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DIRECTORATE-GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT A
ECONOMIC AND SCIENTIFIC POLICY

Economic and Monetary Affairs

Employment and Social Affairs

Environment, Public Health and Food Safety

Industry, Research and Energy

Internal Market and Consumer Protection

Sustainable Biofuels: Addressing Indirect Land Use Change

WORKSHOP

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2013

Sustainable Biofuels: Addressing Indirect Land Use Change

EUROPEAN PARLIAMENT

DIRECTORATE GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

Sustainable Biofuels: Addressing Indirect Land Use Change

Brussels, 20 February 2013

Abstract

Further to the publication of a new legislative proposal addressing the emissions from indirect land-use change (ILUC) and amending the Directives on Fuel Quality (Directive 98/70/EC) and Renewable Energy (Directive 2009/28/EC) by the European Commission in October 2012, the Coordinators of the ENVI Committee requested the organisation of a workshop on this issue.

The workshop consisted of an exchange of views with representatives of EU institutions, research institutes, biofuels industry, NGOs and other stakeholders. The first part was aimed at presenting the European Commission's proposal and providing scientific input on the assessment of the impacts of ILUC. The second part introduced policy options on the table and future perspectives from the point of view of industry and NGOs. The workshop was co-chaired by MEPs Corinne Lepage (ENVI rapporteur) and Alejo Vidal-Quadras (ITRE rapporteur). EU Climate Commissioner Connie Hedegaard held the keynote speech. This report summarises the presentations, discussions and conclusions.

IP/A/ENVI/WS/2012-23 March 2013

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This workshop was requested by the European Parliament's Committee on Environment, Public Health and Food Safety.

AUTHORS

ICEDD (Institut de Conseil et d'Etudes en Développement Durable)
Maria José LOPEZ
Yves MARENNE
Marco ORSINI

RESPONSIBLE ADMINISTRATOR

Nora HAHNKAMPER-VANDENBULCKE
Policy Department A: Economic and Scientific Policy
European Parliament
B-1047 Brussels
E-mail: Poldep-Economy-Science@ep.europa.eu

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ABOUT THE EDITOR

To contact the Policy Department or to subscribe to its newsletter please write to:
Poldep-Economy-Science@ep.europa.eu

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LIST OF ABBREVIATIONS

AGLINKCOSIMO	Worldwide Agribusiness Linkage Program + Commodity Simulation Model
CAP	Common Agricultural Policy
CARB	California Air Resource Board
CAPRI	Common Agricultural Policy Regional Impact Analysis
CARD	Centre for Agricultural and Rural Development
CGE	Computable General Equilibrium
CO_2 eq	Carbon Dioxide equivalents
DG	Directorate General
DG AGRI	European Commission Directorate General for Agriculture and Rural Development
DG CLIMA	European Commission Directorate General for Climate Action
dLUC	Direct Land Use Change
EC	European Commission
EEA	European Environment Agency
EP	European Parliament
EU	European Union
FAPRI	Food and Agricultural Policy Research Institute
FAO	Food and Agriculture Organisation of the United Nations
FQD	Fuel Quality Directive (Directive 2009/30/EC)
g	gram (= 10^{-3} kg)
GHG	Greenhouse Gas
GJ	Gigajoule
GTAP	Global Trade Analysis Project
ha	Hectare (=10^4 m^2)
HFFA	Humboldt Forum for Food and Agriculture
IE	Institute of Energy of the European Commission
IEA	International Energy Agency
IFPRI	International Food Policy Research Institute
ILUC	Indirect Land Use Change

IMPACT	International Model for Policy Analysis of Agricultural Commodities and Trade
IPCC	Intergovernmental Panel on Climate Change
JRC	Joint Research Centre
LCA	Life Cycle Analysis
LIIB	Low Indirect Impact Biofuels
LUC	Land Use Change
M or mill.	Million (1,000,000)
MEPs	Members of the European Parliament
MIRAGE	Modelling International Relationships in Applied General Equilibrium
MJ	MegaJoule (= 10^6 J)
MS	Member States
Mtoe	Million Tons of Oil Equivalent
NGOs	Non-Governmental Organisations
NREAP	National Renewable Energy Action Plan
OECD	Organisation for Economic Co-operation and Development
PBL	Netherlands Environmental Assessment Agency
RED	Renewable Energy Directive (Directive 2009/28/EC)
t	metric ton (= 10^3 kg)
TBT	Technical Barriers to Trade
T&E	Transport and Environment
TJ	Terajoule (= 10^{12} J)
TPES	Total primary energy supply
UN	United Nations
USA	United States of America

PROGRAMME

ЕВРОПЕЙСКИ ПАРЛАМЕНТ PARLAMENTO EUROPEO EVROPSKÝ PARLAMENT EUROPA-PARLAMENTET
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PARLAMENT EUROPEJSKI PARLAMENTO EUROPEU PARLAMENTUL EUROPEAN
EURÓPSKY PARLAMENT EVROPSKI PARLAMENT EUROOPAN PARLAMENTTI EUROPAPARLAMENTET

Policy Department A-Economy & Science
Committee on the Environment, Public Health and Food Safety (ENVI)

Workshop on Sustainable Biofuels: Addressing Indirect Land Use Change

Wednesday 20 February 2013 - 15:00 - 18:00
European Parliament, ASP 3 E 2, Brussels

Agenda

15.00 *Welcome by MEP Corinne Lepage, ENVI Committee Rapporteur*

15.05 ***Keynote speech by Commissioner Connie Hedegaard, DG Climate Action***

Part 1: Assessing the impact of ILUC and the EC's proposal

15.20 Methodologies and best practices to assess ILUC - *Luisa Marelli, JRC*

15.30 Comparison of studies on ILUC - *Dr. Chris Malins, International Council on Clean Transportation*

15.40 Impact of EU biofuels policies on global agricultural production and the environment - *David Laborde*, *International Food Policy Research Institute (by videoconference)*

15.50 The "food vs biofuels" debate: support policies, farm land and trade issues- *Ronald Steenblik, OECD*

16.00 The Californian Low Carbon Fuel Standard and ILUC, *John Courtis, Air Resources Board, California (by videoconference)*

16.10 Opportunities and constraints of advanced biofuels - *Dr. Jeremy Woods, Imperial College London*

16.20 Q&A, open discussion

Part 2: Roundtable on policy options on the table and future perspectives

16.40 *Introduction by MEP Alejo Vidal-Quadras, ITRE Committee Rapporteur*

16.45 Short interventions by

- *Raffaello Garofalo, European Biodiesel Board*
- *Thomas Gameson, ePure*
- *Dietrich Klein, COPA-COGECA*
- *Nusa Urbancic, Transport & Environment*
- *Marc-Olivier Herman, Oxfam*
- *Sébastien Haye, Roundtable on sustainable Biofuels*

17.15 Panel discussion facilitated by Dr. Jeremy Woods

17.35 Q&A, open discussion

17.50 Conclusions by the co-chairs

18.00 End

1. SHORT BIOGRAPHIES OF EXPERTS

1.1. Ms Connie Hedegaard, Commissioner, DG Climate Action

Born in 1960, Connie Hedegaard had already been working with climate issues for several years by the time she began her appointment as the EU's first ever Commissioner for Climate Action in February 2010.

In August 2004 she was appointed as Danish Minister for the Environment. In 2007 she was in charge of setting up the Danish Ministry of Climate and Energy, where one of the main tasks was to prepare the UN Climate Conference in Copenhagen in December 2009.

Connie Hedegaard began her political career while a student at the University of Copenhagen. There she studied literature and history while at the same time pursuing a political career that encompassed both Danish and international politics. In 1984, at the age of 23, she was elected to the Danish Parliament as a member for the Conservative People's Party, thereby becoming the youngest Danish MP ever at that time, and in 1985 she became Chair of the Atlantic Association of Young Political Leaders. In 1989, Connie Hedegaard became first spokesperson for the Conservative People's Party, but chose to leave politics for journalism in 1990.

Besides her political career, Connie Hedegaard has had a long career in journalism. In 1990, she began working as a journalist on the Danish national newspaper Berlingske Tidende. In 1998 she became head of the news bulletin service Radioavisen at the Danish Broadcasting Corporation, after which she hosted the current affairs programme Deadline on the television channel DR2. Between 1998 and 2004 she also wrote for the Danish national daily newspaper Politiken.

Apart from working as a politician and journalist, Connie Hedegaard has sat on a number of committees and boards, including chairing the Centre for Cultural Cooperation with Developing Countries (CKU) and as a member of the board of the Danish Parliament's Democracy Foundation. Lastly, she has received various prizes for her involvement in and contributions to social debate, due in great part to her wide-ranging activities as a lecturer and author. Her publications include Da klimaet blev hot, [When the climate got hot] published in Denmark in 2008, as well as contributions to several anthologies and topical books.

Connie Hedegaard lives in Brussels and in Hellerup, Denmark with her husband, Jacob, and their two sons.

1.2. Ms Luisa Marelli, Joint Research Centre / JRC-IET study

Luisa Marelli has been official of the European Commission, Joint Research Centre, since 2003, where she started working in the European Reference Laboratory for Air Pollution, in support to Air Quality validation and implementation of particulate matter monitoring systems. Since 2008, she has been responsible for the JRC research programs on biofuels (Biofuels Coordinating Action). Research activities of the group develop on the analysis and testing of sustainability of biofuels production and use, such as direct and indirect land use changes and related GHG emissions, impacts on biodiversity, pressure on tropical forests, life cycle GHG emissions from biofuels production, compatibility with vehicle and energy efficiency, development of second generation biofuels.

Since 2012, she also leads the Alternative Fuels Action (ALFA), which carries out research in support of the supply and market uptake of alternative transport fuels with its main focus on their sustainability and techno-economic viability and therefore with an outstanding dedication to bioenergy/biofuels. She is also a member of the Scientific Committee of the JRC Institute for Energy and Transport.

1.3. Dr Chris Malins, International Council on Clean Transportation (ICCT)

Chris Malins's current work is focused on analysing the modeling of the indirect effects of biofuels production, and the lifecycle analysis of different fossil fuel pathways. He also supports the ICCT's Communications Team. Prior to joining the ICCT, Chris was Communications Specialist at the UK Government's Renewable Fuels Agency, the world's first biofuel sustainability regulator, where he had been leading on communications since the Agency's creation. Chris holds an MPhys in Mathematics and Physics from the University of Warwick, and a PhD in Applied Mathematics from the University of Sheffield.

1.4. Mr David Laborde, International Food Policy Research Institute (IFPRI)

Dr. David Laborde Debucquet joined IFPRI, Washington DC, in 2007. He is a Senior Research Fellow and leader of the "Globalization and Markets" research program in the Markets, Trade and Institutions Division. His research interests include international trade, measurement and modeling of protectionism, multilateral and regional trade liberalization as well as environmental issues (climate change, biofuels). Beyond his work on databases, he has developed several partial and general equilibrium models applied to trade policy and environmental issues, including the MIRAGE model and its extensions. He is used to support policy making decisions through the use of models both on the field of trade negotiations but also energy policies.

1.5. Mr Ronald Steenblik, Senior Trade Policy Analyst, OECD

Ronald Steenblik is a Senior Trade Policy Analyst in the Trade and Agriculture Directorate of the Organisation for Economic Co-operation and Development (OECD). Among the projects he is currently directing are the OECD's inventory of support to fossil-fuel production and consumption in OECD countries, and several studies on issues at the nexus of trade and the environment.

While on sabbatical from the OECD, in 2006 and 2007, Steenblik served as the first Director of Research for the IISD's Global Subsidies Initiative (GSI), a programme developed by the International Institute for Sustainable Development, where he oversaw a number of studies on government support to biofuels.

Over the last 25 years he has also made important contributions to the policy debate on subsidies to agriculture, fishing, and fossil-fuel production. He is also a regular peer reviewer for several academic journals, including Energy Policy. Steenblik earned degrees from Cornell University's School of Natural Resources and from the University of Pennsylvania.

1.6. Dr. Jeremy Woods, Imperial College London, Lecturer in bioenergy and Co-Director of Porter Alliance

Jeremy Woods is a Lecturer in bioenergy at Imperial College London working on the interplay between development, land-use and the sustainable use of natural resources. At Imperial, he is a co-director of ICEPT (Centre for Energy Policy and Technology) and the Porter Institute which is dedicated to the development of advanced biorenewables. He is a member of the Royal Society – Leverhulme Africa Awards Assessment Panel and has sat on two RS working groups, 'GHG emissions from agriculture' in 2010 and in 2008/09 its working group on 'Biofuels' which produced an internationally acclaimed report on the science and policies needed for their sustainable development. His research links environmental impact, techno-economic and sustainability assessment frameworks and is applied to policy making and industry standards. His external interests including being a trustee of a voluntary community-based carbon offsetting charity, Plan Vivo (www.planvivo.org) and a trustee of the Environmental Law Foundation (www.elflaw.org).http://www.imperial.ac.uk/people/jeremy.woods.

1.7. Mr Raffaello Garofalo, European Biodiesel Board

He was appointed Secretary General of the European Biodiesel Board (EBB) - i.e. the European federation of biodiesel producers - in May 2002. Previously he worked for four years within FEDIOL, the European Federation of Vegetable Oils Producers, dealing among others, with non-food uses of vegetable oils, which include bio-lubricants, bio-solvents and of course, biodiesel. In 1998 he worked temporarily in the European Commission (DG Agriculture) as well as within the Research Directorate of the European Parliament. After graduating with distinction in Politics in the International Politics Department of the Institut d'Etudes Politiques (Sciences-Po), in Paris, in 1997, he was admitted as a foreign student at the French Ecole Nationale d'Administration (ENA). He obtained a Master's Degree on European Administrative Studies at the College of Europe in Bruges in 1998.

1.8. Mr Thomas Gameson, ePURE (Abengoa Bioenergy)

Thomas Gameson is an environmental economist. He is currently Director of government and public affairs of Abengoa Bioenergy, the biggest bioethanol producer in Europe and the only producer in the three main bioethanol markets of Europe, the US and Brazil. In addition, he is a Member of the board of ePURE, the steering committee of the European Biofuel Technology Platform and a Member of the board of the NVDB, the Dutch sustainable biofuels association.

1.9. Mr Dietrich Klein, COPA-COGECA (Bundesverband der Deutschen Bioethanolwirtschaft (BDBe))

Since 2006, Dietrich Klein has been Secretary General of the German association that represents the bioethanol sector, the "Bundesverband der Deutschen Bioethanolwirtschafte.V." (BDBe) in Berlin. At the European organisation of farmers and their co-operatives, COPA COGECA, he is Chairman of the Working Party on Bioenergy and Biotechnology. Until 2005 he was Chairman of the COPA COGECA Working Party on Foodstuffs. From 1980 to 2005 he was legal advisor and director of parliamentary relations at the German Farmers' Union DBV. From 2003 to 2008 he has also been the Secretary General of the Association of German Beet Growers' Organisations. Dietrich Klein was born in 1952 and lives in Berlin.

1.10. Ms Nusa Urbancic, Transport & Environment (T&E)

Nuša Urbancic is T&E's specialist on fuels and electrification since 2008. She worked previously in Greenpeace's EU unit on the renewable energy campaign. She has also worked as a journalist and translator and at the French economic mission to Slovenia.

1.11. Mr. Marc-Olivier Herman, OXFAM

Marc-Olivier Herman is the European Union Economic Justice Policy Lead for Oxfam International. He leads the advocacy towards the European Union of the Oxfam confederation on food security issues. Marc-Olivier Herman holds an LL.M. from Georgetown University Law Center in Washington DC and law degrees from the universities of Leuven and Louvain-la-Neuve. Before coming to Oxfam, he has worked as a researcher and an advocate in the field of human rights, development and the environment for Amnesty International, the European Network for Central Africa (EurAC), Belgian development organizations (11.11.11 and Broederlijk Delen) and Greenpeace. Oxfam is an international confederation of seventeen organizations working together in over 90 countries to find lasting solutions to poverty and injustice. Food justice in a resource constrained world is Oxfam's current prime global focus. Food price volatility, access to land, investment in small-scale agriculture and climate change are the main issues covered.

1.12. Mr Sébastien Haye, The Roundtable on Sustainable Biofuels

Sébastien Haye is the Standards Director of the Roundtable on Sustainable Biofuels. He joined the RSB in 2007 as Manager for Environmental Affair and has been working on the environmental and social impacts of bioenergy production since 2006. Prior to the RSB, Sébastien worked for the Resource Optimisation Initiative (Bangalore, India) and conducted environmental and social impact assessments on the use of agricultural residues for bioenergy in rural India. His other assignments are with Terre des Hommes Suisse as a project advisor and for Artjuna as board member. Sébastien holds a BSc in Biology and MSc in Environmental Sciences (lifecycle analysis, ecotoxicology and risk analysis) from the University of Geneva.

2. EXECUTIVE SUMMARY

Indirect Land Use Change

In March 2007, EU heads of state and government endorsed a set of ambitious targets to tackle climate change and promote renewable energy to 2020 and beyond (the so-called **20/20/20 targets**). These targets - that were subsequently endorsed as part of the Europe 2020 Strategy, adopted by the European Council in 2010 - include inter alia increasing the share of renewable energy in transport fuels to 10% by 2020.

On 23 April 2009, the EU adopted the **Renewable Energy Directive** (RED), which established a legally binding target of 10% for the use of renewable energy in road transport fuels by 2020. Although renewable energy can include electricity, hydrogen, or second-generation biofuels (that is, ethanol and biodiesel made from non-food feedstocks such as agricultural residues and switchgrass), the main mechanism for meeting this target - at least up to 2020 - will be first-generation biofuels. The Directive also established environmental sustainability criteria for biofuels consumed in the EU, including a minimum rate of direct greenhouse gas (GHG) emission savings (35% in 2009, rising to 50% in 2017) and restrictions on the types of land that may be converted to production of biofuel feedstock crops. This restriction covers direct land-use changes only.

The revised **Fuel Quality Directive** (FQD), adopted at the same time as the RED, includes identical sustainability criteria, and targets a 6% reduction in lifecycle greenhouse gas emissions from transport fuels consumed in the EU by 2020.

To avoid possible negative side-effects, both Directives thus impose sustainability criteria that biofuels and bioliquids need to satisfy in order to be counted towards the targets and receive support. These sustainability criteria (in force today) prevent the direct conversion of forests and wetlands and areas with a high biodiversity value for biofuel production. However, there is a risk that part of the additional demand for biofuels will be met through an increase in the amount of land devoted to agriculture worldwide, leading to an indirect increase in emissions due to land conversion.

Land-use changes occur when farmers, domestically and abroad, replace production historically dedicated to food and feed with production of biofuel crops or when they convert natural land to cropland. These land-use changes are considered direct if farmers convert natural land cover directly to cropland for growing the feedstock crop used in biofuels within the biofuel-producing country. On the other hand, land-use changes are considered indirect if changes in market prices cause another crop to expand into natural land cover or if a reduction in exports from the biofuel-producing country causes farmers in other countries to convert natural land to cropland to expand production of those (or other) crops. The process whereby carbon sinks are destroyed outside of Europe to cultivate land for biofuels crops is commonly called indirect land-use change (ILUC) impact.

Given the complex nature of domestic and international market linkages, indirect land use changes are much harder to verify and observe than direct land-use conversions. Therefore, in 2009 the European Council and the European Parliament (EP) asked the European Commission (EC) to review the impact of ILUC on GHG emissions and propose legislative action for minimising that impact.

The EC subsequently launched four studies to examine ILUC issues. The studies showed that when taking into account ILUC, e.g. when biofuel production causes food or feed production to be displaced to non-agricultural land such as forests, some biofuels may actually be adding as much to GHG emissions as the fossil fuels they replace. One study, conducted by the International Food Policy Research Institute (IFPRI), analysed the impact

of the European biofuels mandate and possible changes in Europe's biofuel trade policies on global agricultural production and the environmental performance of the European biofuel policy, as spelled out in the RED. The report suggested that ILUC was a valid concern but that there was a high degree of uncertainty regarding its magnitude. Following these investigations and public consultation, in December 2010 the EC published a report acknowledging that ILUC could reduce the GHG emissions savings associated with biofuels. Because of the many uncertainties, however, the EC did not deliver a clear recommendation about whether and how measurement of ILUC should be included in the legislative framework. It only announced that new research would be conducted and that an impact assessment report would propose several policy options.

In October 2011, the EC released a new modelling exercise conducted by IFPRI on the land-use issue and used the IFPRI study as reference to make a proposal on ILUC. On 17 October 2012, the EC finally published its proposal with the aim of limiting global land conversion for biofuel production and raising the climate benefits of biofuels used in the EU. However, contrary to initial plans, the proposal did not introduce mandatory accounting for the indirect GHG emissions of specific biofuels by using ILUC factors.

The new proposal, which aims at amending both the RED and FQD Directives, contains measures aimed at preventing the EU from providing incentives for the continued displacement of food crops for fuel. These include:

- a 5% cap on the amount of food crop-based biofuels in the EU's 2020 transport mix;
- an end to public subsidies for biofuels after 2020 unless they can demonstrate "substantial GHG savings";
- a quadrupling of credits for second-generation biofuels to incentivise production;
- a 60% GHG saving threshold that will apply to new biofuels installations from 1 July 2014; biofuels installations in operation before 1 July 2014 must meet a GHG saving threshold of 35% as of 1st December 2017 and of 50% as of 1st January 2018;
- a review of policy and scientific evidence on ILUC in 2017.

Summary of discussions and conclusions

In her keynote speech, EU Climate Commissioner Connie Hedegaard pointed to the necessity of ensuring the sustainability of biofuels in the future. This especially considering that first generation biofuels produced from agricultural crops were expected to be the main contributor to the mandatory 10% biofuels target up to 2020 and that the estimated ILUC emissions from these biofuels were significant. This was particularly a problem with biodiesel crops such as palm, soy and rapeseed. In order to promote advanced biofuels that did not require agricultural land for their production (such as those made from algae, waste and residues) - and which currently remained under-developed due to their higher production costs - the Commissioner referred to the proposed 5% cap for food-based biofuels and the suggestion to only subsidise advanced biofuels after 2020. With regard to competition between food and biofuels made from agricultural crops, the 5% cap would have a positive effect as limiting food crop-based biofuels also meant limiting their negative effect on global food production and food prices. Ms Hedegaard welcomed the support of the European Parliament in maintaining the EC proposal's ambition and expressed the hope that the proposal would be adopted before the end of the legislative period.

The keynote speech was followed by presentations from experts who had modelled the impacts of Europe's demand for biofuels on global land use, food prices and carbon emissions. In the second session, stakeholders from agriculture, industry and NGOs were given the opportunity to present their views. The overall picture of both sessions was:

- Factors such as utilization of by-products; reduced food consumption (demand change); yield effects; crop switching and area response as well as land use change emissions drive the outcomes of the economic ILUC modelling. The models assume that increases in feedstock demand associated with biofuel policies cause commodity prices to raise; in turn these price changes drive food consumption reduction and ILUC.
- In all the studies undertaken to date, biofuels' ILUC impact is positive (i.e. above zero) and ethanol crops have lower ILUC impacts than oilseeds/biodiesel crops under all circumstances. ILUC was thus demonstrated in all models: for biodiesel, GHG emissions from land use change are dominated by palm cultivation on peatland (for palm oil) and conversion of forests (other biodiesel), while for ethanol, GHG emissions are significantly lower. In fact, the studies show that biodiesel made from rapeseed, palm, soy or other vegetable oils is even more polluting than fossil fuels mainly because it displaces agriculture onto new land which previously stored carbon. In contrast, bioethanol made from corn or other cereals might save some GHG emissions because people eat less as a result of an increase in food and feed prices. Consequently, less new land is turned over to agriculture to compensate for the crops used to produce bioethanol and less carbon is released into the atmosphere because of land use change.
- The latest IFPRI study (which was used by the EC for its impact assessment) - although overestimating yields and underestimating emissions from peatland - is commonly considered as the most reliable and sophisticated study on ILUC impacts.
- As to policy options, there was consensus among the scientific experts that reducing the biofuel ambition appeared to be the most direct way to limit additional land use emissions. Similarly, cutting back on biofuels was needed to avoid food price rises. To avoid competition between food and fuels, the simplest policy was to stop subsidising and mandating biofuels. The EC's proposal was a first step in this direction.

However, the EU farmers' representative in the panel stressed that, in order to prevent ILUC impacts from imports (which result in a greater share of GHG emissions in the IFPRI study), the EU should conclude bilateral/multilateral agreements with third countries (for instance, containing provisions on sustainability criteria that encourage the introduction of legislation in these countries) as well as excluding biofuels from countries in which there were land use changes with regard to forest areas and peat bogs from being counted towards the EU target. The biofuel industry representatives on the panel stressed the need of a stable regulatory framework to invest in future technologies for second generation biofuels and to keep on incentivising any biofuels that have net positive GHG savings. Finally, NGOs insisted on the need of a precautionary approach for accounting GHG emissions related to biofuel, stressed the importance to take ILUC into account, to limit or reduce the biofuel targets, to phase out food crop-based biofuels. In addition, NGOs suggested to stop subsidies and emphasised that an intelligent sustainable policy in the transport sector was preferable to any biofuel mandate.

3. ASSESSING THE IMPACT OF ILUC AND THE EC'S PROPOSAL

In her introductory speech, **MEP Ms Corinne Lepage (ENVI rapporteur)** who chaired the first part of the workshop dedicated to scientific aspects and the EC's proposal highlighted the relevance of the subject for climate change, the environment and the economy as well as the importance of finding a balanced solution.

Commissioner Ms Connie Hedegaard (European Commission, DG CLIMA) held the keynote speech. She started by explaining how the transport sector remained challenging in the context of reaching the EU climate change goals. This was because it relied heavily on liquid fuels while at the same time it was experiencing a decline in fossil fuels reserves, an increase in global demand due to population growth, and higher energy prices. In addition, a great amount of more polluting unconventional sources of crude oil from oil sands and oil shale would enter the global market. Efficiency gains observed in the transport sector were not enough to ultimately achieve the EU climate goals. For certain sectors such as aviation, for which not many alternatives exist, sustainable biofuels were expected to play an important role in this respect. For this reason, policies were needed to encourage the use of cleaner and lower carbon fuels.

She affirmed that the Renewable Energy and Fuel Quality Directives were currently the main policy drivers for the development of cleaner fuels in the EU. She recalled the mandatory targets for 2020 for MS: to achieve a 20% share of renewable energy including a 10% mandatory sub-target in the transport sector and a 6% reduction in the carbon intensity of road fuels. According to the current renewable energy action plans presented by the MS, first generation biofuels produced from agricultural crops were expected to be the main contributor to these transport objectives. For this reason, the EC was keen to address the issue of biofuels being truly sustainable. Some years ago, everyone was aware that there might be such a thing as ILUC, but the science at that time was not very well developed and Ministers indicated that ILUC should be taken into account when more scientific knowledge was available. She acknowledged that because of the concerns associated with the sustainability of crop based biofuels, criteria aimed at avoiding the conversion of forest in areas of high biodiversity were included in the existing legislation and the EP played an active role in asking for more clarification and more ambition when new knowledge and new science became available.

