI report from 32 to 6 g CO2eq/MJ.

Second, the study virtually ignores emissions from peatlands. According to the ISPRA study these are, depending on where biodiesel is sourced, between 15 (for EU-sourced biofuels) up to 250 g CO2eq/MJ (for Indonesia-sourced biodiesel). This wipes out the remaining 6 g CO2eq/MJ benefit.

Third, the IFPRI study's MIRAGE model turns out to be the model predicting the lowest levels of land use changes of all models analysed in the ISPRA study. Other studies arrive typically at 2 to 4 times higher values.

This means that two conditions under which the 10% target for renewables in transport was adopted will not be met. These conditions were:

1. that biofuels have to be environmentally and socially sustainable. However, the studies show that the target will end up increasing, not decreasing, carbon emissions from the transport sector with negative impacts on forests and other habitats, people, food security, biodiversity and so on.
2. that "second-generation" biofuels will be commercially available. These studies show, however, that the share of second-generation biofuels will be less than 10% of overall biofuels use. Even that may be optimistic. Many believe that 2G will not be commercially viable before 2020 (if at all). [12]

In short, both conditions are not met. Therefore, not only should the sustainability criteria be reviewed, but so should the 10% target itself.

### Marginal levels of GHG from ILUC

The studies also give us an indication of marginal ILUC emissions and, to some extent, tell us what is the marginal ILUC associated with different biofuel feedstocks.

There are two ways to calculate marginal ILUC emissions. On the one hand, we can extrapolate emissions per unit of fuel from aggregate emissions of the policy. This would yield a feedstock-neutral ILUC factor applicable across the board. On the other hand, models can extrapolate marginal ILUC emissions for small increases in consumption of specific biofuel feedstocks. This would yield feedstock-specific ILUC factors,

No study comes up with zero or negative impacts of marginal ILUC for land-using biofuels. In Annex I of this paper, it can be seen that ILUC emissions range between 16 g $CO_2$/MJ (IFPRI study for sugar beet under BAU scenario with conservative assumptions about the biodiesel/ethanol split) to 352 g $CO_2$/MJ (LEITAP for EU biodiesel scenario).

The IFPRI study calculates marginal ILUC emissions associated with EU biofuel policies, as shown in Table 3. This is also illustrated in Annex II (under the business-as-usual scenario).

[12] See for example BusinessGreen, 2009. Algae biofuels still 10 years away, says Shell. http://www.businessgreen.com/business-green/news/2254159/algae-biofuels-years-away-shell

Table 3: IFPRI Study Marginal ILUC Factors

**Table 12 Marginal Indirect Land Use emissions, gCO2/MJ per annum. 20 years life cycle.**

| | MEU_BAU | | MEU_FT | |
|---|---|---|---|---|
| | Without Peatland effects | With Peatland effect | Without Peatland effect | With Peatland effect |
| ***Ethanol*** | *17.74* | *17.74* | *19.16* | *19.18* |
| **Ethanol SugarBeet** | 16.07 | 16.08 | 65.48 | 65.47 |
| **Ethanol SugarCane** | 17.78 | 17.78 | 18.86 | 18.86 |
| **Ethanol Maize** | 54.11 | 54.12 | 79.10 | 79.15 |
| **Ethanol Wheat** | 37.26 | 37.27 | 16.04 | 16.12 |
| ***Biodiesel*** | *58.67* | *59.78* | *54.69* | *55.76* |
| **Palm Oil** | 46.40 | 50.13 | 44.63 | 48.31 |
| **Rapeseed Oil** | 53.01 | 53.68 | 50.60 | 51.24 |
| **Soybean Oil** | 74.51 | 75.40 | 67.01 | 67.86 |
| **Sunflower Oil** | 59.87 | 60.53 | 56.27 | 56.89 |

*Source: Authors' calculations*

*Note:The marginal coefficient is computed in 2020 after the implementation of the 5.6% mandate.*

Adding marginal ILUC emissions on top of direct emissions of producing biofuels (cultivation, transport and processing), means that the GHG emissions of many biofuel feedstocks increase compared to fossil fuels. The range in Annex I is also due to the fact that the studies use different methodologies .

### How to address ILUC - what course of action is appropriate (questions 3 and 4 of the consultation document)?

The EU legislature makes clear that accurate accounting of GHG savings is paramount. Based on the EC's scientific findings (and other analytical work), ActionAid believes tha t feedstock-specific ILUC factors must be included because they better reflect actual differences in emissions between the various feedstocks. For calculating feedstock -specific ILUC factors, the IFPRI study currently represents the best available information on marginal ILUC emissions. Despite being a very conservative estimate, the IFPRI study could serve as a basis for the first set of ILUC factors until further research is completed.