Ms Hedegaard pointed out that the Commission's studies conducted over the last four years concluded that the estimated ILUC emissions from biofuels produced from agricultural crops were significant. In the case of biodiesel crops such as palm, soy and rapeseed, there were no GHG savings compared to fossil fuels when the estimated emissions from ILUC were taken into account. This was a significant concern as biodiesel feedstocks represented three quarters of the current market. In contrast, advanced biofuels that did not require agricultural land for their production such as those made from algae, waste and residues and which seemed to be much more sustainable, remained under-developed due to their higher production costs. According to Ms Hedegaard, further incentives for these types of biofuels were therefore urgently needed.

According to Ms Hedegaard, the main objective of the proposal was to accelerate the transition towards biofuels that deliver substantial GHG savings while respecting existing investments. She believed that the proposal's approach balanced environmental and economic interests. This approach was ensured by limiting the maximum contribution from conventional biofuels towards the RED targets to the current levels, which was 5%. This way, support for existing investments could be maintained while at the same time

stimulating the development of second generation biofuels from non-food feedstocks which emitted substantially less GHG than fossil fuels and did not directly interfere with global food production.

She added that while the main purpose of the proposal was to reduce GHGs, limiting food crop-based biofuels also meant limiting their negative effect on global food production. This was not a minor issue but rather a substantial challenge, in times when the global demand for food according to the United Nations (UN) would increase 15% by 2030. In addition, in the USA and Eastern Europe food prices were at a record high last year and unfortunately, with climate change, such records would be very likely in the future. Thus, limiting food crop-based biofuels also made sense in this regard. In addition to the 5% limit for first generation biofuels, the EC proposed to provide further incentives for advanced biofuels for non-land using feedstocks by introducing additional support measures such as multiple counting towards the target. Also, the EC intended to improve transparency and raise awareness of the ILUC impact associated with biofuels consumed in the EU through the inclusion of ILUC factors for the various feedstock groups in the MS' reports under both Directives.

She highlighted that the EC had a clear preference for biofuels produced from non-food feedstocks for the future. As such, the EC was of the view that only advanced biofuels should be given public support after 2020 which would be a clear signal for investors to make the right kind of choices.

Ms Hedegaard concluded that the Commission's proposal was not perfect but by addressing the problem of emissions from ILUC, the Commission's legislative proposal ensured a credible low carbon transport policy which was a pre-condition for a stable and reliable framework for much needed investments. Ms Hedegaard welcomed the support of the European Parliament (EP) in maintaining the ambition of the proposal and expressed the hope that the proposal would be adopted before the end of the Commission's mandate (end of next year), so that the necessary transition towards more advanced biofuels could start as soon as possible.

MEP Ms Lepage confirmed that the EP would be both ambitious and pragmatic and would seek to find the right balance between environmental and economic aspects. She highlighted the importance of promoting innovation as well as second generation biofuels while taking into account the capacity of the investors to switch from first to second generation biofuels. She then passed the floor to the panellists of the first session.

Ms Luisa Marelli (EC, DG JRC IE) explained the main methodologies used to assess ILUC and provided some examples of the main assumptions made by different studies.

Ms Marelli started by describing the way economic models calculated the final ILUC value. She explained that all models started by calculating the total amount of additional land required to satisfy increased biofuel demand. This, however, was far from being the true ILUC value because all of the models assumed that there was also a reduction in the total net land demand. The first reduction was due to the use of by-products that replaced feed crops. Secondly, all of the models assumed that the increased demand for biofuels would result in an increased crop price, which would result in a reduction in food consumption and increased crop yields. The resulting reductions in land demand would free some of the area and reduce the total net land demand.

Ms Marelli subsequently explained the differences in the results of the IFPRI MIRAGE model, the GTAP model used mainly in the US, the historically based approach that the JRC is working on with the Dutch Environmental Agency (PLB) and a recent study from the Humboldt Forum for Food and Agriculture (HFFA). The HFFA study assessed the environmental impacts (including ILUC) of banning the use of certain types of pesticides.

MIRAGE from the IFPRI study was the model of reference for the EC. Ms Marelli also noted that the historically based analyses do not take into consideration reduction in food consumption but only yield and by-product related reductions.

As to the studies' results, Ms Marelli mentioned that the ILUC value in the HFFA study was much higher than the others because it considered everything as fixed (that is, it did not consider reduction in increasing yields and in feed and food consumption). In contrast, the ILUC value in the IFPRI MIRAGE study was the lowest when compared to the other studies. This was due to the fact that in this study, the initial land use demand was the lowest as it incorporated a very high yield in the baseline (in particular for wheat, maize and rapeseed) which resulted in a lower demand in additional crop land. This meant that in the IFPRI study, cereals had particularly low final ILUC values.

Ms Marelli continued by stating that the reduction of food consumption was very important in all economic models used to assess ILUC that had been analysed (FAPRI-CARD, GTAP, IMPACT, AGLINK-COSIMO, IFPRI, etc.). She presented the feedstock requirements reported by the models with and without food reduction due to price increases. The models used to estimate ILUC emissions substantially reduced their estimates of ILUC by diverting crops from food to biofuel use. If this side-effect of biofuels was eliminated in the models, there was a substantial increase in the estimated ILUC values. Although reduced food consumption saved ILUC area and GHG, it was debatable whether these emission reductions should be considered as a benefit of biofuels use as they were due to the reduction of food consumption rather than the expansion of biofuels.

Ms Marelli pointed out that in the IFPRI MIRAGE model there was an important reduction of food consumption and food quality (that is, the amount of calories consumed by individuals) which was driven by the food prices. This meant that due to the price increase, fruits and vegetables were replaced by less expensive cereals, which in turn had a higher yield that allowed for a large reduction in the land requirement. This was particularly the case of cereals for ethanol. Thus the values for ethanol in the IFPRI MIRAGE analysis were much lower than those for biodiesel, for example, because a big portion of this ILUC was reduced due to a decrease in food quality.

As to alternatives to the existing models, Ms Marelli referred to a method based on historical data that was currently elaborated by the JRC in cooperation with the PLB. In particular, this method (designed to calculate the ILUC effects of different biofuel crops) assumed that the increased demand came from area expansion and increased yields, which followed the same historical trends. Thus the model took the historical yield and the historical land use change (reported by FAO and various statistics and data analyses) and calculated the historical ILUC effects happening until now, without projection into the future. As a result, yields were sometimes overestimated because they were assumed to increase over time and not because of increased biofuel demand. Although this model was less rigorous than economic models, it was easier to understand and verify. Also, as it was based on real historical data, it did not suffer from the criticisms of the economic models.

In detail, Ms Marelli explained that there were four steps in the calculation. As a first step, the net amount of land needed to make one TJ of biofuel was calculated, considering the historical crop yield reported in the different regions of the world as well as the energy content of different biofuels. Thus the study calculated the area in ha per TJ and attributed part of this land demand to biofuels and by-products. The share of biofuels and by-products was established according to the energy content or according to the economic value (following the indications for allocation of the RED). The second step was to calculate the percentage of land use change, which could be attributed to the increased demand in biofuels assuming that part of the increased demand happened in the same region as the biofuel demand and was in part coming from exporting countries (an average of the two).

The combination of the two steps provided the ILUC area in ha per TJ from which one could calculate the CO_2 emissions by applying regional emissions factors. These were preliminary results. The yield was very important for this method (for example, US corn which had a very high yield had a very low ILUC value). While wheat straw had a very low ILUC value, willow/poplar and switchgrass had important ILUC values due to the fact that there were no by-products credits; so the results should be carefully interpreted. The study was ongoing but had already obtained encouraging results.

Ms Marelli concluded that ILUC was a reality, and that all models and studies showed that there was an ILUC impact and that this impact was above zero. The models provided different results because they used different assumptions, mainly regarding yield increase and the reduction in food consumption. However, when these assumptions were fixed, reliable and comparable results could be obtained. The uncertainties were the same as for direct emissions. Finally, she reiterated that the reduction in food consumption was an effect assumed by all economic models but that it was questionable whether the benefits of these GHG reductions should be attributed to the use of biofuels.

Dr Chris Malins (International Council of Clean Transportation - ICCT) started by mentioning that when policies like RED increased demand for biofuels, feedstock must come from some combination of the following : by drawing down stocks in the USA and to some extent in Europe (although this did not have a land use implication and was not sustainable in the long term); by reducing demand in other sectors (e.g. to have fewer animals to feed people); by increasing yields (directly for instance with wheat ethanol or by moving from crops with a lower tonnage per ha to crops with a higher tonnage per ha); by using waste and residues (irrelevant for the analysis of crop-based biofuels) and by increasing the cultivated area. Predicting the balance of these effects required ILUC modelling.

Concerning the IFPRI study based on the MIRAGE model, Mr Malins recalled that it provided lower ILUC emissions (about 10-15 g CO_2 eq/MJ) in the central estimates for ethanol and higher ILUC emissions for biodiesel (around 50 g/MJ). Consequently, the model concluded that biodiesel from unused vegetable oils was not a good GHG emissions mitigation option for the EU. However, Mr Malins praised the model as being the most comprehensive, sophisticated and innovative one for Europe for several reasons: it covered the greatest number of sectors and regions; by-products of bioethanol and biodiesel were well treated by the model; and the predicted impact of other vegetable oil demand on the palm oil market made by the model was realistic. Hence the model's findings that LUC and ILUC for all biodiesel options lead to higher emissions than the required 35% emissions savings were robust.

Mr Malins also recalled that legislation in the US (both at the federal level and in the state of California) included ILUC factors which was currently not the case in Europe. In the US legislation, the main conclusions from the MIRAGE model - and by the way all other regulatory modelling exercises - were reflected in the ILUC emissions attributed to biodiesel from soy, rapeseed and palm oil crops. ILUC emissions were so significant that it was difficult (if not impossible) for these crop-based biodiesels to achieve the 35% carbon savings.

Concerning supply versus demand elasticity, Mr Malins stated that there was good historical econometric evidence that when commodity prices increased, there was an area response to prices (link between feedstock price and area expansion). Also, food demand decreased when prices went up (link between feedstock price and reduced consumption). However, for yields, there was no strong historical evidence (although this did not mean that there was no effect but rather that experts had not been able to isolate this variable in econometrics).

Mr Malins showed how vegetable oil markets were well connected to biodiesel demand. During the past decade, biodiesel imports went up and exports down, introducing a significant trade deficit in vegetable oils (so one might conclude that the biodiesel was partly responsible). Palm oil was imported in Europe and its demand was linked to the demand for domestically produced oils. He also demonstrated that by looking at different types of oil, all oils responded in the same way; thus the prices of palm oil, soybean oil and rapeseed oil were well correlated.

Mr Malins pointed out that there was good evidence that palm oil demand drove deforestation and peat loss (i.e. there was an accelerated trend of peat loss in Indonesia and Malaysia) and this could be attributed to some extent to biodiesel related ILUC. He also highlighted that the IFPRI study had underestimated emissions in the use of a 55 tons carbon/ha/year emissions value for peat as new evidence suggested that the value was twice that figure.

According to Mr Malins, limiting and reducing the use of biodiesel could help in complying with the RED requirement for a minimum 50% GHG reduction compared to fossil fuels. He added that introducing ILUC factors (or some other effective ILUC minimization approach) to EU biofuel policy would make sure that it delivered the correct outcomes.

Mr Malins concluded saying that ILUC would happen (potentially negating any potential emissions savings), that the food vs fuel debate was real and that there could be a negative impact from European biofuel policies even taking into account the potential for jobs, income, etc. Finally, he acknowledged that there was substantial uncertainty around ILUC emissions, even with sophisticated modelling available. However, the existence of uncertainty did in his view not in itself justify the absence of regulatory actions.

In his introductory remarks, **Mr David Laborde** (IFPRI), author of the IFPRI MIRAGE study, mentioned that as biofuels were not commercially viable, policies helped to put them into use because their social value (energy, farm and environmental policies) was not captured by the market. However, proper CO_2 accounting was needed and land use change (LUC) had to be considered. In fact, LUC had happened and would happen because land was still needed to produce crops.

He showed trade and production of biodiesel, vegetable oils and rapeseed in the last ten years, concluding that Europe started to import more and more vegetable oil and rapeseed oil, and from 2006, rapeseed seeds, so biofuels in Europe from rapeseed came from crop land extension or reallocation.

As the mechanisms linked to ILUC were quite complex, modelling was needed to capture all effects. For instance, the model assumed that increases in feedstock demand associated with biofuel policies caused commodity prices to rise and these price changes drove food consumption reduction and ILUC.

Mr Laborde explained that the MIRAGE model did not use historical data because the price had been declining in the past while the model predicted that agricultural prices would rise over the next 20 years, triggering innovation and thereby increasing yields. This explained why the model provided more optimistic results than the historical trend studies. The model also considered that biofuels could trigger side effects such as generating investments, cutting demand and reducing ILUC (in case of high commodity prices).

He clarified that the model estimated the total land use change (LUC is equal to ILUC + direct LUC/dLUC) but assumed that dLUC did not take place (due to RED), so the total LUC in the model was equal to the ILUC that policy makers were interested in.

Mr Laborde recalled that it was a complex model which covered different sectors for the whole world in a dynamic framework. It used data, a baseline (without the new policy) and a scenario (with the full implementation of the new national renewable energy action plans, known as NREAPs, by the MS) to see how the world would look like in 2020. It compared the world with and without additional demand for biofuels and looked at land allocation changes in 2020. He acknowledged, however, that there were uncertainties in the model.

The additional EU consumption of biofuels from 2008 to 2020 driven by NREAPs was 16 million tons of oil equivalent (Mtoe). The question was therefore what additional amount of biomass would be needed to produce the 16 Mtoe of biofuel. In this regard, Mr Laborde illustrated a domino effect: in order to produce 16 Mtoe of biofuel, about 5 million ha of land were needed to produce the crops. However, the additional cropland needed would actually be 2 million ha because land would be re-allocated among crops (more land was needed for rapeseed, soybean, and less land for other crops). Of these additional 2 million ha, only around 350.000 ha of new land (meaning land that had never been used to produce crops, as pasture or for other uses) would need to be converted. Most of this land use would not occur in Europe. It would mainly occur in the former Soviet countries such as Ukraine, Russia, Kazakhstan as well as in Latin America. In carbon value a large share would come from Latin America and a surprising share would come from Southeast Asia, Malaysia and Indonesia due to the peatland (e.g. more than one third of the emissions came from peatland in Southest Asia due to the impact of the biodiesel market on palm oil).

Similarly to Mr Malins, Mr Laborde reiterated that the study eventually underestimated emissions from peatland (science evolved and the values of peatland were different from those obtained five years ago), but clarified that the model tried to capture the economic effect and changes in land use based on economic drivers. The information related to the carbon stock in different lands was not provided by the model but came from other sources.

He explained that with the land and the carbon stock figures, the ILUC coefficient could be obtained by crop. Most results for biodiesel showed indirect land use emissions on the top of relatively large direct emissions. He underlined that the model used 2020 technologies to estimate direct emissions which meant that the model was optimistic as current biofuels were not so efficient. In addition, biodiesel and palm oil had consequences on deforestation (e.g. in Brazil and Southeast Asia).

The model provided smaller figures for ethanol in terms of LUC. On the one hand, the sugar based ethanol crops (sugar beet and sugar cane) had quite high yields in terms of energy per ha and would not touch the most sensitive regions in terms of carbon stock. On the other hand, maize and wheat were going to have high yields. In addition, and even more importantly, Europe was able to extract a significant share of sugar from crops already produced, and with the by-products that contained proteins from the livestock industry, a significant amount of additional cereals could be obtained to produce biofuel.

Mr Laborde stated that the model dealt with these crop specific values in a specific equilibrium so even if the conclusion was that biodiesel was not better than ethanol, the results for ethanol would not be the same if all consumption of biofuels became ethanol.

The way that carbon was counted in ILUC was not simple for two important reasons: First, the ILUC coefficients were dependent on the timeframe of the study (20 years or until 2020) and on the emissions policy. Second, there was a leakage effect on the fossil fuel market: if an European consumer was saving fossil fuel it did not mean that the world was saving the same amount of fossil fuel (e.g. in the study estimations, there was basically one third leakage effect meaning that when European consumers saved 90 grams of CO_2

coming from fossil fuels, the world itself would save 60 grams). In addition, the world balance for biofuels was even worse because the global accounting was not the same.

According to Mr Laborde, an important conclusion from the study was that there was a serious concern about LUC. Although the exact values could be argued, it was clear that they were not zero nor negative and hence that carbon was released when producing biofuel from biomass.

Mr Laborde concluded that even though biofuels were not the main source of LUC, better land use practices were needed for agriculture, biofuels or other uses. A solution could also be to adopt less ambitious targets for the consumption of biofuels. In this respect, the EC's proposal was quite rational and wise. Another approach was to introduce crop specific ILUC factors (which was quite challenging for some crops due to uncertainty). Anyway, even if uncertainty was high, it was clear that there was a difference between biodiesel and ethanol in all studies. Another solution was to increase the minimal requirements of direct energy savings to be sure that biofuels would be made using the best available technologies. Finally, a critical issue was the evolution of yield both from the technological point of view and from the regulatory framework. In this context, the EU should examine what kind of biotechnology to allow in Europe. It was impossible to produce biofuels without land use change and not relying on biotech. According to Mr Laborde, this involved a political choice that should be consistent.

After his intervention, **MEP Ms Lepage** asked Mr Laborde if the study had underestimated the positive effects of developing proteins.

Mr Laborde responded that the ILUC factor for cereal based ethanol was small because the model managed to include all the proteins in the system, so the study did not underestimate these effects.

Mr Ronald Steenblik (Organisation for Economic Co-operation and Development - OECD) focused on some general principles. First, he remembered that the biofuel industry was born dependent on government support. Almost all countries had started out exempting biofuels from fuel-excise taxes. These taxes varied considerably from a few euro cents to 60 euro cents— and thus so did rates of support. This affected trade because biofuels tended to be in countries with high sources of support. Mandates - that required volumes to blend - came later because they followed the logic of the electricity market, which was competing with food production. Some countries had eliminated that direct support, leaving only mandates (but this was also an indirect form of price support). As an agricultural policy, biofuel support differed from policies in most OECD countries aiming at decoupling support from production and prices. Government support had been critical in creating the biofuel industry and in sustaining it for many years when it would not have been profitable otherwise. This had led to a significant worldwide capacity.

Mr Steenblik highlighted that the effects of increasing biofuel production had actually been anticipated. The prime objective in almost all economies that have supported biofuels had been to create new markets for crops in order to help firm up crop prices. He noted that historically prices for crops and plant oils had risen dramatically, in part due to biofuel “demand”. Higher prices for prime feedstocks had also driven up prices for close substitutes in the food market (non-feedstock oils and other grains). Relative prices among foodstuffs had also been affected, with biofuel crops (and close substitutes including some fruits and vegetables) competing for land with less heavily supported crops. Based on an illustration, Mr Steenblik showed that the ultimate beneficiaries of biofuel support policies were not industry, but the owners of land.

He also emphasized that biofuel policies were not exclusively to blame for food-price inflation as costs and non-biofuel demand had been rising and supplies at times had been hit by shocks such as droughts, heat, cold, and pests. Rising energy prices had meant rising costs for fuel and fertilizer, though the effect was somewhat offset by rising yields. Also, with population growth and higher incomes in emerging markets, demand for feed grains and protein meals had been increasing. However, rising energy input costs had been exaggerated and a bigger factor had been a demand-driven effect on farm-specific inputs as a result of the rush to expand production. Thus, biofuel demand came on top of other demands. As biofuel mandates made this demand less flexible, there had been shifts in the adjustment burden to food and feed markets.

Mr Steenblik also showed that the growth in grain and oil consumption due to biofuels had been "a substantial fraction" of the total global growth rate since 2005. He brought some sobering numbers from the draft report of the High Level Panel of Experts on Food Security and Nutrition:

- To produce the world's harvested biomass (crops, crop residues, forage, and timber), people already manipulated around 75% of the world's vegetated lands and 85% of total water withdrawals.
- If 100% of the world's currently harvested biomass were devoted to bioenergy, it would contribute in the order of 30% to the world's total primary energy supply (TPES) today, and in the order of 20% to the world's TPES in 2050.
- If 100% of the world's crop production were diverted to bioenergy, it would provide some 9-13% of the world's primary energy.
- Producing 10% of the world's transport fuel by 2020 would require 26% of the world's current crop output.

Mr Steenblik also spoke about sustainability criteria. They were a response to the acknowledgement that "bad" biofuels could contribute to rising food prices, encourage land conversion and increase GHG emissions more than the fuels they would displace. He noted that the concept of ILUC was the most controversial part of sustainability standards as it was difficult to trace but even more difficult to disprove. The basic premise of the logic for biofuels was that the carbon emitted from exhaust pipes when burning biofuels did not "count" because it was offset by carbon absorbed by plant growth. That, however, was only true if that plant growth was additional.

Sustainability criteria for biofuels could be vulnerable to legal challenge as GHG criteria were politically determined numbers (e.g., 20% or 50% or 70%) and LCA was an imprecise science. In addition, if an emissions value was contested, importers might either feel obliged to accept exporters' (more favourable) data, or stand by their own values and risk having to defend their data and calculations against a legal challenge. Finally, conflict could arise if the same kind of calculations for LCAs was used as the basis for other policies (e.g. carbon labels for food).

Mr Steenblik concluded by stating his main message according to which applying sustainability criteria was like *stepping on the brake pedal while continuing to press on the accelerator pedal*: if the aim was to avoid adverse food and environmental effects, the simplest policy was to stop subsidising and mandating biofuels.

MEP Ms Lepage subsequently announced that **Mr John Courtis** (Air Resources Board, California - CARB) could not attend the meeting by videoconference due to technical reasons, but referred to his presentation (included in the annex to this document).

Dr Jeremy Woods (Imperial College London) presented the potential advantages of advanced biofuels, the role that they would play in a bioeconomy and the solutions and tools they might deliver.

He recalled that in terms of food security, biofuels were mainly seen as a competitor for food production. However, most of his research in particular in South Africa looked at bioenergy as a support for food production. He wondered, especially thinking about these interactions with energy and prices, if in the future a world without bioenergy, delivering energy services into agriculture, was compatible with increasing food production and food security.

He criticized that the current policy debate around ILUC factors was pretty much halting any investment in advanced second generation lignocellulosic research and had strongly negative implications for investments in biorefinery. In his view, ILUC factors were a major obstacle to sustainable development and provided the wrong signals about how to deal with the world's major problems. Mr Woods claimed that there were serious problems with the scientific basis and that there was a lack of scientific consensus in the way ILUC coefficients were calculated, taking into account, in particular, the high uncertainty related to future energy prices, the causes of deforestation etc.. Also, he emphasized that it was dangerous to leave biomass supply for bioenergy to be sourced as a residual of the demand signal.

Mr Woods recommended a new perspective on integrated land management to be developed. He pointed out that advanced systems had the ability of using biomass to produce high value products in a bioeconomy allowing driving different cropping production systems into the agriculture landscaping. He stated that major opportunities lied in scientific innovation and in closing the loop on nutrients and carbon. The biofuels produced from conventional food crops increased the productive capacity. Producing a larger range of outputs more efficiently from biomass, innovative conversion of feedstocks and multiple markets were key points in this context (see, for instance, the recent ETP analysis of the IEA showing alternative production systems of the future).

Mr Woods underlined that in order to tackle CO_2 emissions from transport, advanced and unconventional biofuels and the development of low or negative GHG perspectives were needed. In this relation, strong technological innovation (and related to this, enhanced investments in science) and an integrative view of climate, energy, food and landscape level planning were crucial. Mr Woods identified the lack of scientific consensus on ILUC as a key barrier to long term investment.

Mr Woods added that virtually all studies addressing the potential for sustainable bioenergy now looked (driven in particular by ILUC) for ‘unused,’ ‘degraded’ or ‘idle’ land to locate bioenergy crops onto. In practice, maximum value and utility could only be gained when biomass production for the bioeconomy was integrated directly into local agricultural and livestock systems (where the main solutions lied).

Mr Woods concluded proposing five interlinked solutions: Farm-level carbon stock management and trading tools for landscapes; farm based nutrient ‘trading’ schemes and novel tools (water quality and soil erosion control); novel crops and cropping systems; biorefining to maximise value, biomass conversion efficiencies and minimise losses (technology innovation) and policy-level interventions (e.g. revisions to Common Agricultural Policy (CAP), setting maximum daily nutrient loads, enabling farm/landscape level carbon / nutrient ‘trading’).

MEP Ms Lepage subsequently opened the first Q&A session.

Dr Kalanithi Nesaretnam (Embassy of Malaysia) congratulated the EU for the Directives dealing with ILUC and basically RED which had introduced improvements in developing countries like Malaysia. For instance, following adoption of the Directive Malaysia had developed sustainable agricultural practices (e.g. a limiting factor in palm production). She then asked what the EU plans were with regard to people in Malaysia who were dependent on palm production when looking for a balance between the economy and the environment.

Mr Urban Wästljung (Estonia) asked if the calculation of ILUC values took into consideration the large amount of idle farmland in Europe (around 10 million ha or more). He questioned if that affected the calculation of ILUC values in some way or if it was assumed that all the crop was displaced to virgin land in other areas of the world.

Mr Bas Eickhout (ENVI MEP) reminded that the EU had a biofuel target to meet in 2020. Accordingly, the flexibility *"to go in or out biofuels"* mentioned by Mr Woods was a bit restricted. Also, he agreed with the five solutions Mr Woods mentioned but expressed doubts about them being realistic. Turning to Ms Marelli, MEP Mr Eickhout asked for clarifications regarding yield increase. In most of the economic models used to calculate ILUC, the use of biomass for biofuels was actually increasing yields. He therefore doubted that ILUC was decreasing the attention to yield increase.

Mr Ilmari Lastikka (Neste Oil) stated that as a producer of advanced biofuels, their business was based on both Directives, so any changes in the legislation were very important for them. The Fuel Quality Directive and carbon would be driving the market and this meant that any savings with biofuels would be done because it would mean better prices. He added that there were tremendous possibilities for improvements with vegetable oils for instance (e.g. 60% GHG savings improvements). However, when investing in agriculture the numbers were sometimes very small (5 or 10 grams of CO_2). Consequently, when talking about implementing ILUC factors it could mean that there would be no sense in investing in a lot of these feedstocks because the ILUC factor impact was so large. For the moment, these developments made sense because the market was driven by carbon. When developing the legislation, attention should therefore be paid to promote investments in advanced technologies and to not exclude some products today and allow their use again in a few years because models then said that they could be used again.

Ms Christa Klass (ENVI MEP) asked for further clarifications regarding the theoretical concept of ILUC and whether there were guarantees that everything - and in particular the by-products used for feed that reduced the EU imports of feedstocks - was accounted for. She also asked how ILUC factors could be modernized.

As to MEP Mr Eickhout's question on the yield increase, **Ms Marelli** stated that yield effects were taken into consideration in all models through the yield-price elasticity. For instance, in the IFPRI study price elasticity was about three times higher compared to other models. In all the analyses the yield increase was driven by an increase in crop prices. Another issue to consider was that farmers would spend more due to increasing prices but they would also use more fertilisers which should be taken into account in the analyses as well.

Concerning the question on idle land, Ms Marelli answered that this was more related to land use models than to economic models as economic models calculated the total amount of land needed to satisfy the increasing demand of biofuel. In land use models, this extra land had to be allocated somewhere to convert these ha of extra land into GHG emissions. So the answer was yes, it depended on the land use model used and it was true that in Europe, in particular in Eastern countries, this abandoned/free land was available. However, the yield on this land was much lower than the yield in already existing lands so probably use of this land would lead to more ha required to satisfy the biofuel demand.

Concerning the question on by-products, Ms Marelli replied that in all studies the use of by-products allowed to save a lot of land. By using by-products in biofuel production instead of using crops for animal feed, land would be freed, and in some studies the effect of by-products was quite important (according to them, around 50% of the land reduction was due to the use of by-products).

Mr Woods stressed that his proposal was about changes in land management practices at the farmer level to address the fundamentals of agricultural sustainability including an integrated perspective in terms of land management to solve the problems in the agricultural sector in the long term. As to mandates, there were biofuel programmes large enough to be visible within the price signals in markets (in Brazil and USA). When the price signal went up for food production (as it had been the case in USA or Brazil recently) there was a decline in biofuel production. Consequently, they switched away from biofuel production and there was an increase in the supply of these crop products to other markets which was not a perfect signal.

MEP Ms Lepage thanked the speakers for their contributions. Furthermore, she highlighted the need to reduce the use of food crops for biofuels production, not only regarding climate change but also for food security reasons, and concluded that the inputs were extremely robust to continue working on ambitious objectives for the EU.

MEP Mr Alejo Vidal-Quadras (ITRE rapporteur) closed the first session concluding that MEPs had to improve the EC's proposal on ILUC and biofuels in the next months.

4. ROUNDTABLE ON POLICY OPTIONS ON THE TABLE AND FUTURE PERSPECTIVES

MEP Mr Alejo Vidal-Quadras (ITRE rapporteur) introduced the second session which provided the stakeholders' positions on the legislative proposal.

Mr Raffaello Garofalo (European Biodiesel Board) stated that the two existing Directives, the FQD from 2003 and the RED from 2009, gave a clear legislative framework to promote and develop biofuel industries. Nonetheless, this objective of promoting biofuels had been questioned as biofuels had been discredited. Consequently, Mr Garofalo underlined the need for consistency in European policies to encourage investment in first, second and third generation biofuel capacity.

Mr Garofalo stated that, with ILUC, biofuels and particularly biodiesels were now presented as a climate problem, pointing out that the future of the biofuel industry was at risk today because of unverified assumptions behind ILUC's econometric modelling. Hence he recalled that the biofuel industry represented 400 000 direct and indirect jobs in European agriculture, which produced more than 50% biodiesel worldwide. He stressed that this industry had committed itself to ambitious sustainability and certification criteria and, in Mr Garofalo's opinion, the EU should be proud of the European biofuel industry.

Also, Mr Garofalo regretted that the current ILUC factors of biodiesel (55 g / MJ) suggested that biodiesel was worse than fossil fuel despite the fact that they were not mandatory. Even though not mandatory, their inclusion in the future Directive could cause serious image problems and threaten the biodiesel industry as a whole.

He suggested to put the biofuels production in relation with other uses of land and invited participants to keep in mind that biofuel related agriculture represented less than 1% of world agriculture. Furthermore, Mr Garofalo reminded about the EC's proposal to create ecological focus areas (i.e. set-aside land) on 7% of all of the CAP eligible hectares of arable land in Europe. By comparison, he questioned if the 2-3% of agricultural land currently dedicated to biofuels could be the root of the ILUC problem worldwide. He also questioned whether biofuels were really the root of all food problems since one third of food produced worldwide was wasted before being consumed.

Mr Garofalo stated that there were no renewable alternatives to liquid biofuels for the transport sector (as electricity and hydrogen were only energy carriers mostly produced from fossil fuels). Taking into consideration the highly ambitious renewables and climate targets set at EU level, the essential question was how the existing biofuel industry could be improved in order to help decarbonising the transport sector and meet these targets.

Mr Garofalo recalled that second generation biofuels – more sustainable than first generation - would be produced in most cases by the same installations producing first generation biofuels. Therefore, industry would need a stable regulatory framework to invest in future technologies for second generation biofuels. Furthermore, he added that refusing biofuels would mean implicitly promoting fossil fuels.

Mr Garofalo concluded by emphasizing the importance of the European biofuel industry for reaching the climate and energy targets but also with a view to enhancing the EU's energy independence, security of supply and providing additional agriculture outlets.

Mr Thomas Gameson (ePURE, Association of European producers of renewable ethanol) started by stressing that ePURE supported the objectives of both the FQD and the RED. He recalled that there was a broad consensus that bioethanol industries contributed to decarbonise road transport even when taking into account ILUC factors. He added that

similar consensus on assumptions used in the models behind ILUC would be needed. Also, ePURE welcomed the EC's proposal to enhance incentives for advanced biofuels in principle, even if the doubling or the quadrupling was highly problematic.

Mr Gameson noted that bioethanol was the only low carbon and renewable substitution possibility for petrol. Therefore, ePURE was in favour of enhancing the existing legislative framework by creating sub-targets of at least 10% of bioethanol in petrol (with a quota of 8% assigned to conventional biofuels). This would ensure existing investments and support the new breakthrough technologies (such as conversion of the cellulose of plants from straw and wood waste into energy). A general target for advanced biofuels of at least 2% of the final consumption of energy of road transport by 2020 would also be needed in order to support new technologies.

Mr Gameson stressed that the bioethanol industry avoided costly imports of fossil fuels and created sustainable jobs, many in the less favoured rural areas of the EU. Furthermore, the ethanol industry was important for the co-products it produced: European ethanol would add approximately as much food (in form of high protein GMO-free animal feed) into the food chain as it consumed.

Mr Gameson concluded by urging the EU to keep on incentivising any biofuels that had net positive greenhouse gas savings and most of all the best performing biofuels in terms of greenhouse gas performance.

Mr Dietrich Klein (COPA-COGECA, European Farmers and European Agri-Cooperatives) stated that it was crucial to know the goals before establishing any policy options. He questioned if the EU should prevent GHG emissions caused by indirect or direct land use changes or both and, according to him, the only possible answer would be to avoid the maximum amount of GHG emissions regardless of whether they were caused directly or indirectly.

Mr Klein reminded that the IFPRI report states that more than 70% of the GHG emissions related to LUC resulted from changes in land use of forest and peat bogs in Brazil and Southeast Asia. The report also assumed that the European Union would import up to 91% of its need in bioethanol from Brazil and up to 23 - 24% of its biodiesel from Southeast Asia by 2020. Therefore, Mr Klein questioned whether there were policy options to prevent GHG emissions caused by these forecasted imports. According to Mr Klein, biofuel imports from Brazil and Southeast Asia would be promoted further in the future by counting palm oil and bioethanol from sugar cane towards the target. Thus the EC's current proposal implied that the greatest part of GHG emission related to ILUC (70%) would continue to be accepted.

Moreover, additional imports of palm oil from waste or residues would also be promoted in particular through fourfold weighting. For Mr Klein, this would intensify the problem since such promotion could also be understood as an invitation to increase the palm oil amounts in waste and residual substances at the expense of primary palm oil production.

Mr Klein explained that there was another political option. He stated that the EU should endeavour to conclude bilateral or multilateral agreements with third countries containing provisions on sustainability criteria that encourage the introduction of official environmental legislation in these countries in order to prevent land use change (these kinds of agreements were in fact encouraged by Para 44 of the EP resolution of 15 March 2012 on a Roadmap for moving to a competitive low carbon economy in 2050 (2011/2095(INI))[1].

[1] Para 44, EP Resolution: "calls, therefore, on the Commission to follow a broader approach on the issue of ILUC and to promote adequate protection of the environment in third countries affected by land use change bilaterally and multilaterally in order to take account of the greenhouse gas emissions attributable to changes in land use patterns; this could be achieved through the introduction of additional sustainability requirements

Referring to the remark made by Dr Nesaretnam, Mr Klein insisted on the fact that there were examples that such legislation worked and that it could prevent land use change.

Mr Klein also proposed a second option for supporting such agreements, i.e. to not promote biofuels from countries in which there were land use changes with regard to forest areas and peat bogs by not counting them towards the EU target. This would prevent more than 70 % of the GHG emissions calculated by the IFPRI study.

To conclude, Mr Klein recalled that the reduction of the target for food crop-based biofuels to 5% proposed by the Commission had no impact on changes in land use in forest areas and peat bogs, but the EU should encourage the introduction of official environmental legislation in third countries in order to prevent land use change. Finally, Mr Klein called for re-evaluating the CO_2 emission values for fossil fuels.

Ms Nusa Urbancic (Transport & Environment – T&E) started by explaining that problems caused by biofuels were not the only ones that harm the climate. However, biofuel was a specific problem because of the 10% mandatory target for biofuels set in the RED. Furthermore, since biofuels were financed by the public sector (3 billion euros per year) she insisted on the need of a precautionary approach for accounting GHG emissions related to biofuel and thus the importance of taking ILUC into account.

Ms Urbancic also stated that ILUC was not a new problem. She recalled that already at the time the RED was written an impressive list of studies and scientific institutions were asking to take ILUC into account. According to Ms Urbancic, biofuel industries knew from the beginning that ILUC would have to be considered at some point in time.

T&E was not in favour of the 10% target of the RED. T&E preferred a CO_2 target as in FQD and recommended that the European authorities avoided picking winners (e.g. biofuel). In any case, T&E wanted correct emission accounting for all fuel and bioenergy. She also recommended that the EP adopts strong sustainability criteria supported by a broad scientific consensus (which clearly existed) on ILUC as it had already been done in California and the United States at federal level. European policy should be based on and aligned with scientific evidence and this would also be the best way to ensure the economic certainty investment in biofuels needed.

Ms Urbancic stated that ILUC factors changed the picture of which biofuels were good for the climate and insisted on the importance of taking abatement costs into account. She highlighted that without taking ILUC into account, CO_2 savings related to biofuel would be 5% and the abatement costs would equal €2 500/ton CO_2. However, if ILUC factors were considered, CO_2 savings might be 53% and abatement costs could be reduced to less than 400 euros per ton, which still represented concrete savings for the public financing of biofuel technologies.

Ms Urbancic explained that T&E had commissioned a study on grandfathering to know what to do with existing investment. This study showed that by 2017, 95% of investment would have been paid back and that many industries would make a profit. Therefore, 2017 seemed to be a realistic time to put ILUC factors into place. She insisted on the fact that T&E wanted to combine economic with ecological interests.

Ms Urbancic concluded by recommending the following options: to introduce science-based feedstock-specific ILUC factors, to keep the cap at the current level of 5% refusing any increase in consumption and to introduce ILUC factors by 2017. These elements would combine environmental effectiveness with a clear framework for the continuation of low-

on certain categories of biofuels imported from third countries."
(http://www.europarl.europa.eu/sides/getDoc.do?type=TA&language=EN&reference=P7-TA-2012-86).

carbon investment with a fair treatment for past investments and ensure future low-carbon biofuels.

Mr Marc-Olivier Herman (OXFAM) put the biofuel issue in a global perspective. He insisted that the problem discussed during the workshop was about people, people's livelihood, food and scarce resources like land and water mostly in the developing world. But it was also about jobs created by subsidised industries in Europe. Mr Herman stated that humans were facing some major global challenges. By 2050, 9 billion people would have to be fed, food production would have to increase by 70% and the world would be confronted with high and volatile food prices.

Referring to the most recent report from DG Agriculture in December 2012[2], Mr Herman recalled that biofuel was the most dynamic factor in the agriculture market. If policy was not changed, the European biofuel consumption would nearly double by 2020 and the share of imports would explode from 25% currently to 50%, which meant that the impact of biofuels would not only be felt in the EU.

Regarding possible solutions, Mr Herman stressed that an intelligent sustainable policy in the transport sector and in transport emissions was preferable to biofuel mandates. For him, policy makers had to avoid new mandates for ethanol or for any types of biofuel.

Mr Herman also referred to a recent study[3] commissioned by G20 in 2011 following the recent food price crisis. In this report, a unanimous message from international development institutions to G20 was that national policies that subsidise or mandate biofuel production should be removed. According to this recommendation, Mr Herman insisted that the biofuel targets should be reduced instead of keeping biofuels consumption at the current level or, even worse, increasing it. According to him, the simplest way to solve the food vs fuel problem and tackle the problem of emissions would be to reduce the biofuel targets.

Furthermore, Mr Herman urged an improvement of the EC's proposal. He insisted on the fact that the two Directives (RED and FQD) had to be coherent. He recalled that an accounting limit was currently only present in the RED but it should be implemented in both Directives since they were both the main drivers of the biofuel market. Furthermore, he added that the cap had to be a real cap and not an accounting limit, meaning that the limit had to be included in the sustainability criteria. He warned that with the current proposal, governments could be allowed to subsidise as much biofuel as they wished.

Mr Herman concluded his presentation by asking for a pathway to limit biofuels, to phase them out and finally to stop subsidies of biofuels beyond 2020.

Mr Sébastien Haye (Roundtable on sustainable biofuels - RSB) underlined that the RSB standards covered direct impact of biomass and biofuels production beyond the requirement of the RED. So they included aspects related to land rights, local food security as well as soil and water management. Currently, the indirect impacts of biofuel production were not addressed in the standard but this issue had been discussed since the beginning of the initiative in 2007. The main question for RSB was whether and how a voluntary certification system which targets individual projects could address indirect impacts of

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[2] Prospects for Agricultural Markets and Income in the EU 2012-2020. December 2012. DG Agriculture and Rural Development. European Commission. It is available at: http://ec.europa.eu/agriculture/publi/caprep/prospects2012/fullrep_en.pdf.

[3] Inter-Agency Report to the G20 on food price volatility. The preparation of this report, coordinated by FAO and OECD, has been undertaken in a truly collaborative manner by FAO, IFAD, IMF, OECD, UNCTAD,WFP, the World Bank, the WTO, IFPRI and the UN HLTF. The report was submitted to the French Presidency of the G20 on 2 June 2011.
It is available at: http://www.fao.org/fileadmin/templates/est/Volatility/Interagency_Report_to_the_G20_on_Food_Price_Volatility.pdf.

biofuels. For Mr Haye, this was also an important question from a policy perspective since voluntary standards were the main if not the only vehicle to implement the sustainability criteria of the legislation.

Mr Haye added that RSB had consulted the public as well as its members in order to know in the first place whether and how the RSB's standards could address indirect impacts. During the consultation, different options were presented to the participants. These options were similar to those used by the Commission during its own consultation process.

- Option 0 "Do nothing": Status quo, no additional requirement in the standard.
- Option 1: "Low Indirect Impact Biofuels Approach (LIIB)": Integration of a lower risk of displacement practices at the project level.
- Option 2: "Principles and criteria": Mandatory requirement in the principles and criteria.
- Option 3 "ILUC factors": Integration of ILUC factors in GHG calculation.
- Option 4: "Regional assessment": Implementation of specific measures in each region to limit the risk of displacement and indirect land use change.
- Option 5 "Indirect Impact Fund": Development of an offset program where operators could contribute to a fund to help farmers in Southern countries.

Although the consultation had not been finalised, a few trends (that could, however, not be considered the official position of the RSB) could be pointed out. In particular, results showed a clear trend that indirect impacts should be addressed in the voluntary standards of the RSB. In terms of options, there was currently a preference for the LIIB approach. Indeed, with the lack of consensus on ILUC modelling, it would probably be easier to use an option based on good practices at the project level. However, the other options were not rejected and most participants had a preference for a combined approach. Some members were hesitating to adopt voluntary standards before the legislation changes.

Mr Haye concluded by hoping for a formal decision in the next few weeks.

During the second **Q&A session**, **MEP Ms Christa KLASS** agreed with the use of sustainability criteria for all biofuels. However, she questioned how the use of biofuels in a could be guaranteed sustainable way and asked Mr Klein for further clarifications. In particular, she asked if biofuels should be imported only from countries where no direct or indirect land use change was happening or from countries which fulfilled European law and were parties to international agreements (e.g. WTO agreements).

Mr Klein answered that such a regulation would be compatible with the relevant WTO law, the agreement on Technical Barriers to Trade (TBT) and its articles 2.1 and 2.2 and quoted an example from the RED which excluded biofuels from the so called "no-go areas" (as stated in the article 17) while complying with the TBT agreement.

MEP Ms Christa KLASS asked Mr Garofalo if a real border existed between first and second generation biofuels as well as a way to better identify a real second generation biofuel.

Mr Garofalo answered that the border was very unclear. Indeed, the same industries produced both first and second generation biofuels. Furthermore, different products (recycled fats, animal fats, vegetable fats, algae etc.) could be used to produce biofuels undergoing the same chemical transformation. Thus, the technical capacities were the same and this was why the same industries were investing in both generation capacities. Mr Garofalo added that if a double or a quadruple counting or extra incentives were put in place for second generation biofuels, it would be essential to avoid claims about the nature

of the products whether they were recycled or virgin. Therefore, biofuels would need a certification system.

Mr André P.C. Faaij (Scientific Director of the Copernicus Institute of Utrecht University) who is currently involved in bio-based economy research, pointed out that development of a bio-based economy options on a large scale was urgently needed. Indeed, the latest IPCC assessment report showed that the bio-based economy had to play a critical role to reduce GHG emissions. A twenty fold increase of modern bioenergy use would be needed to meet current climate targets. There was solid scientific evidence that it was feasible: it could be done by optimising agriculture, it could be economically viable and it could provide profound environmental benefits if it was combined with better farming and better natural resource management.

Mr Faaij agreed that the current biofuel policies were only half a policy. They pushed biofuels on the market without proper preconditions. He added that current ILUC studies were only half the science needed to tackle the problem. According to Mr Faaij, a proper policy should make biomass and bio-based economy part of sustainable development and land use. The task of the EC was to make the bio-based economy part of the new CAP. He argued that studies should show not only how things could go wrong but also what could be done to avoid the problem.

Finally, he called for a policy that requested an integral approach to sustainable agriculture and sustainable bio-based economy, an industry that implemented these principles, sciences that showed how to achieve them and NGOs that promoted them.

MEP Mr Bas Eickhout stressed that the debate on ILUC was rather complex, with different facets in favour and against biofuels. For example, ILUC would add to the debate referring to ethanol also because of ethanol being more competitive when adding ILUC factors. **Mr Gameson** replied that competitiveness was not an issue. The biofuels industry was interested in moving on with second generation since this was crucial in terms of capacities and that was the reason the biofuel industry was looking for a policy that helped to move on.

Mr Sebastien Risso (Greenpeace) asked Mr Gameson if he knew what would be the overall footprint of ethanol production taking into account not only the carbon balance but also the needed use of fresh water and pesticides. He also asked what would be the overall environmental impact of an increase of ethanol consumption from the current level to 8% in the EU. **Mr Gameson** answered that their proposal for first generation ethanol was slightly more modest than what was forecasted by Member States in their proposal to 2020.

Mr Steenblik explained that he was confused by the figures presented by Mr Garofalo. He questioned if there could be some double counting when speaking about the creation of 400 000 new jobs. He asked Mr Garofalo if this figure also took into account the distributors, the farmers already growing crops and the farm suppliers. According to him, a large amount of these jobs were already existing and it was hard to imagine more than a few 10 000 real new jobs that could be created in the transesterification plants.

Mr Garofalo replied that there was no double counting. In his view, this part of the debate was missing. For him, hundreds of thousands of farmers would simply not produce anything anymore without biofuels due to the problems the agricultural sector in the EU was currently facing. He highlighted that biofuels were not only favourable to reduce GHG emissions but also to rural development, energy independency and security of supply. The European biodiesel production (12 million tons a year) enhanced in the same extent the EU security of supply with regard to Russia. He concluded that ILUC was certainly important

but that other points such as agriculture, independency and security of supply should also be taken into account.

At the end of the workshop, **MEP Mr Vidal-Quadras** concluded that the ILUC issue was more difficult than initially thought. He stated that there were good reasons to develop biofuels and, in this sense, quoted the IEA: *"to reduce dependency on oil and to contribute to growing efforts to decarbonise the transport sector, biofuels provide a way of shifting to low carbon non petroleum fuels often with minimal changes to vehicles stocks and distribution infrastructures"*.

MEP Mr Vidal-Quadras added that production and use of biofuels could increase energy security, transport sustainability, reduce price volatility and support economic development creating new sources of income in rural areas. Despite all these benefits he acknowledged that biofuels, as any source of energy, presented some problems and ILUC was one of them.

There was a broad consensus on the need to deal with ILUC. Promoting advanced biofuel would minimise LUC and therefore benefit the whole biofuel industry. However, there were big differences in opinion on how to reduce GHG emissions related to ILUC while harming European industry as little as possible. In fact there remained numerous questions without clear answers.

He questioned if there was sufficient scientific evidence to adopt specific values of ILUC related emissions, how MS could achieve the 10% renewable energy goals with a ceiling on current biofuels and if there existed sufficiently justified means to reduce GHG emissions independently of the impact on agriculture and industrial sectors (especially as it was not Europe that was converting forest into land for crops).

Finally, MEP Mr Vidal-Quadras explained his intention to adopt a balanced Directive that did not underestimate any of all those elements and succeeded in introducing methods which supposed an effective reduction of emissions derived from ILUC. But the EU would not achieve these goals without a realistic transition that gave time to first generation fuels to contribute to the targets. Furthermore, the first generation fuel experience was needed for the development of new generations of biofuels.

MEP Ms Corinne Lepage thanked the participants for giving the EP the opportunity to better take into account the following factors: GHG emission reduction, fair treatment for existing investment and the necessity of investing in second generation biofuels. She also underlined the need for a realistic transition that did not oblige to choose between food and cars.

She concluded by stating that new studies were giving a better understanding of the ILUC issue. Progress was ongoing and the knowledge required was now available to find out the best possible compromise. She stressed the need of being pragmatic and the possibility of reducing GHG emissions while at the same time taking into account economic reality and the current use of biofuels. She closed the workshop by thanking all the participants for their help with gathering all the necessary elements to improve the EC's proposal.

5. KEY TERMS

Advanced biofuel technologies: Biofuels typically produced from non-food/feed feedstocks such as wastes and residues (i.e. wheat straw, municipal waste), non-food crops (i.e. grasses, miscanthus) and algae. Most technologies are at pilot scale or in development.

Bioethanol: Alcohol-based biofuel typically produced from starch and sugar crops such as wheat and sugar beet, and used as a petrol additive for its use in motor vehicles.

Biodiesel: oil-based biofuels typically produced from vegetable and animal fats, such as rapeseed oil and tallow, and used as a diesel additive for its use in motor vehicles.

Biofuels: Liquid or gaseous fuel used for transport purposes produced from biomass.

Bioliquids: Liquid fuels used for energy purposes other than transport, including electricity, heating and cooling, produced from biomass. These are typically produced from vegetable oils such as palm and waste oils.

Biomass: The biodegradable fraction of products, waste and residues from biological origin from agriculture (including vegetable and animal substances), forestry and related industries including fisheries and aquaculture, as well as the biodegradable fraction of industrial and municipal waste.

Conventionally produced biofuels: Biofuels typically produced from land using feedstocks which are also used in other markets (i.e. food and feed). These also include the use of certain waste and residues which do not require complex technological processes (i.e. biodiesel from used cooking oil or animal fat).

Direct land-use change: Land-use change occurring directly, i.e. mostly referred to in the context of the conversion of land areas to cropland.

Direct emissions from biofuels: Greenhouse gas emissions associated directly with the production of biofuels. These may include greenhouse gas emissions associated with the cultivation and harvest of feedstocks, with the processing and production of the biofuel, its transportation, direct land-use change.

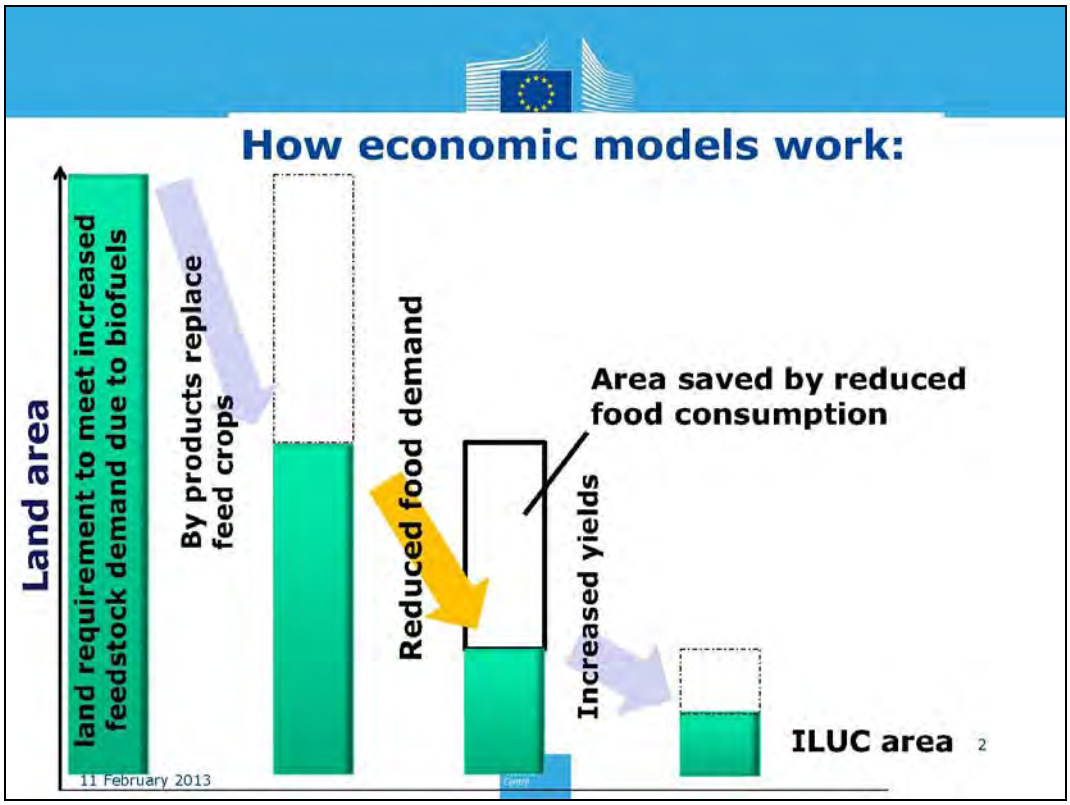
High carbon stock land: Land with large amounts of carbon stored in biomass (trees, grass, roots etc.) and/or soil.