However, the IFPRI research should be viewed as a absolute minimum be cause other studies show higher figures (see Annexes I and II). Higher ILUC factors could be justified on the basis of the precautionary principle; these should incorporate precautionary assumptions about the conversion of peatlands. It is bedrock EU law t hat policies on the environment must be designed to contribute to the objectives of "preserving, protecting and improving the quality of the environment" and a "prudent and rational utilisation of natural resources." The Lisbon Treaty states that EU polici es "shall aim at a high level of protection" and be based on "the precautionary principle and on the principles that preventive action should be taken."

Furthermore, the EU legislature telegraphed the inclusion of an ILUC factor in Recital 85 to the RED :

> "The Commission should develop a concrete methodology to minimise greenhouse gas emissions caused by indirect land -use changes. To this end, the Commission should analyse, on the basis of best available scientific evidence, in particular, the inclusion of a factor for indirect land-use changes in the calculation of greenhouse gas emissions"

Thus, to ensure a concrete and robust methodology for emissions from ILUC -induced carbon stock changes, which fits seamlessly within the overall methodological fram ework in the RED, feedstock - specific ILUC factors are clearly the most appropriate. The factors should be open to periodic review , revising them as necessary in order to reflect the best available scientific evidence.

## CONCLUSION

Without accounting for ILUC, increased demand for biofuels will increase, not reduce, GHG emissions. This undermines the EU's political credibility on climate and development issues. These issues must be urgently addressed through a robust set of feedstock-differentiated ILUC factors before the end of 2010 as the legislation stipulates.

But clearly, a policy that increases GHG emissions is not sustainable. Biofuel targets in member states should be scrapped and the EU's 10% transport target should be reviewed and reformed. Priority must be given, for example, to more fuel efficient cars, energy efficiency, increased use of public transport and renewable electricity in trains, buses and cars to contribute to the EU's renewable target in transport.