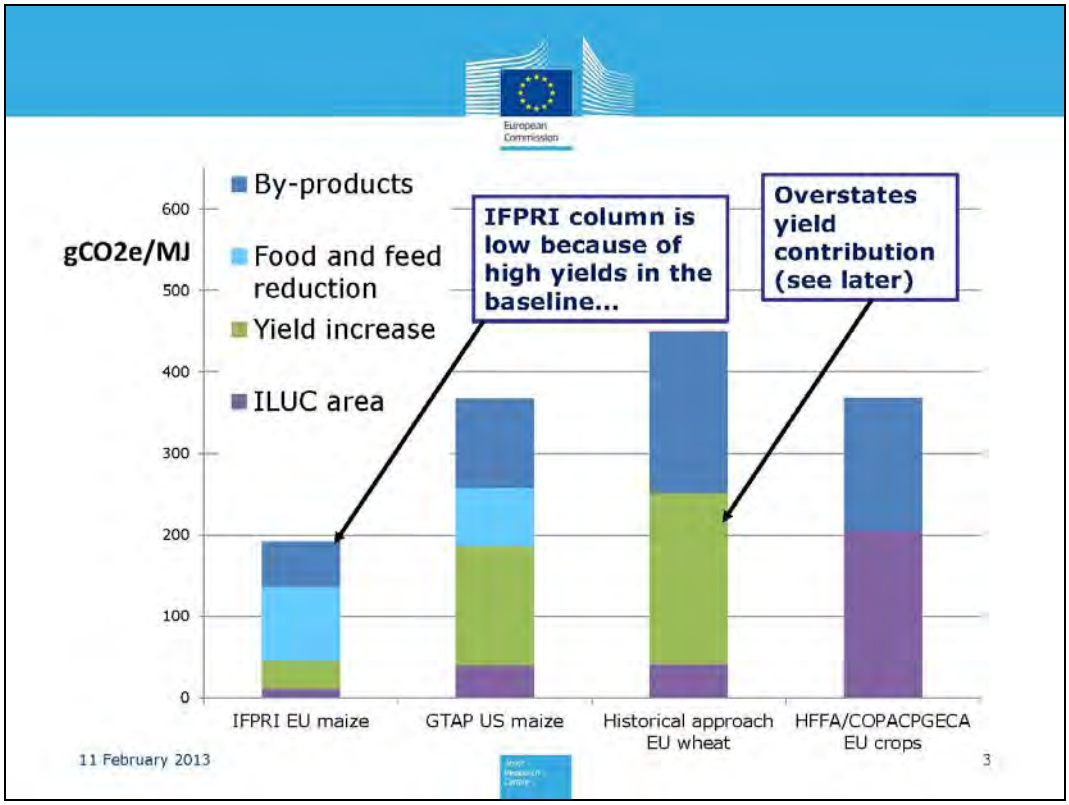
Indirect land-use change: Land-use change occurring indirectly i.e. mostly referred to in the context of land-use change as a result of displaced demand previously destined for food/feed/fibre market as a result of biofuel demand.

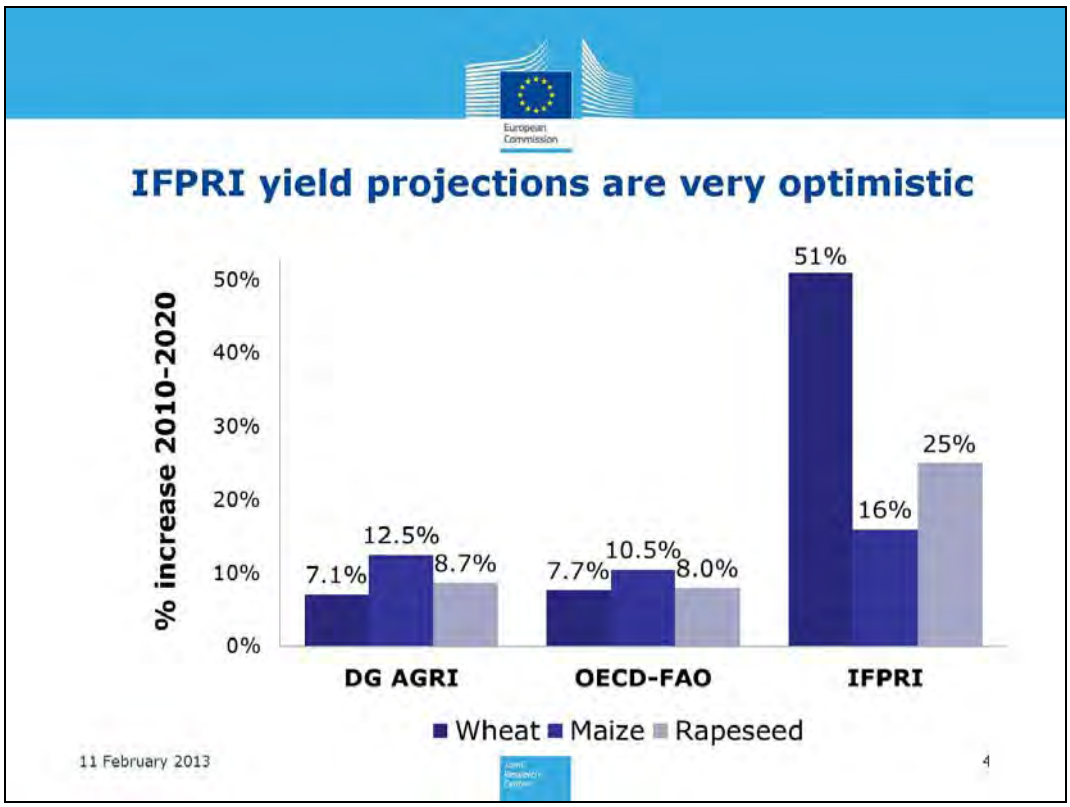
Land-use change: The conversion of land from one use to another, e.g. from forestry to cropping.

6. ANNEX: PRESENTATIONS

6.1. Presentation by Ms Luisa Marelli




By-products
Food and feed reduction
Yield increase
ILUC area
gCO2e/MJ
600
500
400
300
200
100
0
IFPRI column is low because of high yields in the baseline...
Overstates yield contribution (see later)
IFPRI EU maize
GTAP US maize
Historical approach EU wheat
HFFA/COPACPGECA EU crops
11 February 2013
3


IFPRI yield projections are very optimistic
% increase 2010-2020
50%
40%
30%
20%
10%
0%
7.1%
12.5%
8.7%
7.7%
10.5%
8.0%
51%
16%
25%
DG AGRI
OECD-FAO
IFPRI
Wheat
Maize
Rapeseed
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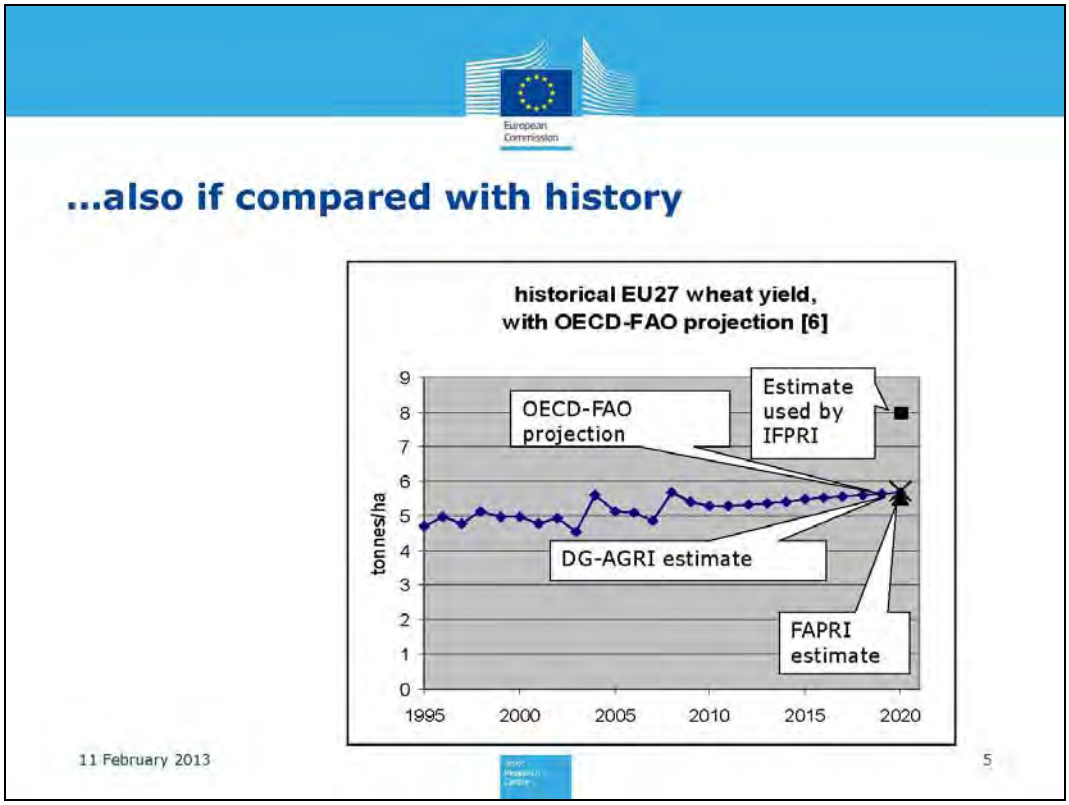
...also if compared with history
historical EU27 wheat yield,
with OECD-FAO projection [6]
tonnes/ha
OECD-FAO projection
Estimate used by IFPRI
DG-AGRI estimate
FAPRI estimate
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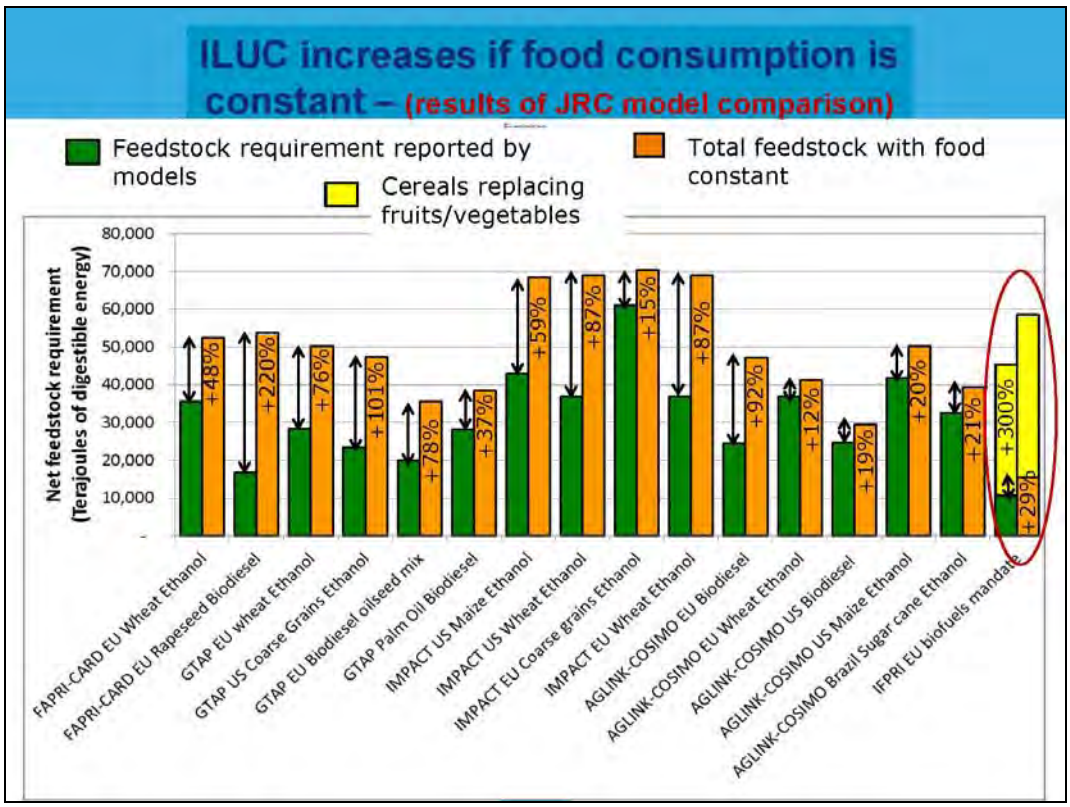
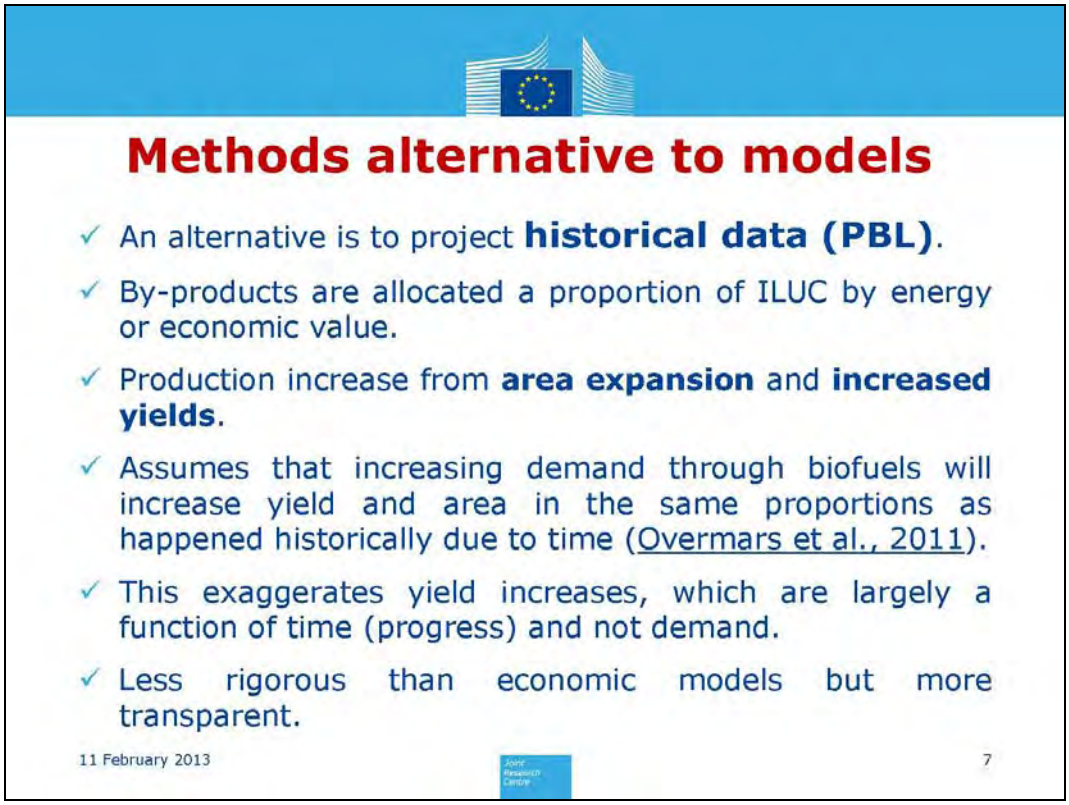

ILUC increases if food consumption is constant – (results of JRC model comparison)
Feedstock requirement reported by models
Total feedstock with food constant
Cereals replacing fruits/vegetables
Net feedstock requirement (Terajoules of digestible energy)
+48%
+220%
+76%
+101%
+78%
+37%
+59%
+87%
+15%
+87%
+92%
+12%
+19%
+20%
+21%
+300%
+29%
FAPRI-CARD EU Wheat Ethanol
FAPRI-CARD EU Rapeseed Biodiesel
GTAP EU wheat Ethanol
GTAP US Coarse Grains Ethanol
GTAP EU Biodiesel oilseed mix
GTAP Palm Oil Biodiesel
IMPACT US Maize Ethanol
IMPACT US Wheat Ethanol
IMPACT EU Coarse grains Ethanol
IMPACT EU Wheat Ethanol
AGLINK-COSIMO EU Biodiesel
AGLINK-COSIMO EU Wheat Ethanol
AGLINK-COSIMO US Biodiesel
AGLINK-COSIMO US Maize Ethanol
AGLINK-COSIMO Brazil Sugar cane Ethanol
IFPRI EU biofuels mandate


Methods alternative to models
✓ An alternative is to project historical data (PBL).
✓ By-products are allocated a proportion of ILUC by energy or economic value.
✓ Production increase from area expansion and increased yields.
✓ Assumes that increasing demand through biofuels will increase yield and area in the same proportions as happened historically due to time (Overmars et al., 2011).
✓ This exaggerates yield increases, which are largely a function of time (progress) and not demand.
✓ Less rigorous than economic models but more transparent.
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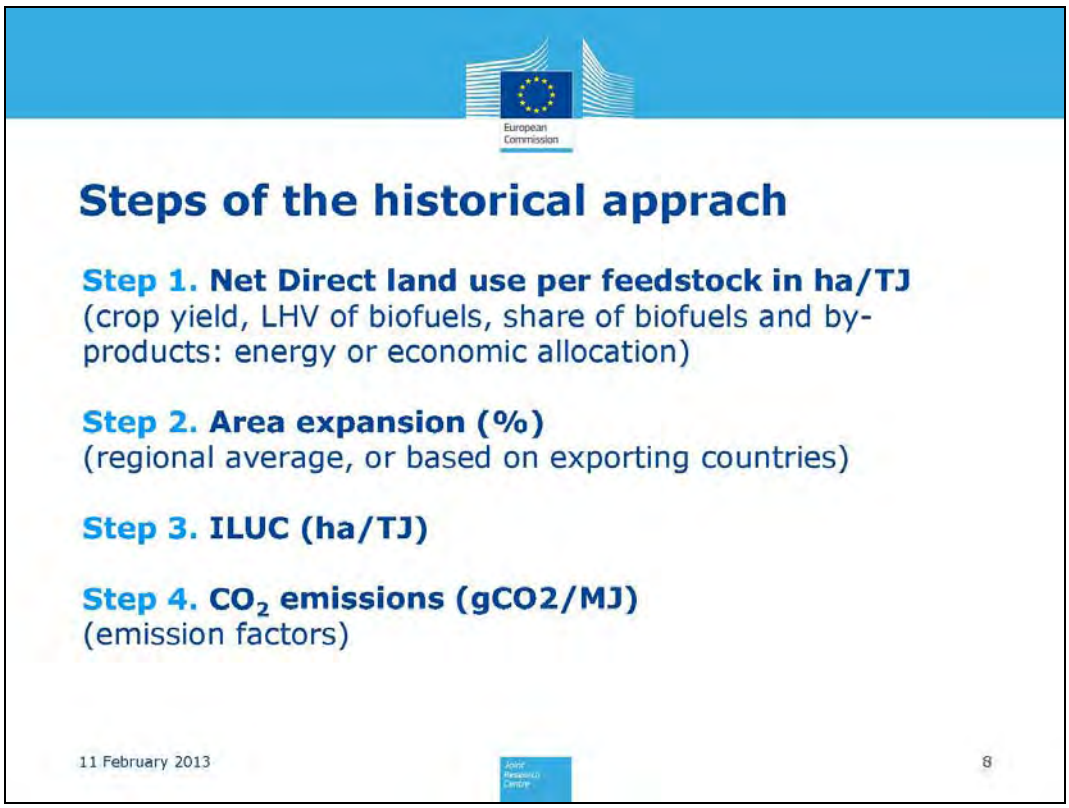
European Commission
Steps of the historical apprach
Step 1. Net Direct land use per feedstock in ha/TJ
(crop yield, LHV of biofuels, share of biofuels and by-products: energy or economic allocation)
Step 2. Area expansion (%)
(regional average, or based on exporting countries)
Step 3. ILUC (ha/TJ)
Step 4. CO_2 emissions (gCO2/MJ)
(emission factors)
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- The JRC (in collaboration with Overmars) is applying this historical approach to estimate ILUC emissions from various feedstocks:

Region and feedstock	Net direct land use (ha/TJ)	ILUC (ha/TJ)
EU wheat	14.08	2.99
EU sugarbeet	6.14	4.87
EU rapeseed	17.48	5.04
US corn	8.27	0.92
US soy	18.99	4.41
Indo/Malaysia palm oil	6.09	3.44
Wheat straw	4.96	0.75
EU willow/poplar	20.70	10.51
EU swithgrass/miscanthus	17.25	8.76

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Another alternative is to measure total historical land use change emissions, and then allocate to vegetable oils, cereals etc.

- Gives similar numbers:
- **Just** the direct replacement of **forest** by crops gives
  - **59 gCO_2e/MJ** vegetable oils
  - **11 gCO_2e/MJ** cereals
  - (...because cereals mostly expand onto pasture land)

(plus emissions from expansion on pasture)

[JRC calculations on VITO study for DG ENV ("Comprehensive analysis of the Impact of EU consumption of imported food and non-food commodities and manufactured goods on deforestation"), draft April 2012. Deforestation data in 1990-2008, from Forest Resource Assessment, FAO 2010]

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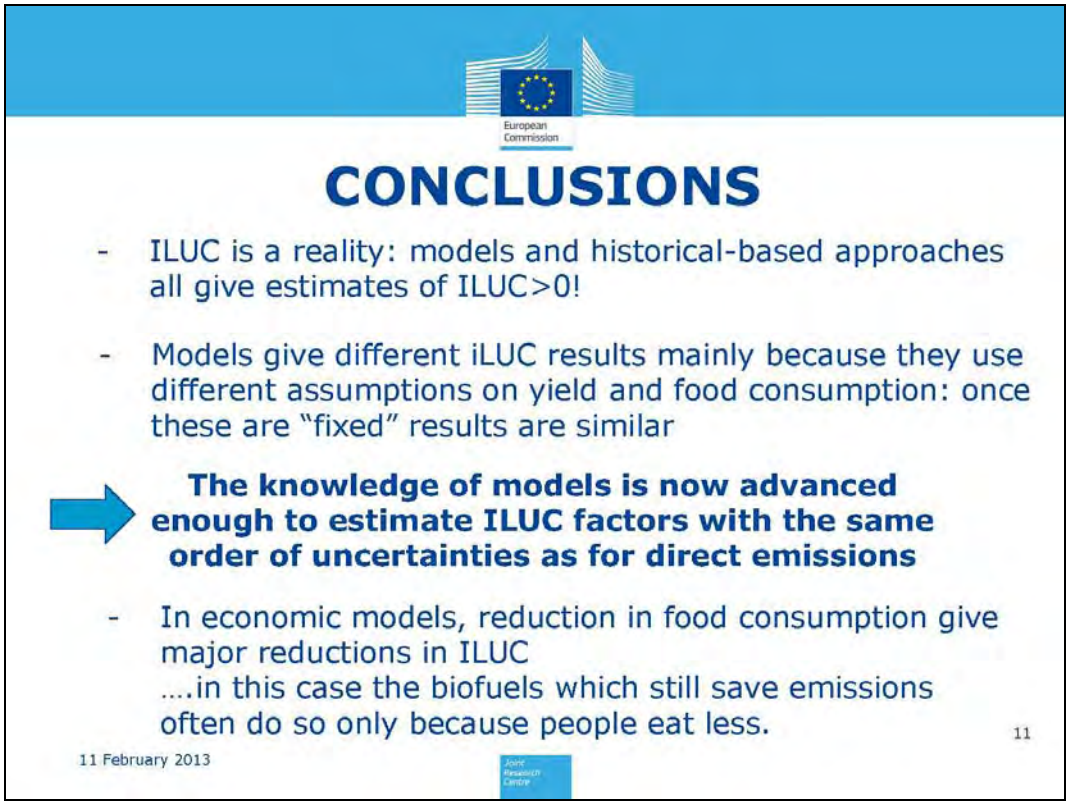
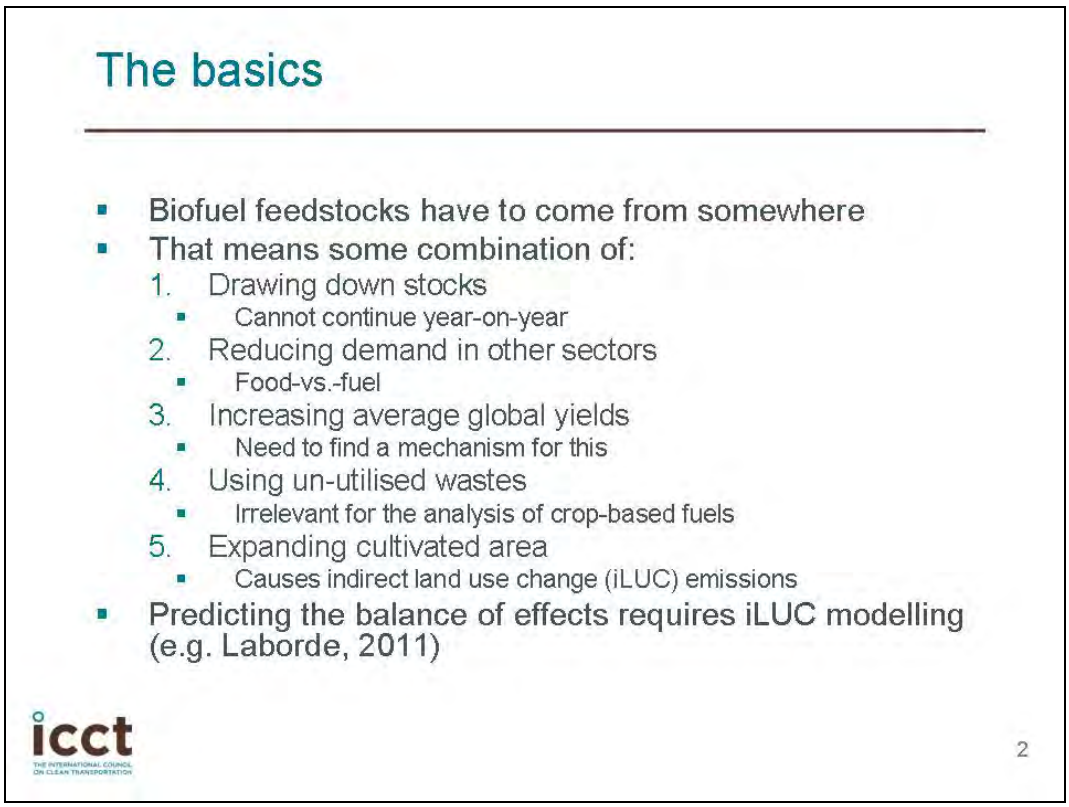
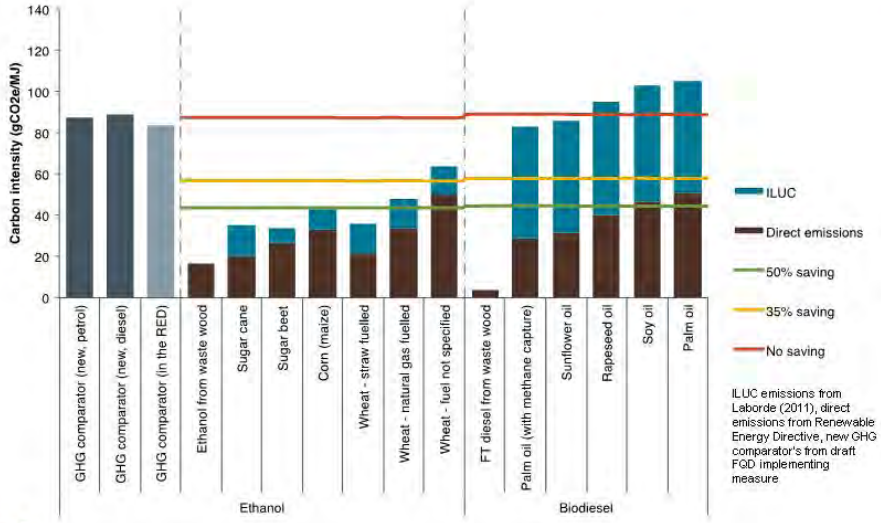

European Commission
CONCLUSIONS
- ILUC is a reality: models and historical-based approaches all give estimates of ILUC>0!
- Models give different iLUC results mainly because they use different assumptions on yield and food consumption: once these are "fixed" results are similar
The knowledge of models is now advanced enough to estimate ILUC factors with the same order of uncertainties as for direct emissions
- In economic models, reduction in food consumption give major reductions in ILUC
....in this case the biofuels which still save emissions often do so only because people eat less.
11
11 February 2013

6.2. Presentation by Dr Chris Malins



IFPRI MIRAGE* iLUC results



*The International Food Policy Research Institute's Modeling International Relationships in Applied General Equilibrium computational model, Laborde (2011)

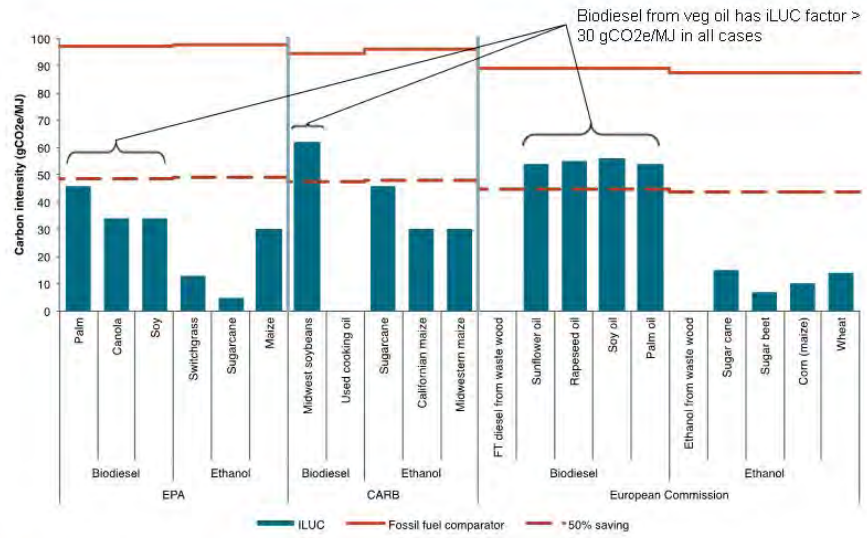
3

IFPRI MIRAGE is the best iLUC modelling available for the EU

- "We think that by-products of bioethanol and biodiesel are well treated by the model"
- The predicted impact of other vegetable oil demand on palm oil market "is not unrealistic"
- "For all biodiesel options … the typical well-to-wheel values plus land use change emission values … lead to higher emissions than the required 35% emission savings. These results are robust."
- "The MIRAGE model by IFPRI … represents a sophisticated modelling approach in the field of CGE modelling."
- Source: Kiel review of the MIRAGE model
- Commissioned by the European Biodiesel Board!

4

Comparing US and EU iLUC results



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Looking beneath the modelling

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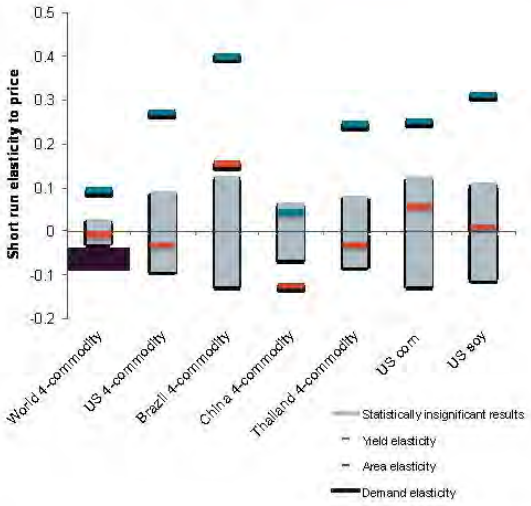
6

Supply vs. demand elasticity

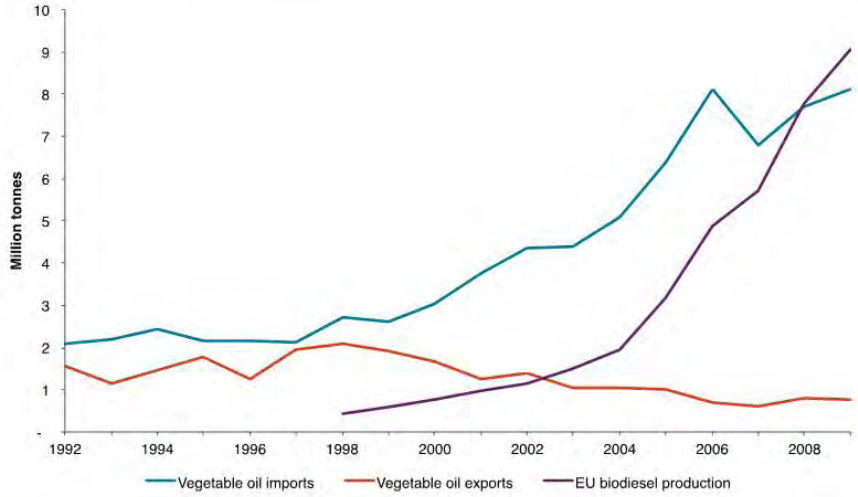
- The historical evidence for a link between feedstock price and area expansion is econometrically well demonstrated
- The historical evidence for a link between feedstock price and reduced consumption is econometrically well demonstrated
- That is not true of direct effects on yield – historically, no convincing econometric evidence



Roberts and Schlenker (2010); Berry and Schlenker (2011)

7

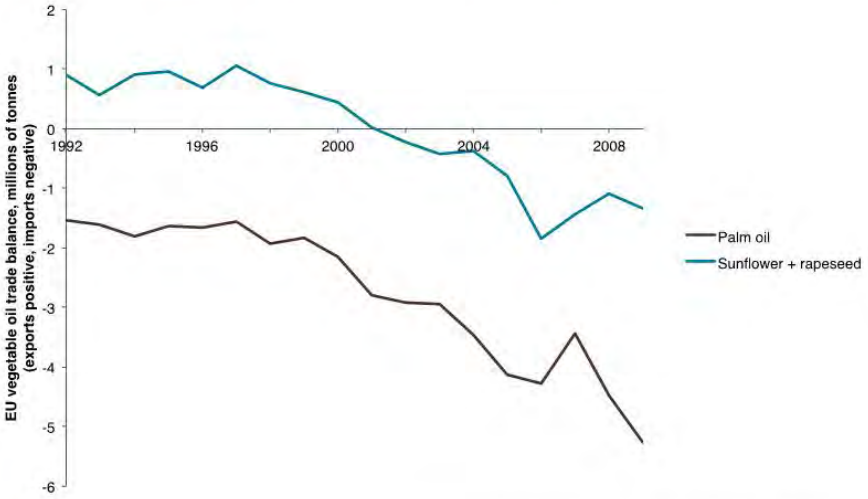
Vegetable oil markets are well linked to biodiesel demand



c.f. ICCT (2013) *Vegetable oil markets and the EU biofuel mandate*

8

Palm oil demand is linked to demand for domestically produced oils



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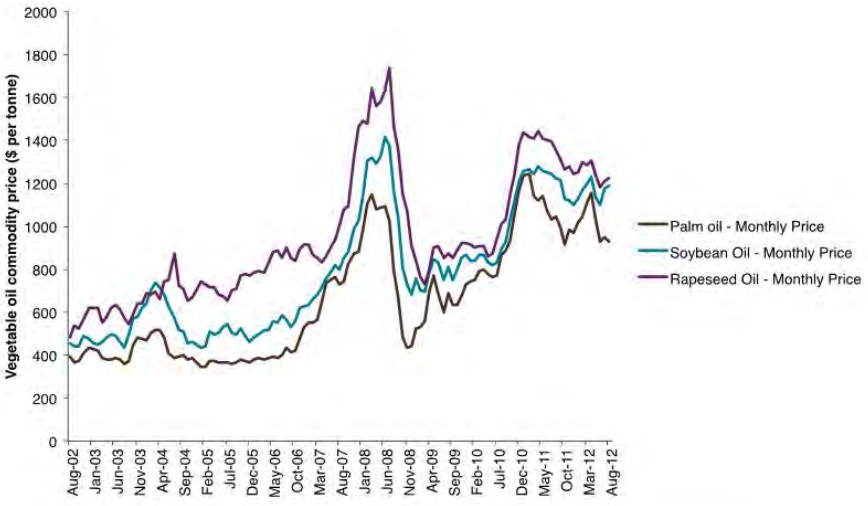
c.f. ICCT (2013) *Vegetable oil markets and the EU biofuel mandate*

9

Vegetable oil prices are well correlated



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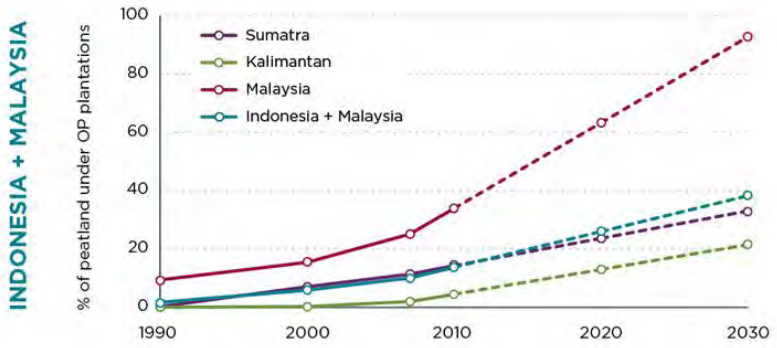
c.f. ICCT (2013) *Vegetable oil markets and the EU biofuel mandate*

10

Palm oil expansion drives peat loss

- For biodiesel, peat drainage is a major emissions source
- Average emissions for 20 years after drainage: 105 tCO_{2e}/ha/yr (Page *et al.*, 2011)
- Rate of peat destruction for palm oil accelerating: 1/3 of new plantations are on peat bogs (Mietinnen *et al.*, 2012)
- Laborde (2011) underestimates peat emissions (55 tCO_{2e}/ha/yr)



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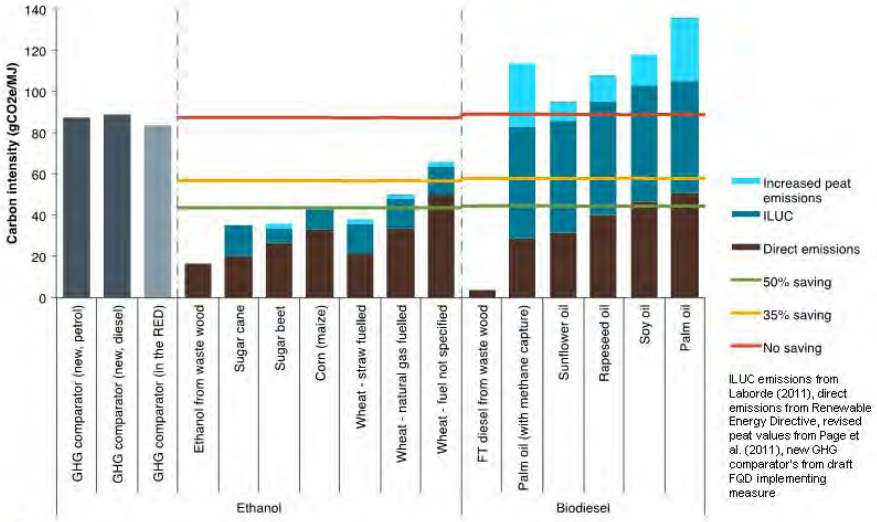
IFPRI MIRAGE iLUC results with revised peat emissions



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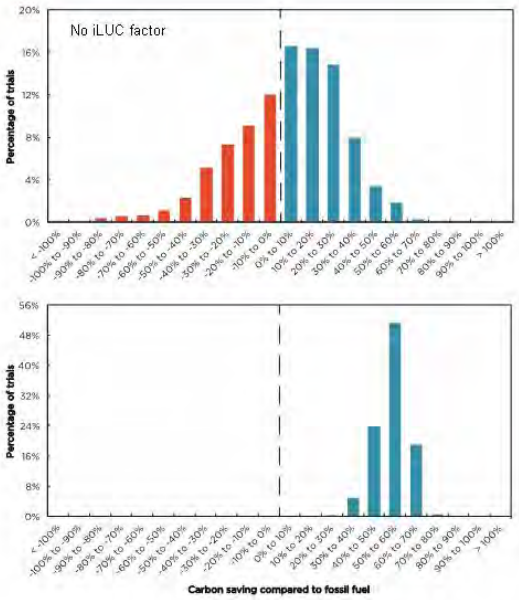
Expected policy outcome of including an iLUC factor (ICCT modelling)

- With no iLUC accounting the expected emission saving from crop based fuels is only 5%
- If iLUC factors are adopted, the expected saving rises to 53%
- Adopting iLUC accounting reduces the risk of increasing net emissions from 30% to 0%
- *But* it gets harder to meet targets



c.f. Malins, 2012. *A model-based quantitative assessment of the carbon benefits of introducing iLUC factors in the European Renewable Energy Directive.* GCB Bioenergy

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Conclusions

- *Some* iLUC will happen – potentially negating any potential emissions savings
- Food vs. fuel is real – broad consensus that biofuel mandates increase food prices and food price volatility
- For some fuels/systems/futures, iLUC emissions might be low in gCO_2e/MJ
- IFPRI-MIRAGE is the best available modelling for Europe
- If iLUC is not addressed, RED and FQD are extremely unlikely to deliver significant carbon savings
- Biodiesel from vegetable oil looks unlikely to reduce net global emissions, and likely to drive habitat loss etc.
- There's uncertainty, but it cuts both ways – biofuels could be better or worse than IFPRI says

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Thank you!

Email me at: chris@theicct.org

More from the ICCT on iLUC at:

http://www.theicct.org/issues/indirect-land-use-change-iluc

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References

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- ICCT (2013). *Vegetable oil markets and the EU biofuel mandate*, The International Council on Clean Transportation
- Laborde, D. (2011). *Assessing the Land Use Change Consequences of European Biofuel Policies*. Washington, D.C.: International Food and Policy Research Institute.
- Malins, C. (2012). *A model-based quantitative assessment of the carbon benefits of introducing iLUC factors in the European Renewable Energy Directive*. DOI: 10.1111/j.1757-1707.2012.01207.x
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- Page, S. E., Morrison, R., Malins, C., Hooijer, A., Rieley, J. O. & Jauhiainen, J. (2011). *Review of peat surface greenhouse gas emissions from oil palm plantations in Southeast Asia*. The International Council on Clean Transportation
- Roberts, M. J., & Schlenker, W. (2010). *Identifying Supply and Demand Elasticities of Agricultural Commodities: Implications for the US Ethanol Mandate*. National Bureau of Economic Research Working Paper Series, No. 15921.

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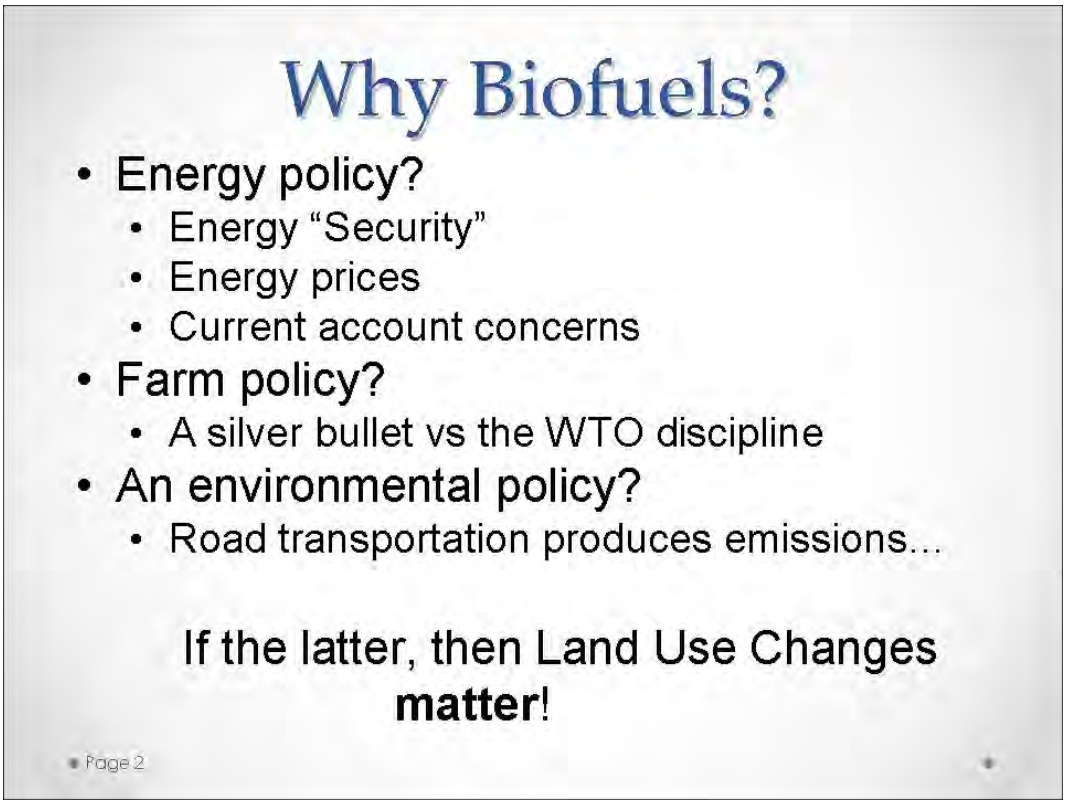
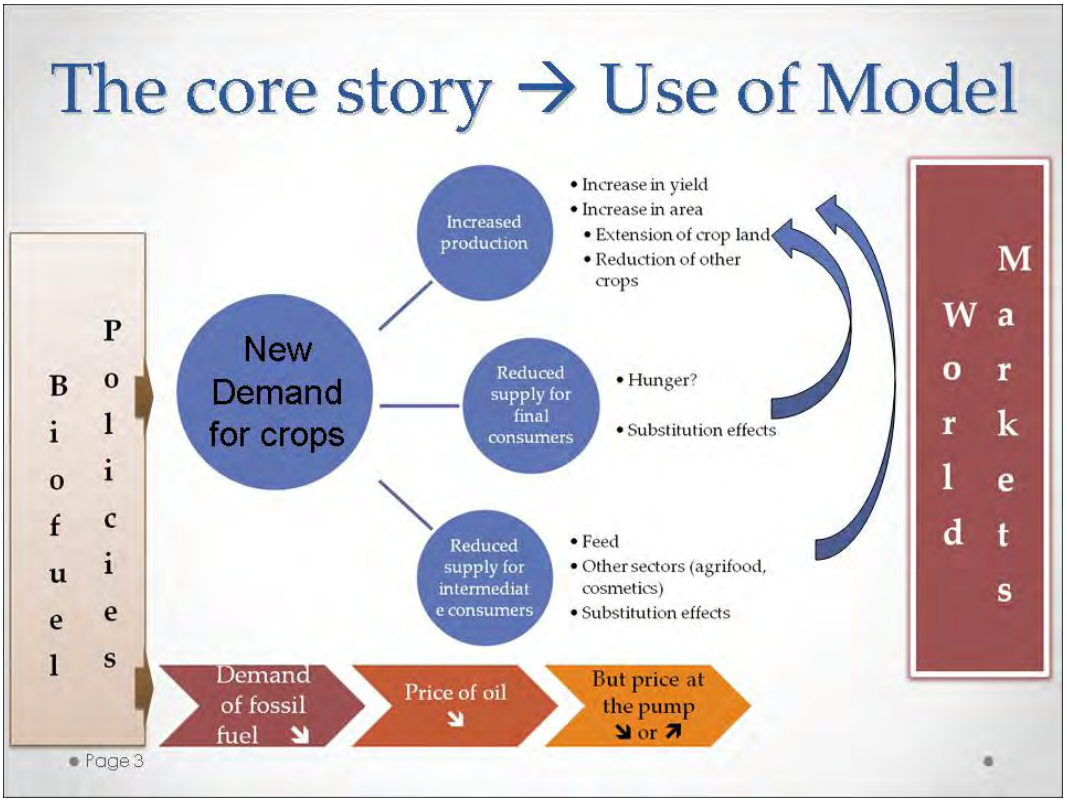
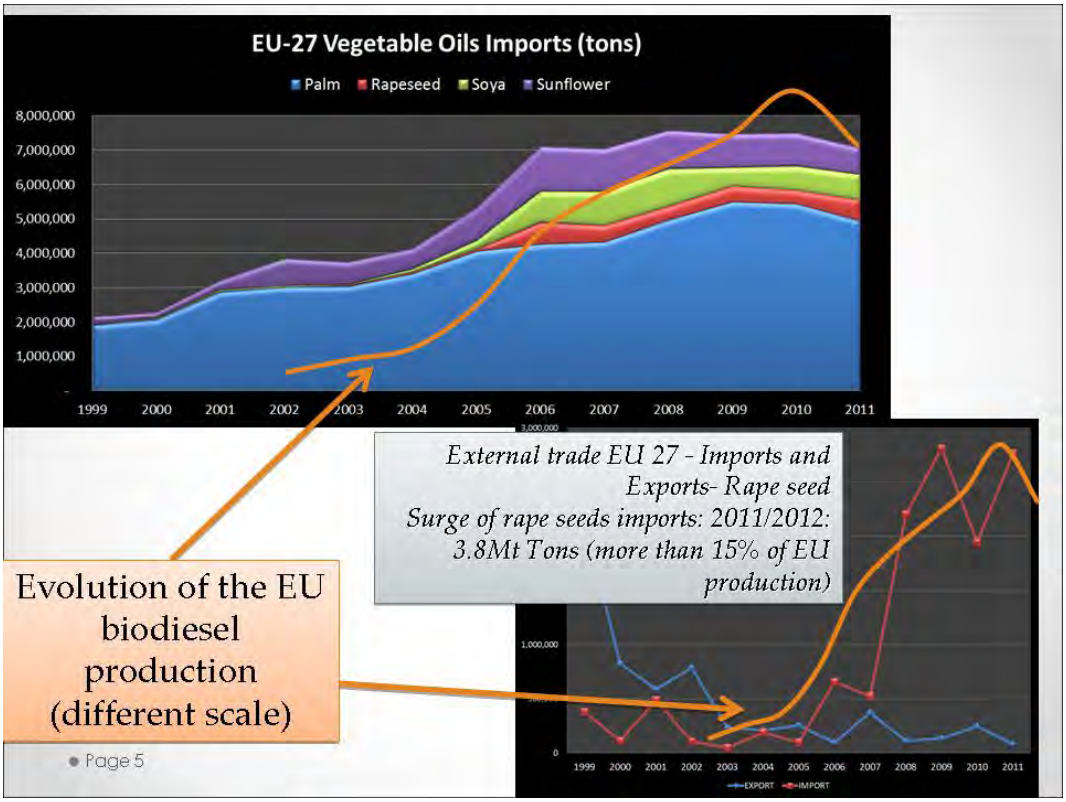
6.3. Presentation by Mr David Laborde




The core story → Use of Model
Biofuel Policies
New Demand for crops
Increased production
• Increase in yield
• Increase in area
• Extension of crop land
• Reduction of other crops
Reduced supply for final consumers
• Hunger?
• Substitution effects
Reduced supply for intermediate consumers
• Feed
• Other sectors (agrifood, cosmetics)
• Substitution effects
World Markets
Demand of fossil fuel ↘
Price of oil ↘
But price at the pump ↘ or ↗
Page 3


A few facts:
Why ILUC exists and the role of international Trade
Page 4



Preamble: iLUC or LUC

- An important and sensitive "policy" issue
- An issue that most models will never address: the spatial dimension
- Few empirical evidences about the relevance of the discrimination
- What matters is the net effects

- Simple arithmetic in the model:

TOTAL LUC = direct LUC + indirect LUC

ASSUMPTION: EU legislation works! Direct LUC is forbidden dLUC=0

TOTAL LUC = 0 + iLUC

The model computes the Total LUC and therefore we can get iLUC estimates.

Page 6

Simulation Design

Modeling Biofuels in MIRAGE-Biof

- MIRAGE model: A Computable General Equlibrium Model
  - Multi country, Multi sectoral, and global
  - Recursive dynamic set-up
- Modified model and data components
  - Improvement in demand system (food and energy)
  - Improved sector disaggregation
  - New modeling of ethanol sectors
  - Co-products of ethanols and vegetable oils
  - New modeling of fertilizers
  - New modeling of livestocks (extensification/intensification)
  - Land market and land extensions at the AEZ level
- The model has been reviewed by different parties and publications based on the model are available in key academic journals.
- Role of the baseline

Scenarios and sensitivity analysis

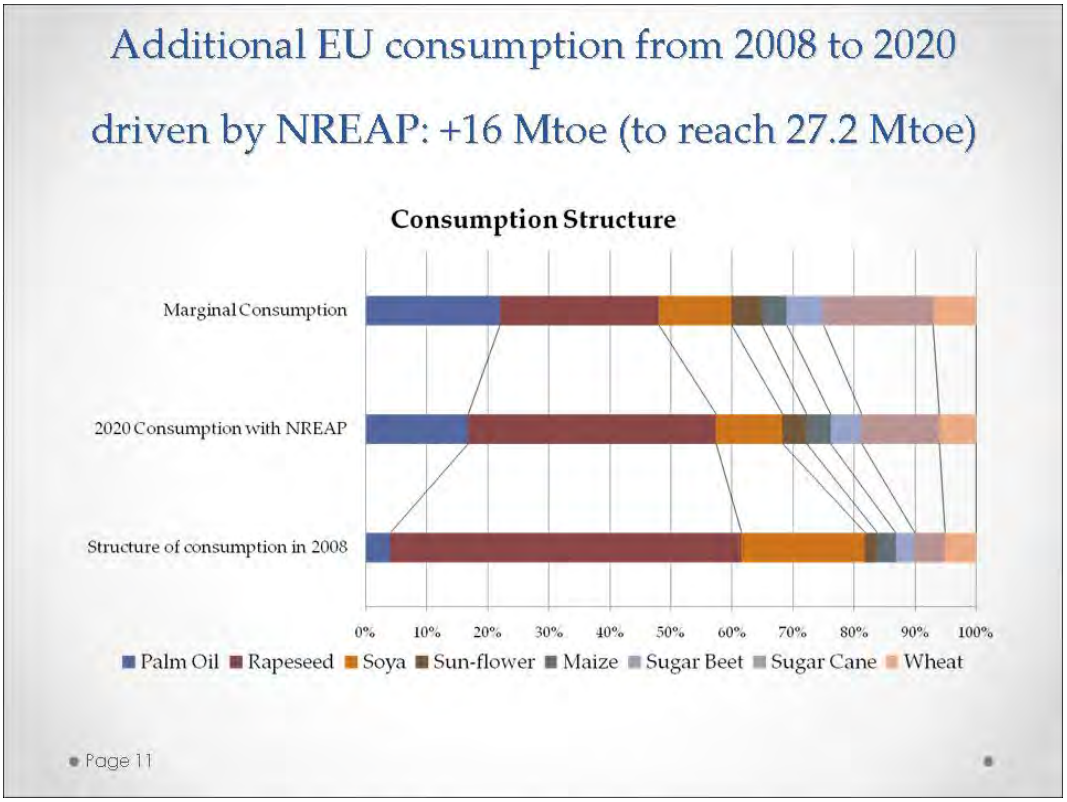
- Central scenarios
  - Biofuel mandate:
    - Member states Action Plan
- Trade policy options:
  - Status Quo
  - Full Liberalization in the EU of Ethanol and Biodiesel
- Sensitivity Analysis
  - On linearity/non linearity issue
    - Estimation of crop LUC at a "half mandate", at a full mandate
      - But still weak on Ethanol: no saturation effects
  - On food consumption
    - Endogenous vs Fixed to Baseline level
  - On Co-products: with or without
  - Monte Carlo simulations on selected parameters
  - But in reality, much more uncertainties (see **Box 2**, 25 items related to LUC, but even more regarding net emissions…)
    - About the land (amount, location, carbon values)
    - About future technologies
    - Both behavioral and technical uncertainties