## Annex I: Marginal emissions from indirect land use change

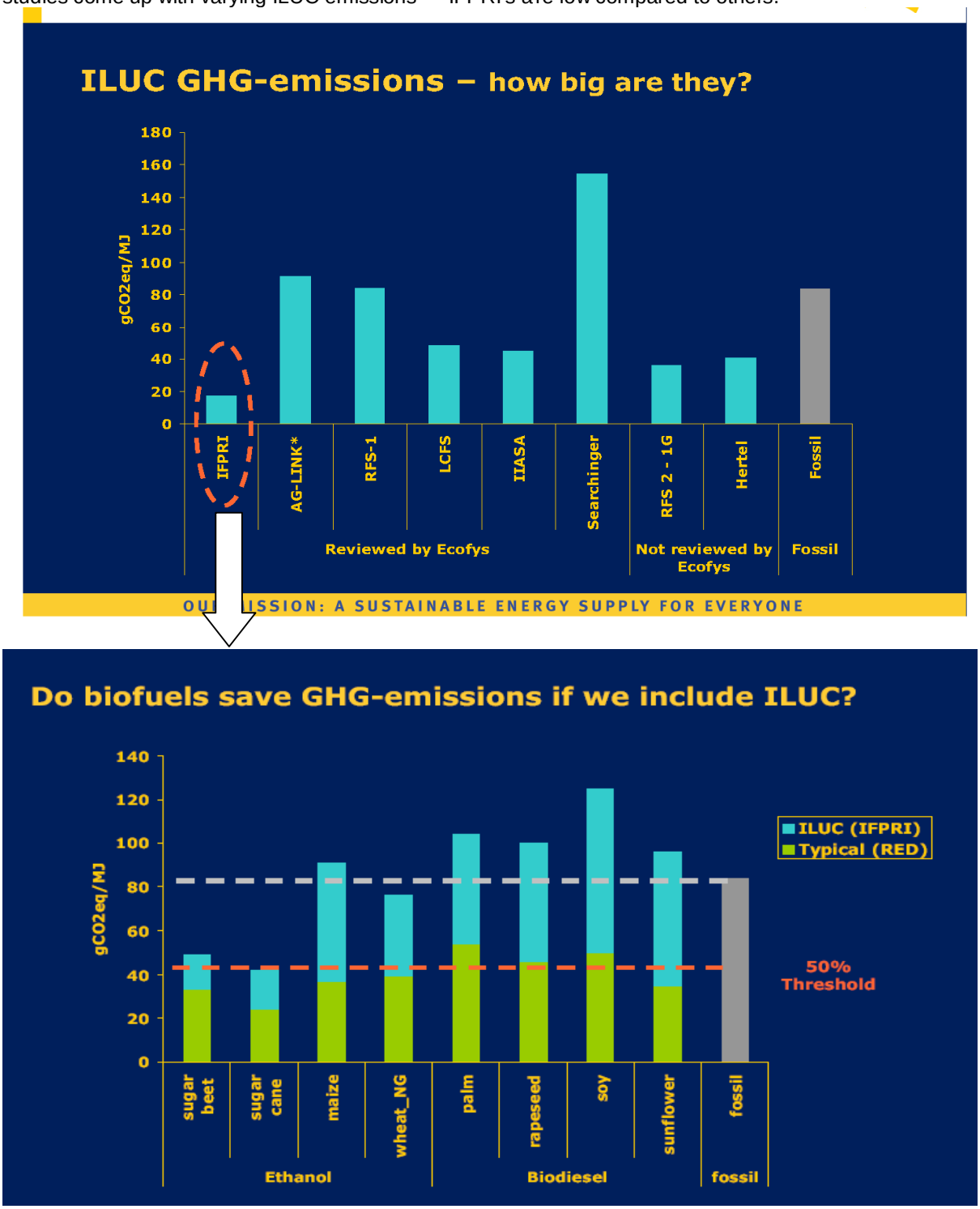
| Scenario | emissions including emissions from peatlands | direct emissions from RED (default value)*** | GHG emissions from biofuels including ILUC | GHG savings (from the RED) | GHG savings (after ILUC is included) |
|---|---|---|---|---|---|
| LEITAP Biod EU-Deu | 352 | 44 | 396.2 | 47% | -373% |
| FAPRI Biod EU | 99 | 44 | 143.3 | 47% | -71% |
| AGLINK Biod EU | 40 | 44 | 84.2 | 47% | 0% |
| AGLINK Biod US * | 42 | 58 | 100.3 | 31% | -20% |
| GTAP Biod mix EU | 73 | 44 | 117.2 | 47% | -40% |
| LEITAP Biod INDO** | 326 | 29 | 355.1 | 65% | -324% |
| GTAP Biod Ind/Mal | 79 | 29 | 107.7 | 65% | -28% |
| LEITAP Wht Eth EU-Fra | 143 | 26 | 169.4 | 69% | -102% |
| FAPRI Wht Eth EU | 69 | 26 | 95.0 | 69% | -13% |
| AGLINK Wht Eth EU | 100 | 26 | 126.4 | 69% | -51% |
| IMPACT Wht Eth EU | 39 | 26 | 65.0 | 69% | 22% |
| GTAP Wht Eth EU | 140 | 26 | 166.2 | 69% | -98% |
| IMPACT Wht Eth US | 39 | 26 | 65.0 | 69% | 22% |
| LEITAP Maize Eth US | 151 | 43 | 194.0 | 49% | -131% |
| AGLINK Coarse Grain Eth US | 89 | 43 | 132.2 | 49% | -58% |
| GTAP Coarse grains Eth US | 37 | 43 | 79.6 | 49% | 5% |
| IMPACT Maize Eth US | 19 | 43 | 61.7 | 49% | 26% |
| IMPACT Coarse Grains Eth EU | 20 | 43 | 63.3 | 49% | 24% |
| AGLINK Sugar cane Eth Bra | 23 | 23 | 46.4 | 71% | 45% |
| IFPRI BAU sugarbeet | 16 | 40 | 56.1 | 52% | 33% |
| IFPRI BAU sugar cane | 18 | 23 | 40.8 | 71% | 51% |
| IFPRI BAU maize | 54 | 43 | 97.1 | 49% | -16% |
| IFPRI BAU wheat | 37 | 26 | 63.3 | 69% | 24% |
| IFPRI BAU palm oil | 50 | 29 | 79.1 | 65% | 6% |
| IFPRI BAU rapeseed | 54 | 44 | 97.7 | 47% | -17% |
| IFPRI BAU soybean | 75 | 58 | 133.4 | 31% | -59% |
| IFPRI BAU sun flower | 61 | 41 | 101.5 | 51% | -21% |
| IFPRI BAU (JRC report) | 34 | 21 | 65.0 | | 22% |
| IFPRI FT (JRC report) | 41 | 28 | 69.0 | | 18% |
| IPTS AGLINK CG (JRC report) | 63 | 48 | 111.0 | | -32% |
| IPTS AGLINK GM (JRC report) | 64 | 48 | 112.0 | | -34% |
| Petrol (draft FQD) | | 85.8 | | | |
| Diesel (draft FQD) | | 87.4 | | | |
| Fossil fuel comparator in the RED | | 83.8 | | | |

* US biodiesel we assumed soy

** Ind/Malay we assumed palm oil

*** The default values given here are some of the most optimistic (ie the lowest) in the RED. Default values could well be higher depending on, for example, the fuel process and type of power plant.

**Annex II** – Marginal ILUC GHG emissions for the IFPRI study (business -as-usual scenario). Different studies come up with varying ILUC emissions – IFPRI's are low compared to others. [13]




[13] ECOFYS, 2010. Indirect effects of biofuel production: Unraveling the numbers. http://www.theicct.org/workshops/iluc_sep10/ICCT_ILUC_workshop_Ecofys_Sep2010.pdf

Note: In Annex I, direct emissions from RED are default values. Ecofys gives slightly different (RED typical) values in this figure.