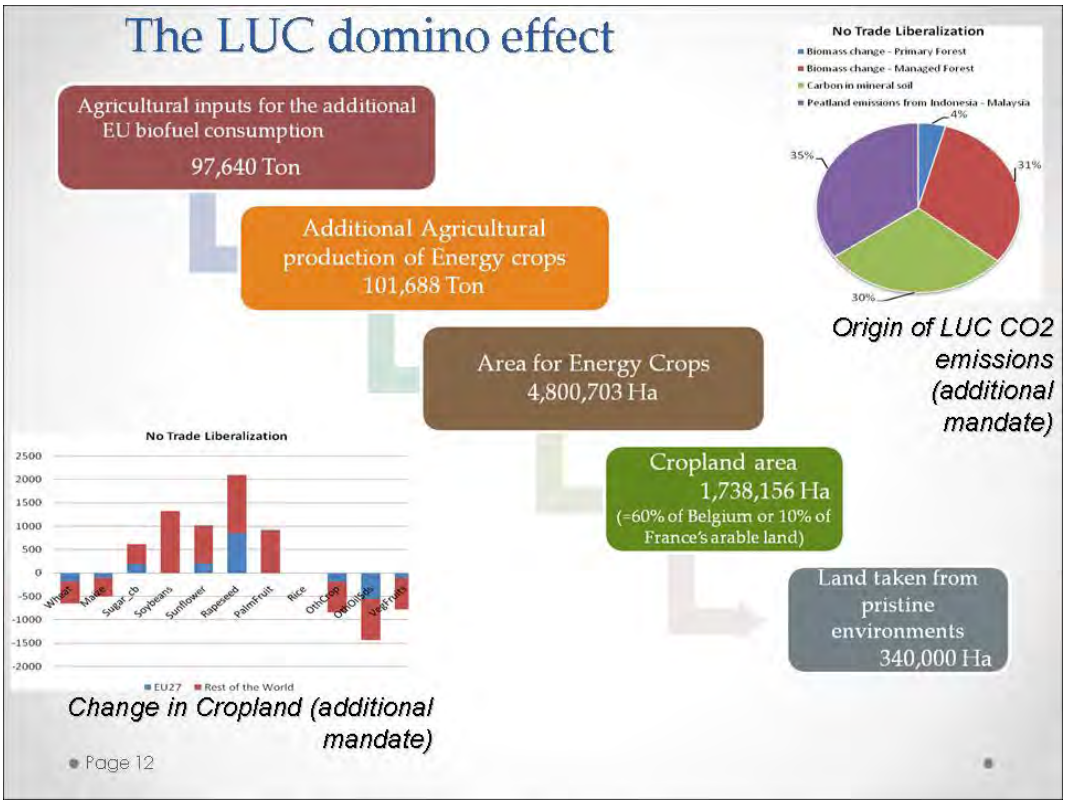
Page 9

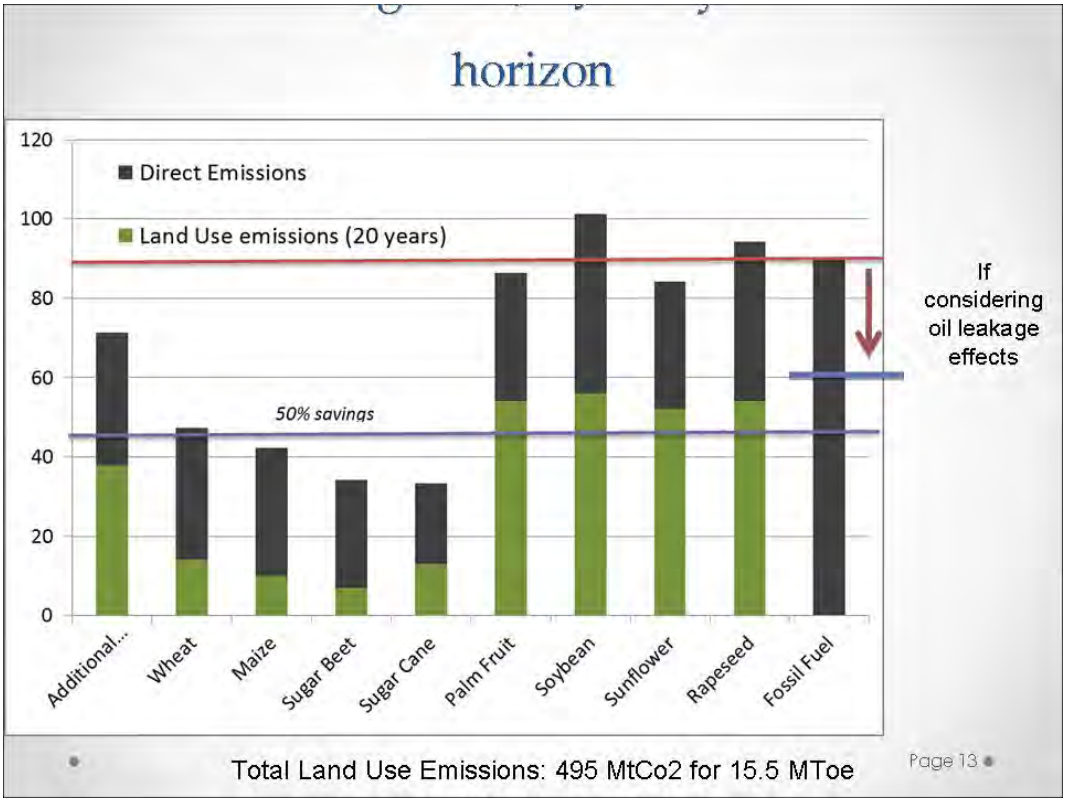
• • •

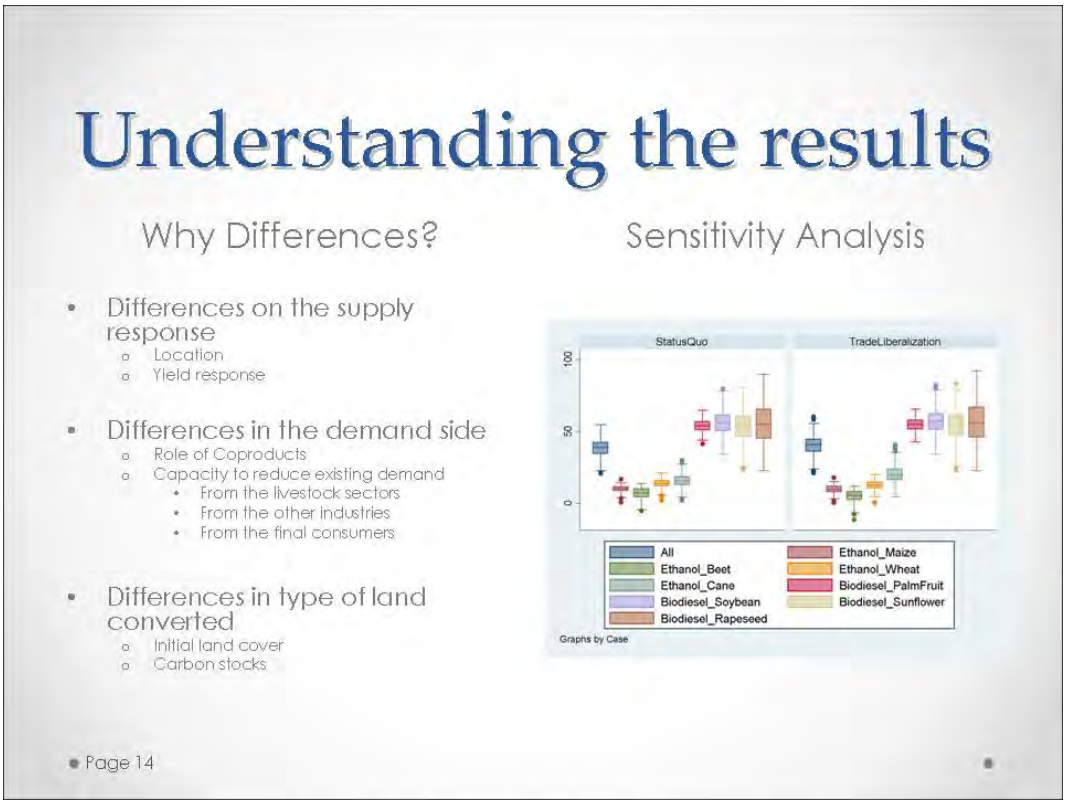
Results

Page 10


Additional EU consumption from 2008 to 2020
driven by NREAP: +16 Mtoe (to reach 27.2 Mtoe)
Consumption Structure
Marginal Consumption
2020 Consumption with NREAP
Structure of consumption in 2008
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Palm Oil
Rapeseed
Soya
Sun-flower
Maize
Sugar Beet
Sugar Cane
Wheat
Page 11

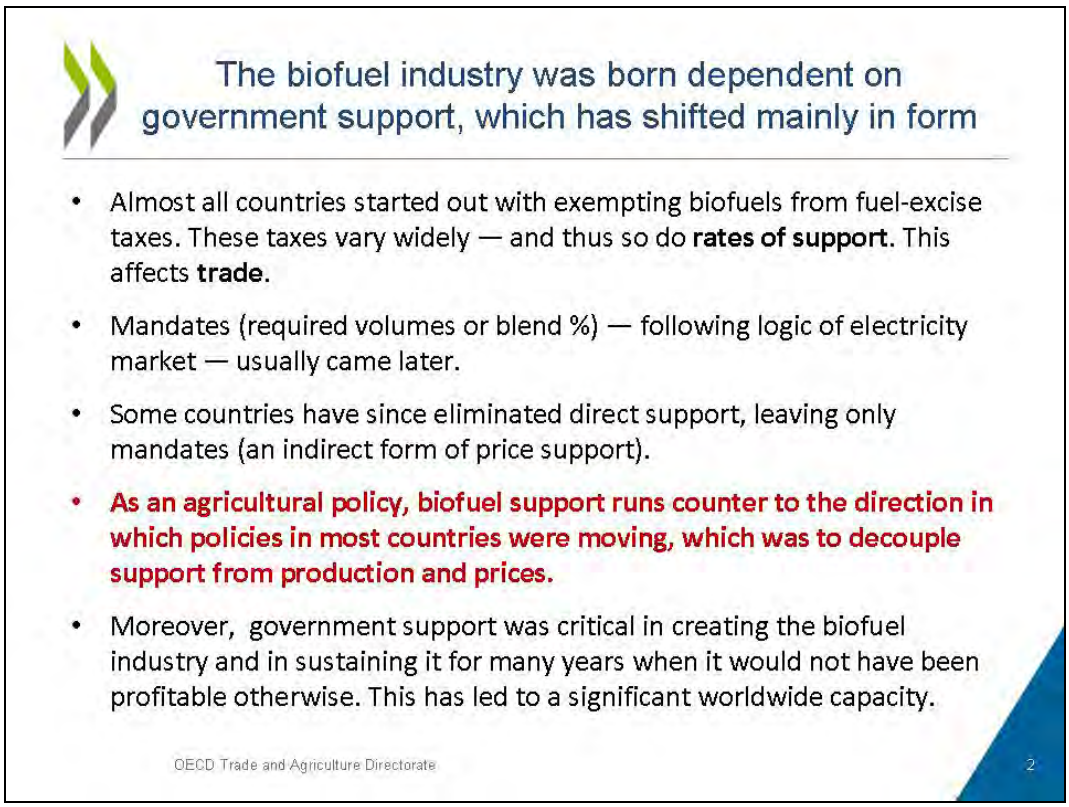

The LUC domino effect
Agricultural inputs for the additional EU biofuel consumption
97,640 Ton
Additional Agricultural production of Energy crops
101,688 Ton
Area for Energy Crops
4,800,703 Ha
Cropland area
1,738,156 Ha
(=60% of Belgium or 10% of France's arable land)
Land taken from pristine environments
340,000 Ha
No Trade Liberalization
Biomass change - Primary Forest
Biomass change - Managed Forest
Carbon in mineral soil
Peatland emissions from Indonesia - Malaysia
4%
35%
31%
30%
Origin of LUC CO2 emissions (additional mandate)
No Trade Liberalization
2500
2000
1500
1000
500
0
-500
-1000
-1500
-2000
Wheat
Maize
Sugar_cb
Soybeans
Sunflower
Rapeseed
PalmFruit
Rice
OthCrop
OthOilseed
VegFruits
EU27
Rest of the World
Change in Cropland (additional mandate)
Page 12


horizon
120
100
80
60
40
20
0
Direct Emissions
Land Use emissions (20 years)
50% savings
Additional...
Wheat
Maize
Sugar Beet
Sugar Cane
Palm Fruit
Soybean
Sunflower
Rapeseed
Fossil Fuel
If considering oil leakage effects
Total Land Use Emissions: 495 MtCo2 for 15.5 MToe
Page 13


Understanding the results
Why Differences?
Differences on the supply response
Location
Yield response
Differences in the demand side
Role of Coproducts
Capacity to reduce existing demand
From the livestock sectors
From the other industries
From the final consumers
Differences in type of land converted
Initial land cover
Carbon stocks
Sensitivity Analysis
StatusQuo
TradeLiberalization
All
Ethanol_Beet
Ethanol_Cane
Biodiesel_Soybean
Biodiesel_Rapeseed
Ethanol_Maize
Ethanol_Wheat
Biodiesel_PalmFruit
Biodiesel_Sunflower
Graphs by Case
Page 14


Policy Recommendations
1. Land use changes driven by biofuel policies are a **serious** concern. This finding is robust as more than 99 percent of crop LUC coefficients in the Monte Carlo analysis are positive.
2. LUC regulation and the Pandora Box: LUC for all, LUC for none? The real challenge is to promote better land use practices for agriculture widely. Biofuels remain a minor component in total land use changes.
3. Reducing the biofuel ambition is still the most direct way to limit additional land use emissions (evolution of political economy due to supply constraint in the EU)
4. Crop specific LUC *can* be difficult to implement. Increasing the minimal requirements of direct savings *can* be a better solution and will provide incentives for the sector to adopt the most efficient pathway.
5. Despite all uncertainties, our findings show the hierarchy between ethanol and biodiesel in terms of LUC. Additional breakdown can be considered. Therefore, promoting a larger share of ethanol than the current projection will be meaningful. Role of trade liberalization
6. Alternative trade policy options may be developed to promote good practices in terms of land conservation at a national level by trade partners (sustainability criteria, TRQ);
7. Using available technologies to increase yield e.g. biotech, and low carbon agricultural practices to reduce emissions;
8. Health check for biofuel policies and needs to have a flexible framework.
Page 15

6.4. Presentation by Mr Ronald Steenblik

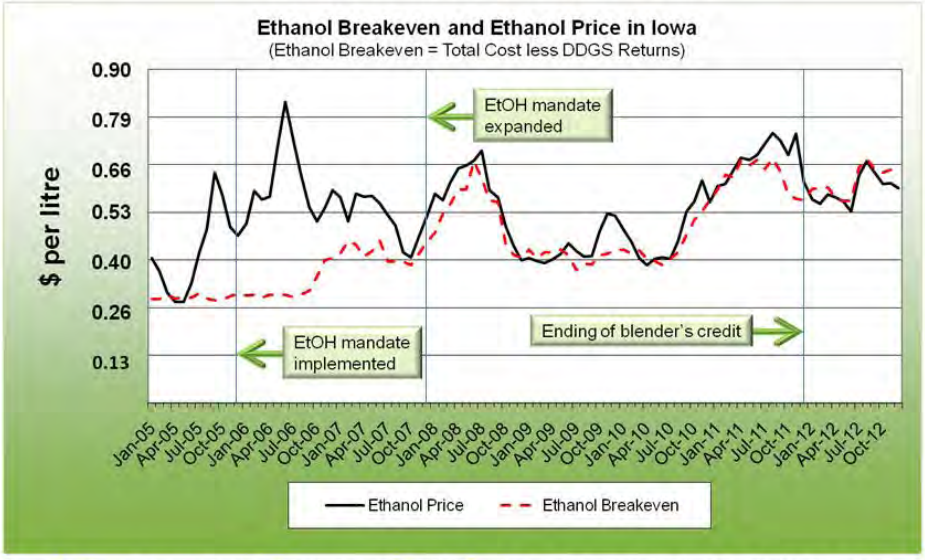


Effects have actually been what was (or should have been) expected

- A prime objective in almost all economies that have supported biofuels has been to create new markets for crops in order to help firm up crop prices. Prices for crops and plant oils have risen dramatically, in part due to biofuel "demand".
- Higher prices for prime feedstocks have also driven up prices for close substitutes in the food market (non-feedstock oils, other grains).
- *Relative* prices among foodstuffs have also been affected, with biofuel crops (and close substitutes) competing for land with less heavily supported crops, such as fruits and vegetables.

OECD Trade and Agriculture Directorate 3

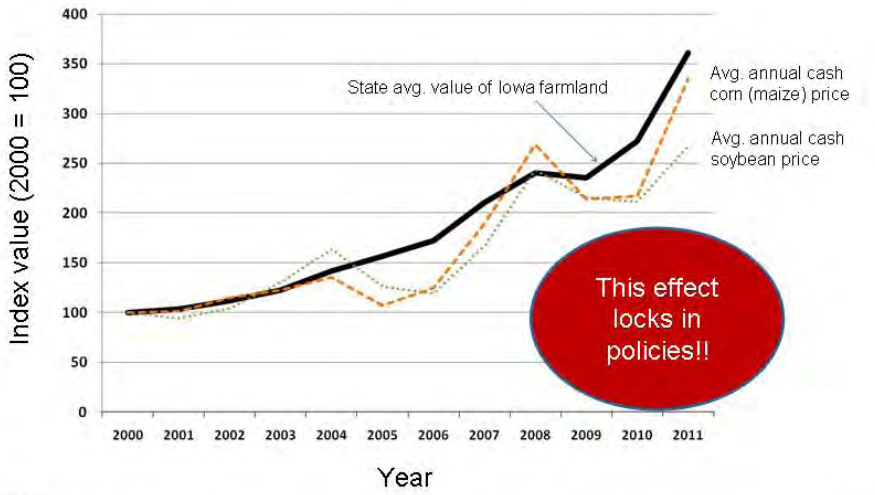
Q: Who are the prime ultimate beneficiaries of biofuel support policies? Not the industry!



Source: http://www.extension.iastate.edu/agdm/energy/html/d1-10.html; prices per gallon converted to per litre by the author

OECD Trade and Agriculture Directorate 4

A: Owners of farmland, because rising commodity prices drive up farmland prices

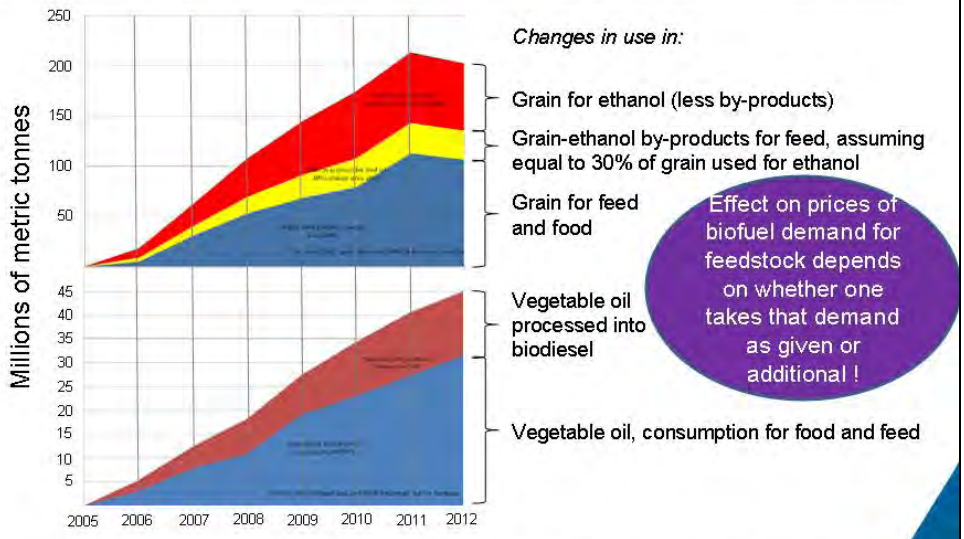


Data sources:
Iowa State University (2013), *2012 Farmland Value Survey* (www.extension.iastate.edu/agdm/wholefarm/html/c2-70.html)
Iowa State University (2013), Iowa Cash Corn and Soybean Prices (www.extension.iastate.edu/agdm/crops/html/a2-11.html)

Are biofuel policies exclusively to blame for food-price inflation?

- No:
  - *Costs have been rising:* rising energy prices have meant rising costs for fuel and fertilizer, though the effect is somewhat offset by rising yields.
  - *Non-biofuel demand has been rising:* With rising incomes and population in emerging markets, demand for feed grains and protein meals has been increasing.
  - *Supplies at times have been hit by shocks:* droughts, heat, cold, pests.
- However:
  - *Cost explanation is often misunderstood:* Rising energy input costs as factor has been exaggerated; bigger factor was demand-driven effect on farm-specific inputs as a result of rush to expand production.
  - Biofuel demand is *on top* of other demands, and because of mandates *less flexible*, which shifts the adjustment burden to food & feed market.

Growth in grain and oil consumption due to biofuels has been "a substantial fraction" of the total global growth rate since 2005



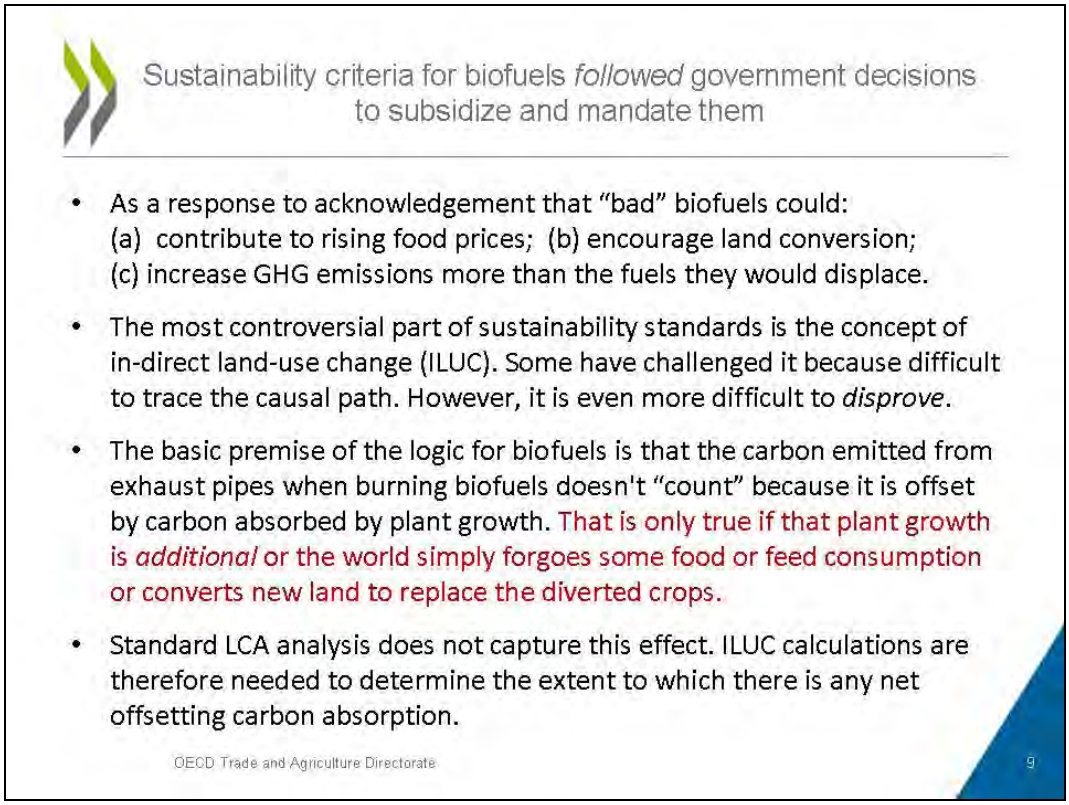
Source: HLPE (2013, forthcoming), based on PS&D data for grain and oils and FAPRI data for ethanol and biodiesel.

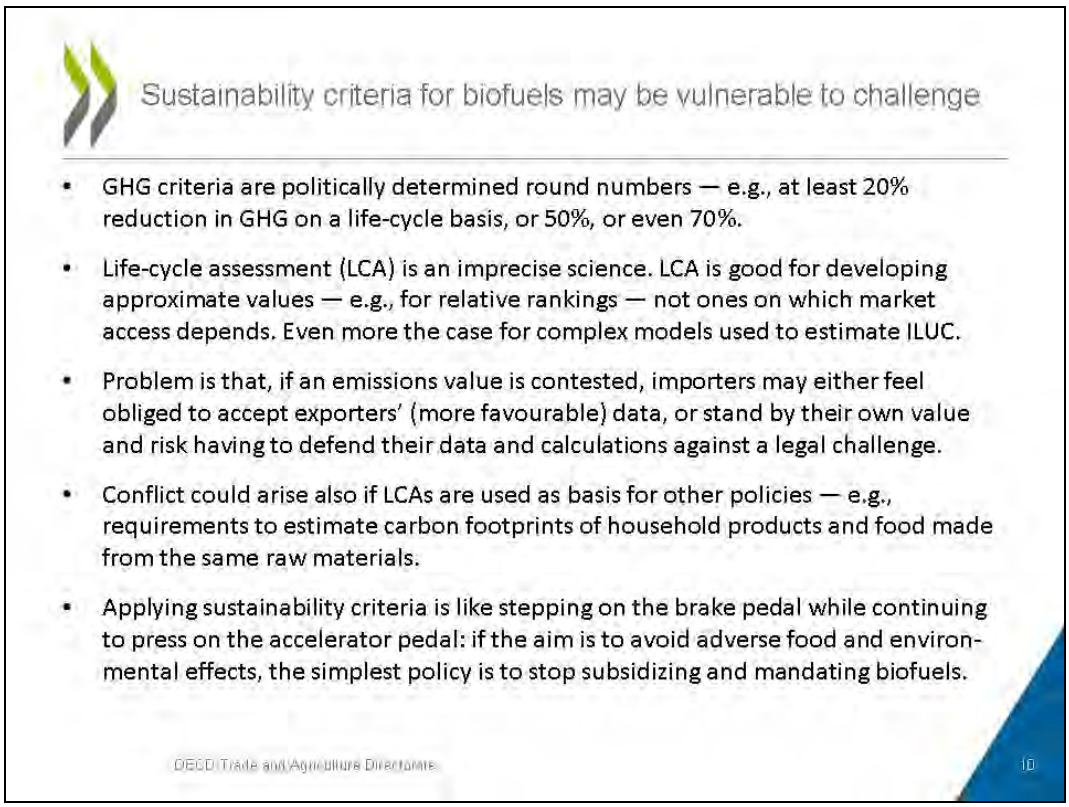
OECD Trade and Agriculture Directorate 7

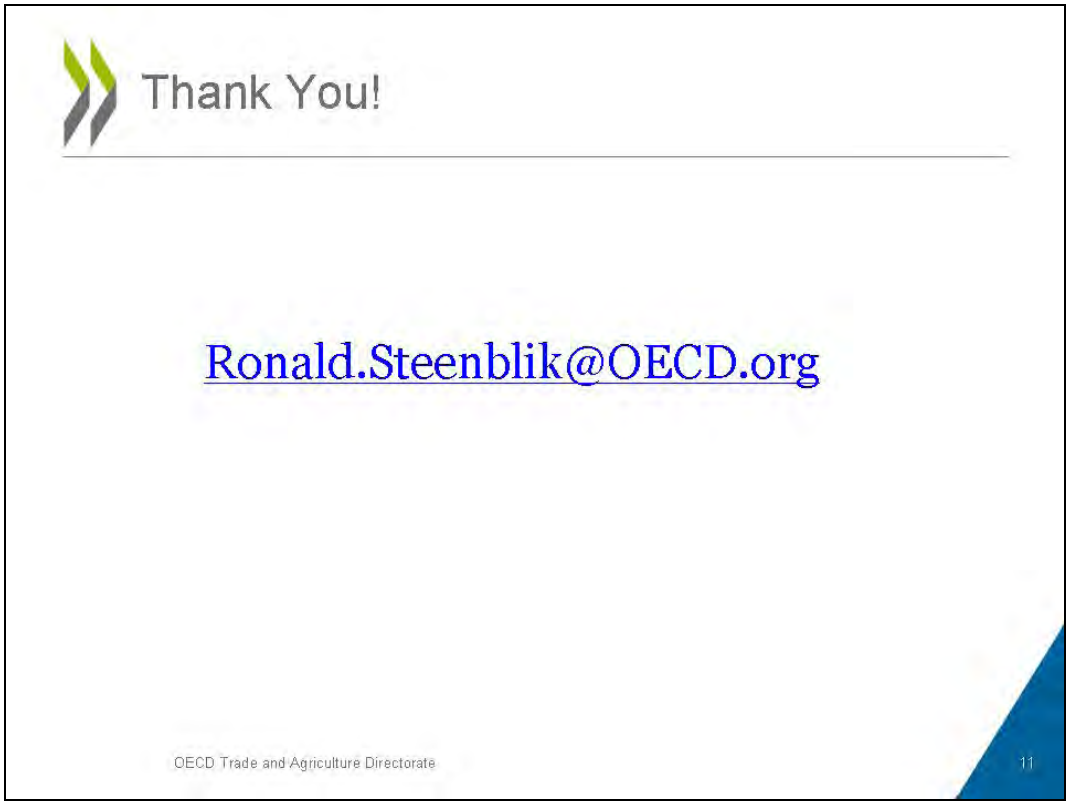
Some sobering headline numbers from the draft report of the High Level Panel of Experts on Food Security and Nutrition

- To produce the world's harvested biomass (crops, crop residues, forage, and timber), people already manipulate around 75% of the world's vegetated lands and devote 85% of total water withdrawals.
- If 100% of the world's currently harvested biomass were devoted to bioenergy, that would yield on the order of 30% of the world's total primary energy supply (TPES), and somewhere on the order of 20% of the world's TPES in 2050.
- If 100% of the world's crop production were diverted to bioenergy, it would provide 9-13% of world primary energy.
- Producing 10% of the world's transport fuel by 2020 would require 26% of the world's current crop output.

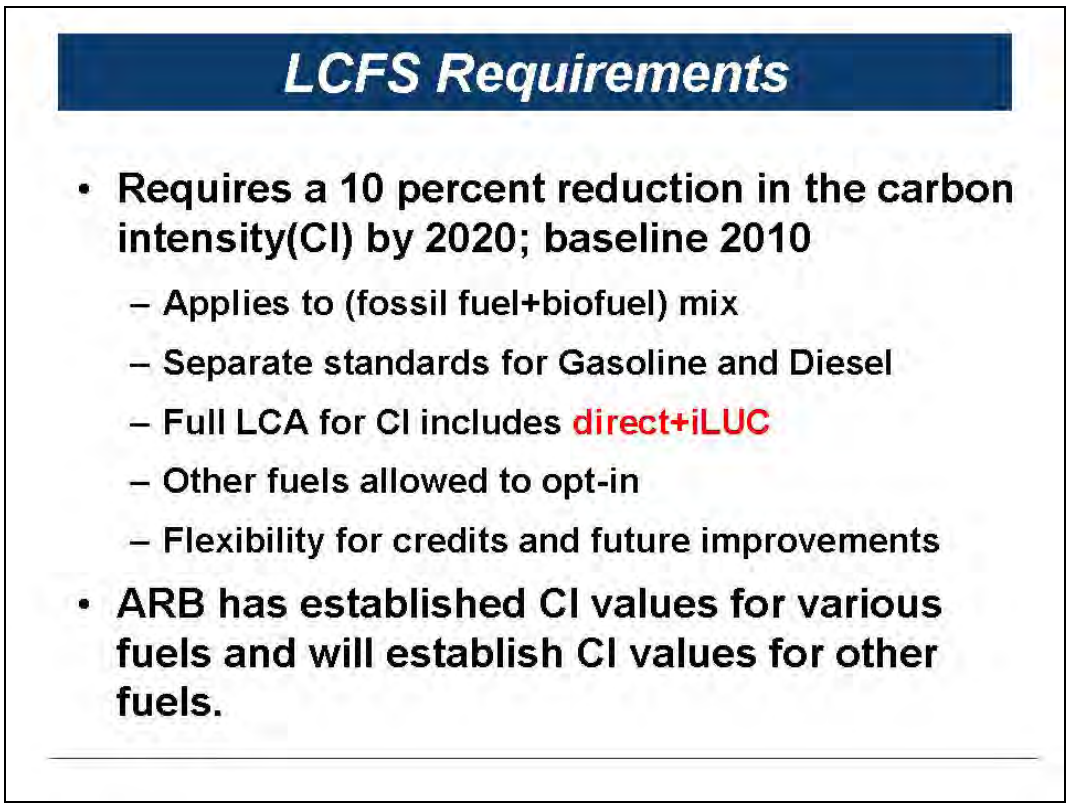
OECD Trade and Agriculture Directorate 8


Sustainability criteria for biofuels *followed* government decisions to subsidize and mandate them
• As a response to acknowledgement that "bad" biofuels could: (a) contribute to rising food prices; (b) encourage land conversion; (c) increase GHG emissions more than the fuels they would displace.
• The most controversial part of sustainability standards is the concept of in-direct land-use change (ILUC). Some have challenged it because difficult to trace the causal path. However, it is even more difficult to *disprove*.
• The basic premise of the logic for biofuels is that the carbon emitted from exhaust pipes when burning biofuels doesn't "count" because it is offset by carbon absorbed by plant growth. That is only true if that plant growth is *additional* or the world simply forgoes some food or feed consumption or converts new land to replace the diverted crops.
• Standard LCA analysis does not capture this effect. ILUC calculations are therefore needed to determine the extent to which there is any net offsetting carbon absorption.
OECD Trade and Agriculture Directorate
9


Sustainability criteria for biofuels may be vulnerable to challenge
• GHG criteria are politically determined round numbers — e.g., at least 20% reduction in GHG on a life-cycle basis, or 50%, or even 70%.
• Life-cycle assessment (LCA) is an imprecise science. LCA is good for developing approximate values — e.g., for relative rankings — not ones on which market access depends. Even more the case for complex models used to estimate ILUC.
• Problem is that, if an emissions value is contested, importers may either feel obliged to accept exporters' (more favourable) data, or stand by their own value and risk having to defend their data and calculations against a legal challenge.
• Conflict could arise also if LCAs are used as basis for other policies — e.g., requirements to estimate carbon footprints of household products and food made from the same raw materials.
• Applying sustainability criteria is like stepping on the brake pedal while continuing to press on the accelerator pedal: if the aim is to avoid adverse food and environmental effects, the simplest policy is to stop subsidizing and mandating biofuels.
OECD Trade and Agriculture Directorate
10


Thank You!
Ronald.Steenblik@OECD.org
OECD Trade and Agriculture Directorate
11

6.5. Presentation by Mr John Courtis



Importance of Including iLUC

- Planting crops for fuel displaces land currently in use for other purposes (i.e. food production, grazing, idle)
- iLUC emissions are real, positive, and potentially large
- Not including these effects sends the wrong market signals
- Motivates fuel producers to develop fuels that are lower in CI and sustainable

3

iLUC Values Under Review

- Planned Revisions to iLUC Values:
  - Corn Ethanol (current iLUC value: 30)
  - U.S. Soy Biodiesel and Ren. Diesel (current iLUC value: 62)
  - Brazilian Sugarcane Ethanol (current iLUC value: 46)
- Planned New iLUC values:
  - Palm Oil, Canola, Shorgum (2013)
  - Cellulosic Feedstocks (2013-2014)

4

iLUC Update

- ARB uses GTAP model for iLUC analysis. Recent model changes are incorporated in the analysis
- ARB staff and contractors are currently reviewing GTAP modeling approach, inputs, issues
- Revisions and possible compliance schedule changes will be proposed to the Board by end, 2013.

5

Recent GTAP Model Updates

- GTAP 7 Database
- Land supply nesting structures
- Greater flexibility in crop switching in response to price changes
- Endogenous yield adjustment for cropland pasture in response to changes in land rent
- Other changes under consideration

6

Additional GTAP Revisions

- Incorporated cropland pasture for U.S. and Brazil
- Used updated energy sector elasticity values
- Incorporated improved treatment of DGS
- Incorporated modified structure of livestock sector
- Use revised estimates for yield on new cropland

7

Emission Factors Updates

- Developed spatially explicit carbon stocks for forest pasture, cropland, and land conversions
- Developed a separate emission factor model
- EF Model accounts:
  - Above and below ground biomass, litter and deadwood
  - Soil carbon
  - Foregone sequestration
  - Conversion by fire
  - Harvested wood products
  - Peatland conversion and cropland pasture conversion

8

iLUC Uncertainty

- **Yes, there is uncertainty with the estimates for direct and iLUC.**
- **Extensive Monte Carlo analyses to evaluate uncertainty.**
- **Most analyses indicate that iLUC effects are positive, significant, and should not be ignored.**
- **There is a number of biofuels that have insignificant or zero iLUC effects.**

9

iLUC Schedule

- Workshop to discuss model revisions, modeling results: Spring-Summer 2013
- Stakeholders comments/inputs/reviews: Spring-Summer 2013

10

iLUC Effect on Compliance Schedule

- If corn ethanol LUC CI changes:
  - Baseline CI for CaRFG changes
  - Compliance schedule targets for gasoline change
- Compliance schedule for diesel is unaffected

11

LCFS Compliance Status

- LCFS is working well
- Approximately 80 fuel providers are reporting
- Regulated parties are over-complying, generating credits for future compliance
- Innovations are occurring in all fuels
- Investments in alternative fuels are increasing
- Challenges remain later in the decade

12

Status of Implementation of LCFS

Carbon Intensities of Some Fuels

- Gasoline: 99 gCO_2e/MJ
- Diesel: 98 gCO_2e/MJ
- Corn Ethanol: 73 - 121 gCO_2e/MJ
- Sugarcane Ethanol: 58 – 73 gCO_2e/MJ
- Biodiesel: 4 – 83 gCO_2e/MJ
- Methane: -15 – 83 gCO_2e/MJ
- Electricity: 35 – 46 gCO_2e/MJ

13

LCFS Credits

- Source of credits
  - 80% from low-CI ethanol
  - 10% from natural gas
  - 8% from biodiesel
  - 2% from renewable diesel
- Credit transactions
  - No LCFS credit transactions in 2011
  - 17 LCFS credit transactions through Q3 2012 Price range: $10 - $30/MT
  - Trade volumes: 100 – 33,000 credits/trade

14

Contact Information

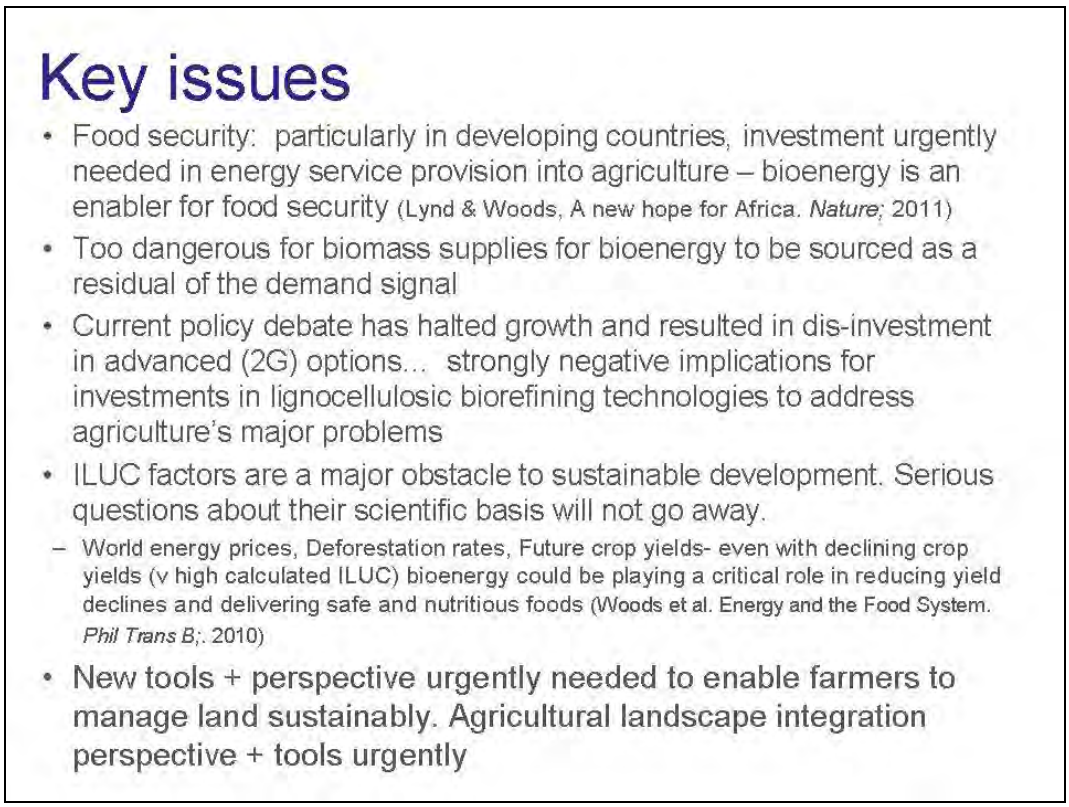
John Courtis, Manager, Alternative Fuels Section
(916) 323-2661, jcourtis@arb.ca.gov

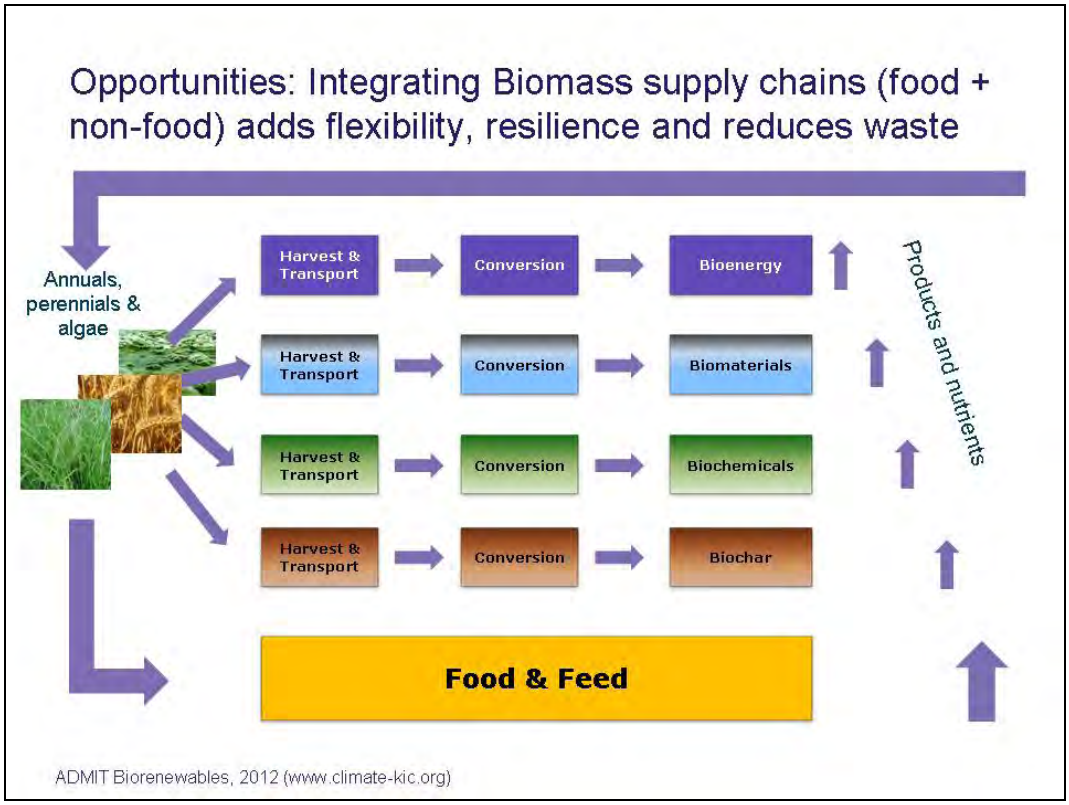
http://www.arb.ca.gov/fuels/lcfs/lcfs.htm

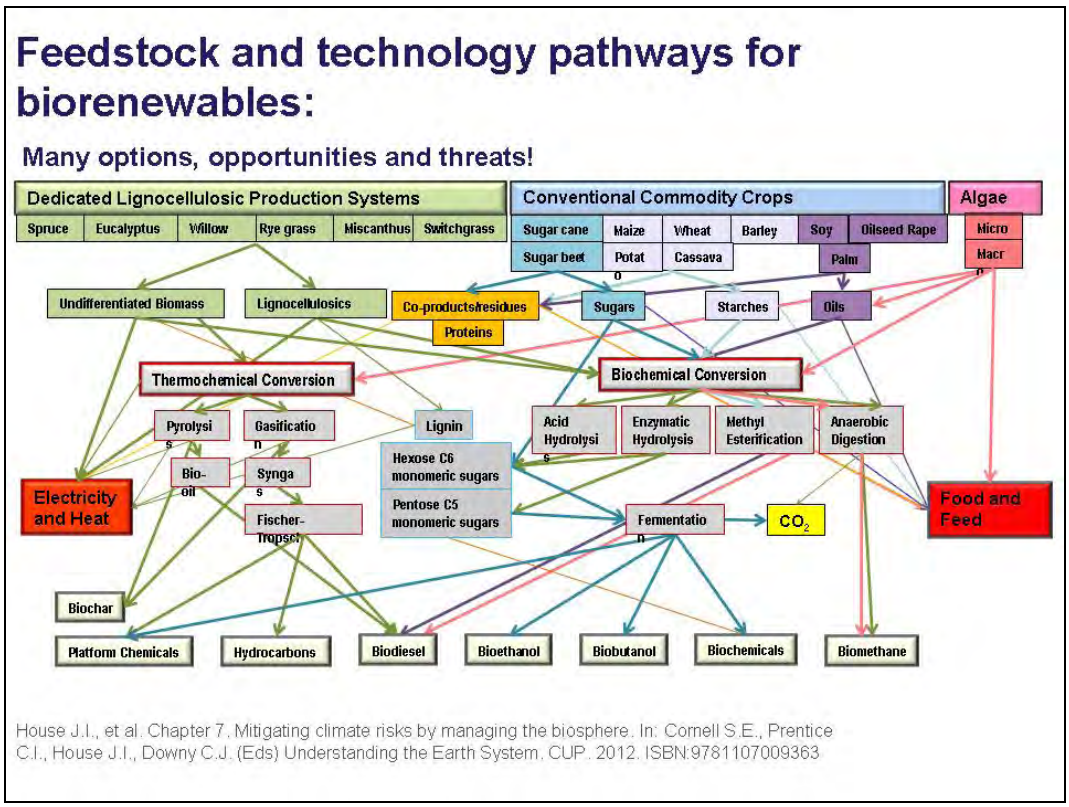
15

Thank You

6.6. Presentation by Mr Jeremy Woods

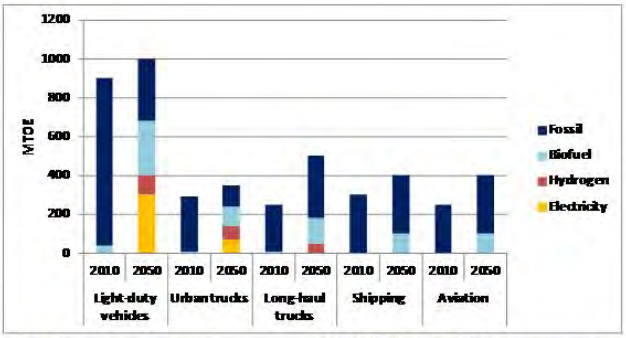



Opportunities: Integrating Biomass supply chains (food + non-food) adds flexibility, resilience and reduces waste
Annuals, perennials & algae
Harvest & Transport
Conversion
Bioenergy
Harvest & Transport
Conversion
Biomaterials
Harvest & Transport
Conversion
Biochemicals
Harvest & Transport
Conversion
Biochar
Products and nutrients
Food & Feed
ADMIT Biorenewables, 2012 (www.climate-kic.org)


Feedstock and technology pathways for biorenewables:
Many options, opportunities and threats!
Dedicated Lignocellulosic Production Systems
Spruce
Eucalyptus
Willow
Rye grass
Miscanthus
Switchgrass
Conventional Commodity Crops
Sugar cane
Maize
Wheat
Barley
Soy
Oilseed Rape
Sugar beet
Potato
Cassava
Palm
Algae
Micro
Macro
Undifferentiated Biomass
Lignocellulosics
Co-products/residues
Proteins
Sugars
Starches
Oils
Thermochemical Conversion
Biochemical Conversion
Pyrolysis
Gasification
Lignin
Bio-oil
Syngas
Fischer-Tropsch
Acid Hydrolysis
Enzymatic Hydrolysis
Methyl Esterification
Anaerobic Digestion
Hexose C6 monomeric sugars
Pentose C5 monomeric sugars
Fermentation
CO2
Electricity and Heat
Food and Feed
Biochar
Platform Chemicals
Hydrocarbons
Biodiesel
Bioethanol
Biobutanol
Biochemicals
Biomethane
House J.I., et al. Chapter 7. Mitigating climate risks by managing the biosphere. In: Cornell S.E., Prentice C.I., House J.I., Downy C.J. (Eds) Understanding the Earth System. CUP. 2012. ISBN:9781107009363

IEA ETP 2 degree scenario- Global estimates of biofuels demand, 2050

Advanced biofuels (e.g. drop-in) often derived from lignocellulosic biomass feedstocks needed to overcome technical limitations, feedstock supply constraints and high costs of conventional biofuels.
Needed for haulage, shipping & avaiation



IEA. Energy Technology Perspectives 2012. OECD/IEA, 2012. International Energy Agency, Paris, France. www.iea.org

2DS includes c. 30 EJ biofuels in 2050 compared to 3 EJ today. Must keep rising after 2050 to stay on 2DS.

Key constraints

- Technology innovation- some conversion technologies are mature but significant R&D is needed, particularly to reduce costs
- Feedstock supplies: how much biomass is needed and where will those supplies come from? How to ensure these supplies are sustainably produced and not competitive with food?
- Perceptions around land constraints and adverse environmental impacts of increasingly intensive land management and biomass production systems (e.g. Foresight. The Future of Food and Farming (2011). The [UK] Government Office for Science, London.)
- A lack of an integrated perspective on the three 'securities'- climate, energy & food and on role of landscape-level planning & management.
- Lack of scientific consensus
- Long term investment options, particularly for feedstock supply

What should industry do?

ILUC is one 'lens' on 4 major problems in agriculture:

- Stagnating yields
  - Increased demand more likely to be provided by increased land area
  - Yield gaps need closing + continued research and development
- Decreasing biodiversity
  - Diffuse, difficult to quantify but serious
- Decreasing carbon stocks
  - Damage to soil productive capacity particularly from declining SOM
  - Associated GHG emissions from land use change
- Nutrient losses / soil erosion and associated declining water quality and GHG emissions

Current policy uncertainty has halted growth & investment in biofuels Solution:
A new perspective on integrated land management needs to be developed.
Industry must be pro-active rather than re-active.

What path to take?

Virtually all studies assessing the potential for sustainable **bioenergy** look for 'unused,' 'degraded' or 'idle' land to locate bioenergy crops onto.

In practice maximum value and utility may only be gained when biomass production for the **bioeconomy** is integrated directly into local agricultural (and livestock) systems

2 possible outcomes:

1. Bioenergy competes with food production and environmental resources or is marginalised to low productivity / high cost land
2. Bioenergy supports food production through close integration

It is dangerous to leave biomass supply to be a residual of demand signals

Tools & Solutions

Only smart policy + support for integrated (knowledge intensive) farming can enable option '2'. Do the policy proposals on the table offer this?

- 5% cap on conventional biofuels
- ILUC Factors

These options are too focussed on a 'residual demand' approach – too far removed from supply chain

- support for advanced biofuels

Support needs to be at land-use level

Climate-KIC's Bioeconomy Platform is working on 5 interlinked innovative solutions:

1. Farmer-level carbon stock management tools (possibly trading)- 'high carbon landscapes'
2. Farm-to-landscape level nutrient 'trading' schemes and novel tools (water quality + soil erosion control)
3. Novel crops and cropping systems
4. Biorefining to maximise value, biomass conversion efficiencies and minimise losses
5. Policy-level interventions (e.g. revisions to CAP, setting maximum daily nutrient loads, enabling farm/landscape level carbon / nutrient 'trading')

Thank You

Is this how it feels to be a biofuel producer?
Who's next- lessons for the bioeconomy?

- Jeremy.woods@imperial.ac.uk
- http://www3.imperial.ac.uk/icept
- www.climate-kic.org

- Lynd & Woods, Perspective: A new hope for Africa. *Nature* (2011) 474. doi:10.1038/474S020a)
- Murphy,R.J. Woods,J., Black,M.J., and McManus,M. Global developments in the competition for land from bio-fuels. *Food Policy* (2011) 36 S52–S61. doi: 10.1016/j.foodpol.2010.11.014.
- Woods,J., Williams,A., Hughes,J.K., Black,M.J., Murphy,R.J. Energy and the Food System. *Phil Trans R. Soc. B.* (2010) **365**, 2991-3006. doi:10.1098/rstb.2010.0172
- Smith, P., et al. Competition for Land. *Phil Trans R. Soc. B.* (2010) **365**, 2941-2957. doi:10.1098/rstb.2010.0127
- House J.I., et al. Chapter 7. Mitigating climate risks by managing the biosphere. In: Cornell S.E., Prentice C.I., House J.I., Downy C.J. (Eds) Understanding the Earth System. Global Change Science for Application. Cambridge University Press. (2012). ISBN:9781107009363. http://www.cambridge.org/9781107009363
- Slade, R. et al. Energy from biomass: the size of the global resource (2011). Imperial College Centre for Energy Policy and Technology and UK Energy Research Centre, London. ISBN: 1 903144 108

6.7. Presentation by Mr Raffaello Garofalo

EBB
European Biodiesel Board

EBB point of view on the Commission proposal and on ILUC theories

- The biofuels sector is the unique industry abiding by compulsory sustainability criteria to ensure appropriate and certified land management and demonstrate effective GHG savings
- Need for consistency of EU policies in the field of biofuels
- Consistency needed in order to enable trust in risks and investment on improved and more efficient biofuels and biodiesel technologies
- Need of real support for industry efforts (why and how biodiesel from UCO are they criticised or are they proposed to be limited?)
- ILUC factors are not an appropriate basis for a fair and proportionate energy policy
- ILUC as a limited perspective on reality: what about 1/3 to ½ of food produced which does not even reach our tables? (recent studies in the UK and FAO reports)

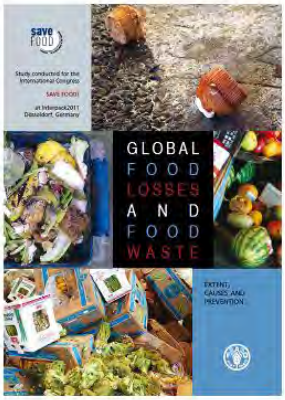
Raffaello GAROFALO
EBB Secretary General

Workshop on Sustainable Biofuels
February 20th 2013

EBB
European Biodiesel Board

"One-third of food produced for human consumption is lost or wasted globally, *which amounts to about 1.3 billion tons per year,*

this inevitably also means that huge amounts of the resources used in food production are used in vain, and that the greenhouse gas emissions caused by production of food that gets lost or wasted are also missions in vain"



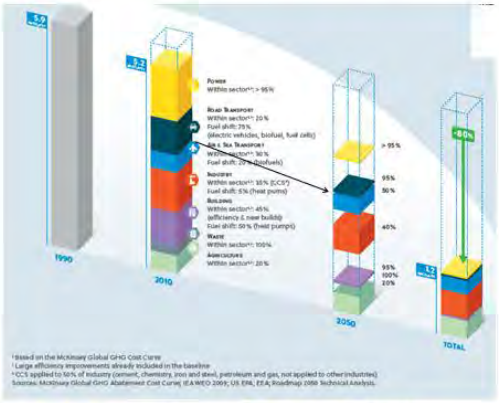
Raffaello GAROFALO
EBB Secretary General

Workshop on Sustainable Biofuels
February 20th 2013

EBB

European Biodiesel Board

Limitation of 5% for food based biodiesel is a defeat when compared to the progress made until now and would not promote used of 'second' generation'



Source: ECF – European Climate Foundation
- *95% reduction in road transport*
- *50% reduction in air and sea transport*

How to get there?

Especially if support for biofuels is missing in Europe?

Raffaello GAROFALO
EBB Secretary General

Workshop on Sustainable Biofuels
February 20th 2013

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European Biodiesel Board

Commission proposal on ILUC and suggested strategies

- Complete reshape of EU biofuels policy based on ILUC unverified assumptions
  - RED would be radically reshaped before complete transposition and implementation
  - RED revision clause is 2014 not 2012
  - Commission policy are inconsistent for biofuels (also for advanced biofuels)
- This ends up in a practical and strong limitation of biofuels development
- What is the **only alternative to biofuels** in transport? **Fossil fuels from fracking:**

INTERNATIONAL
Herald Tribune

The Shale Revolution's Shifting Geopolitics

"Thanks to fracking by 2020 America could be near energy independence in oil"

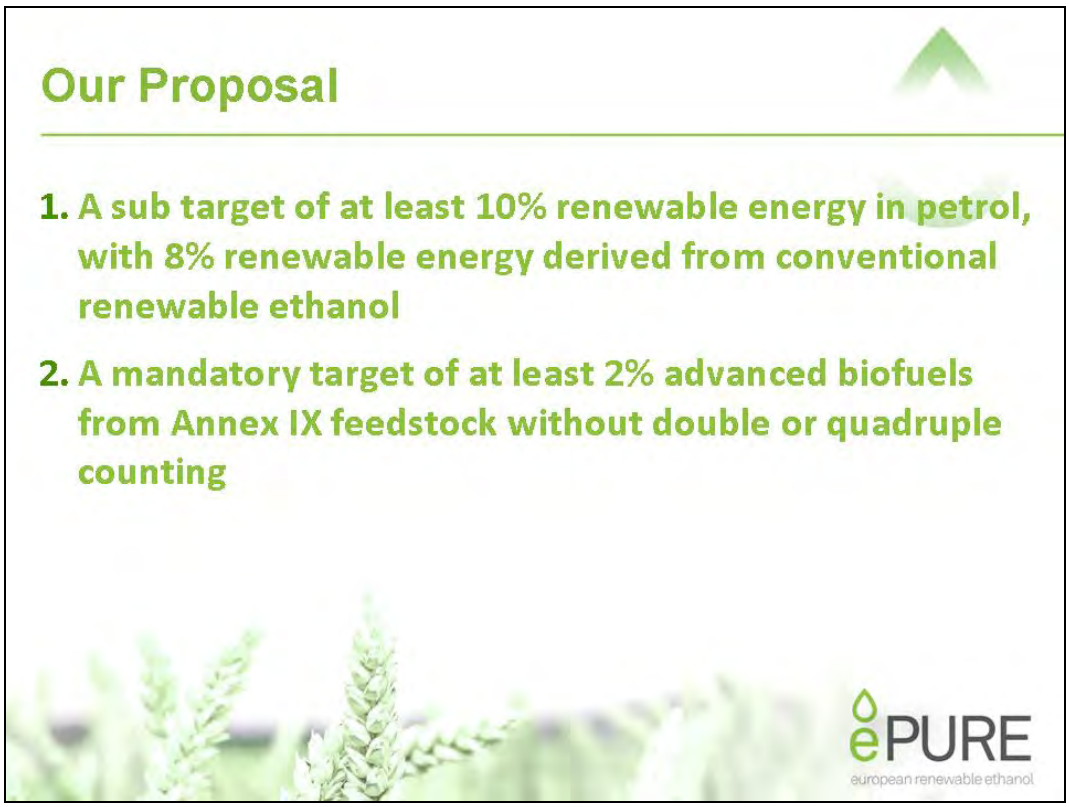
By ALAN RILEY
Published: December 25, 2012

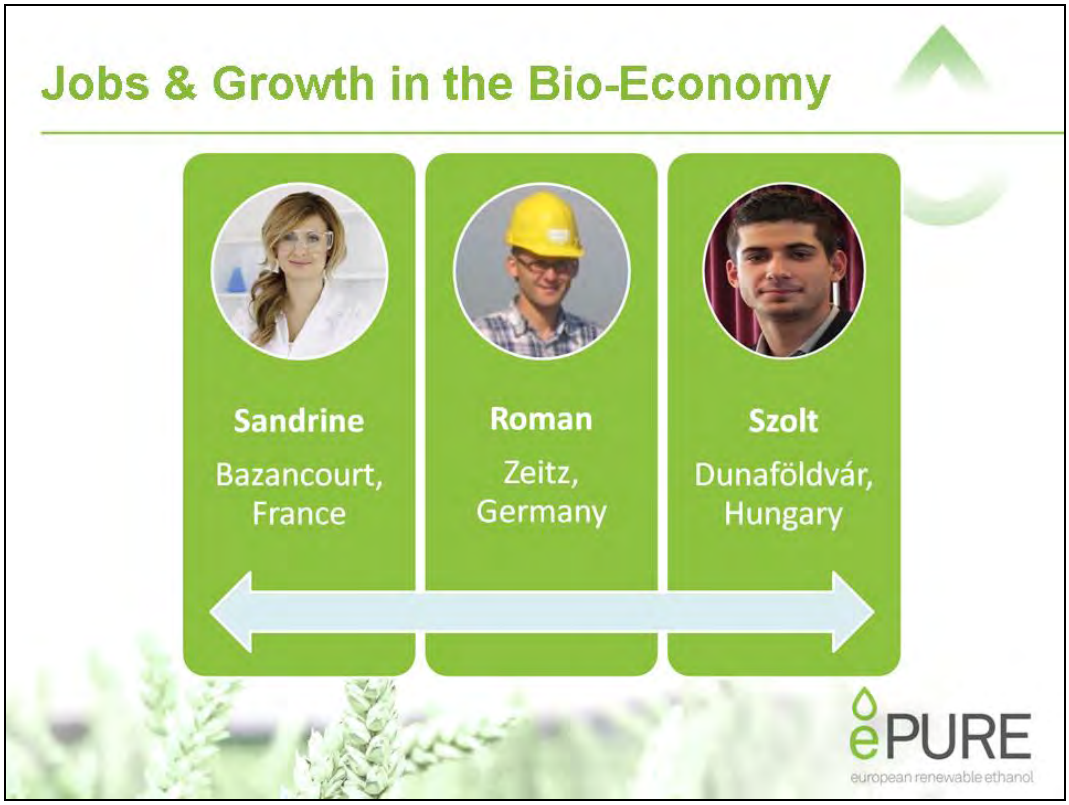
Raffaello GAROFALO
EBB Secretary General

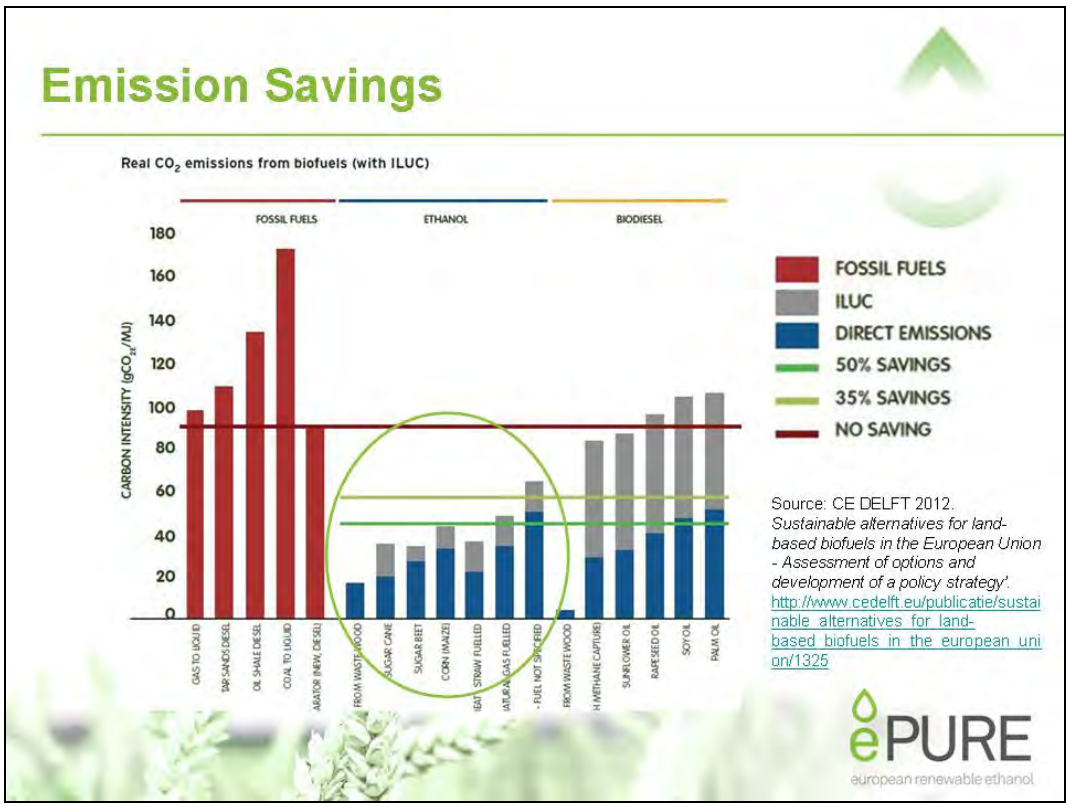
Workshop on Sustainable Biofuels
February 20th 2013

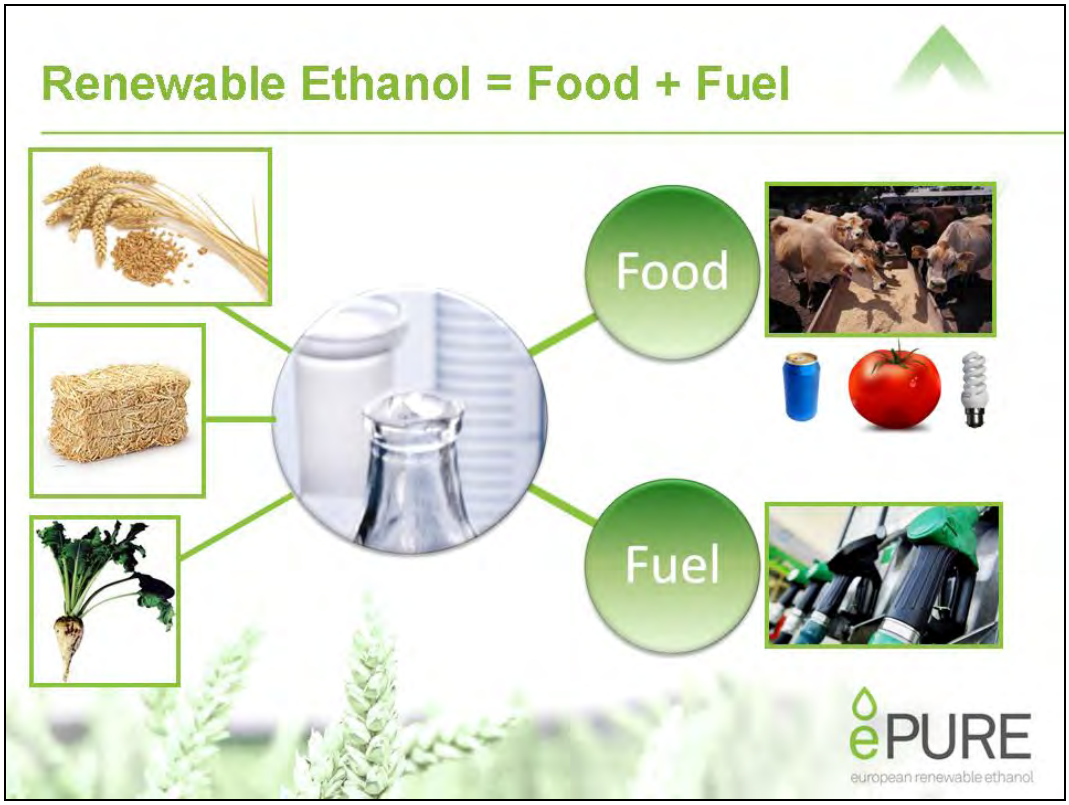

EBB
European Biodiesel Board
Raffaello Garofalo
Secretary General
EBB - European Biodiesel Board
Bld Saint-Michel 34 – 1040 Brussels
Tel +32 2 763 24 77
www.ebb-eu.org
Raffaello GAROFALO
EBB Secretary General
Workshop on Sustainable Biofuels
February 20th 2013

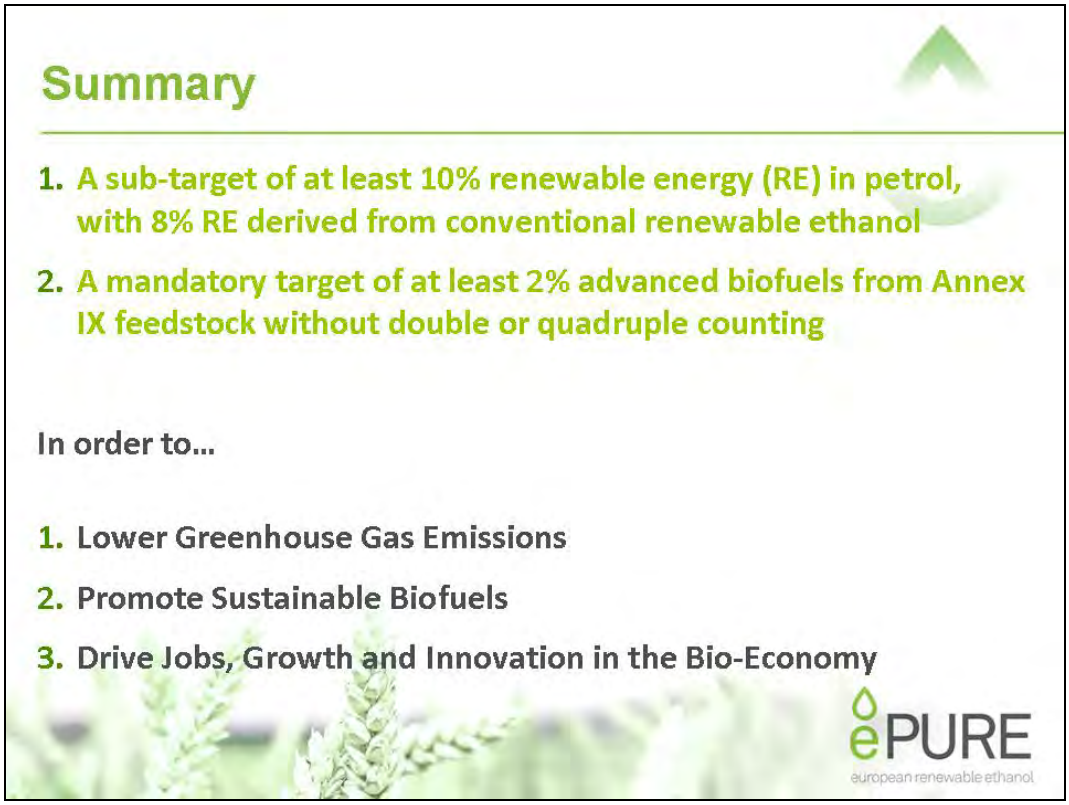
6.8. Presentation by Mr Thomas Gameson




Jobs & Growth in the Bio-Economy
Sandrine
Bazancourt, France
Roman
Zeitz, Germany
Szolt
Dunaföldvár, Hungary
ePURE
european renewable ethanol

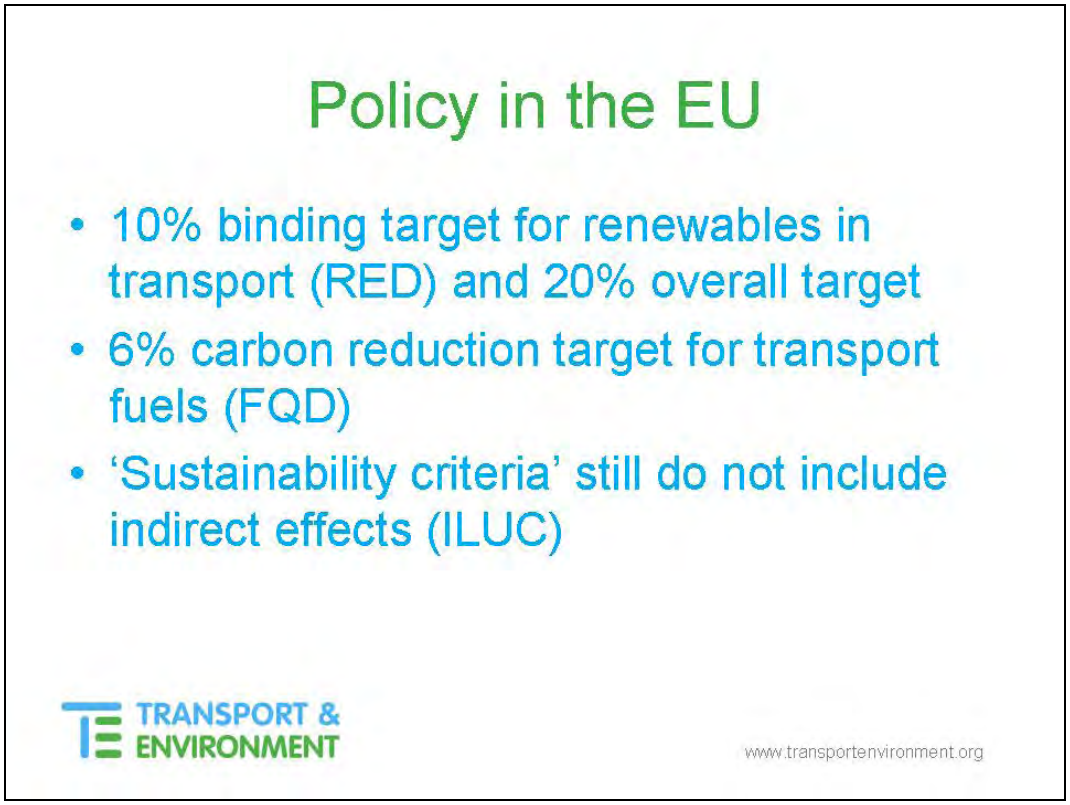

Emission Savings
Real CO_2 emissions from biofuels (with ILUC)
FOSSIL FUELS
ETHANOL
BIODIESEL
CARBON INTENSITY (gCO_{2e}/MJ)
180
160
140
120
100
80
60
40
20
0
GAS TO LIQUID
TAR SANDS DIESEL
OIL SHALE DIESEL
COAL TO LIQUID
ABATOR (NEW, DIESEL)
FROM WASTE WOOD
SUGAR CANE
SUGAR BEET
CORN (MAIZE)
STRAW FUELLED
FUEL NOT SPECIFIED
FROM WASTE WOOD
SUNFLOWER OIL
RAPESEED OIL
SOY OIL
PALM OIL
FOSSIL FUELS
ILUC
DIRECT EMISSIONS
50% SAVINGS
35% SAVINGS
NO SAVING
Source: CE DELFT 2012. *Sustainable alternatives for land-based biofuels in the European Union - Assessment of options and development of a policy strategy'.* http://www.cedelft.eu/publicatie/sustainable_alternatives_for_land-based_biofuels_in_the_european_union/1325
ePURE
european renewable ethanol


Renewable Ethanol = Food + Fuel
Food
Fuel
ePURE
european renewable ethanol


Summary
1. A sub-target of at least 10% renewable energy (RE) in petrol, with 8% RE derived from conventional renewable ethanol
2. A mandatory target of at least 2% advanced biofuels from Annex IX feedstock without double or quadruple counting
In order to...
1. Lower Greenhouse Gas Emissions
2. Promote Sustainable Biofuels
3. Drive Jobs, Growth and Innovation in the Bio-Economy
ePURE
european renewable ethanol


made in
eUROPE
renewable ethanol
ePURE
european renewable ethanol

6.9. Presentation by Ms Nusa Urbancic


Policy in the EU
• 10% binding target for renewables in transport (RED) and 20% overall target
• 6% carbon reduction target for transport fuels (FQD)
• 'Sustainability criteria' still do not include indirect effects (ILUC)
TRANSPORT & ENVIRONMENT
www.transportenvironment.org


In a perfect world
• CO2-based targets (FQD approach)
• Don't try to pick 'winners' (biofuels)
• Correct carbon accounting for all fuels and bioenergy
• Sustainability criteria for water, biodiversity, agricultural practices, social criteria
TRANSPORT & ENVIRONMENT
www.transportenvironment.org

ILUC is real

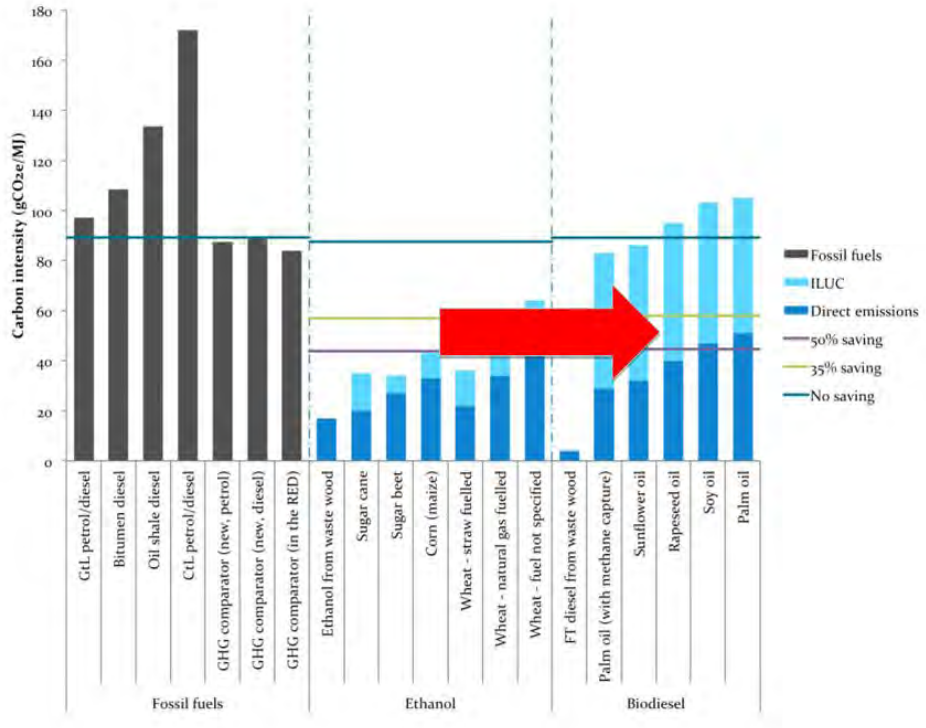
- Six studies for the Commission and numerous other scientific reports

"We urge you to align the EU biofuels policy with the best scientific knowledge and take into account emissions from indirect changes in land use."

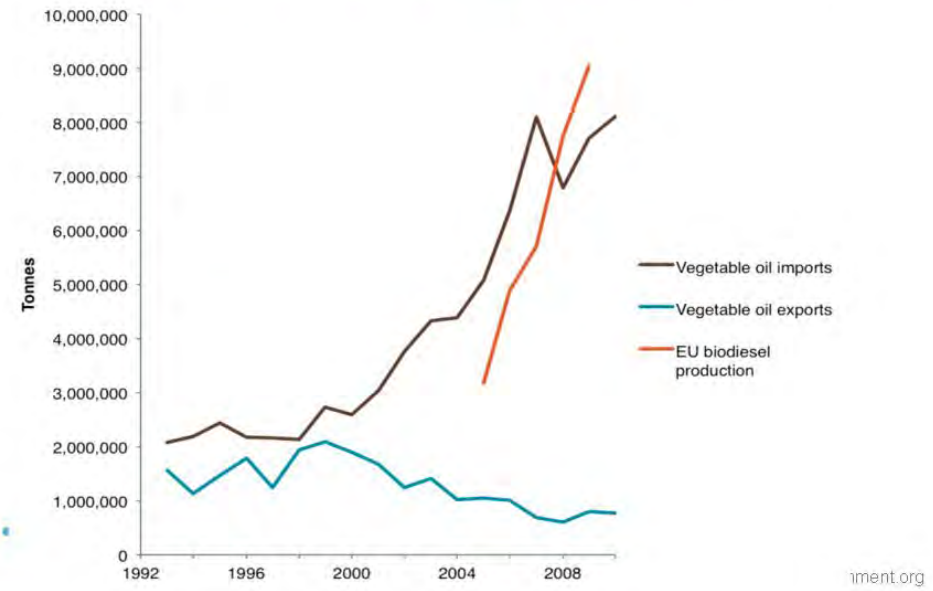
Union of Concerned Scientists letter to Barroso
Signed by 210 scientists and researchers

TRANSPORT & ENVIRONMENT

www.transportenvironment.org



Imports of vegetable oils



Do nothing

- CO2 savings maybe 5%
- Abatement cost = €2500 /tonne CO2

ILUC factors

- CO2 savings = 53%
- Abatement cost < €400 /tonne CO2

Source: ICCT

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Our proposal

- Science-based, feedstock-specific ILUC factors
- Grandfathering strategy that caps high-ILUC biofuels at current supply levels while gradually phasing them out post 2017
- Combines environmental effectiveness and a clear framework for new low-carbon investment with fair treatment of past investment
- Ensures that only low ILUC biofuels come to the market

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www.transportenvironment.org

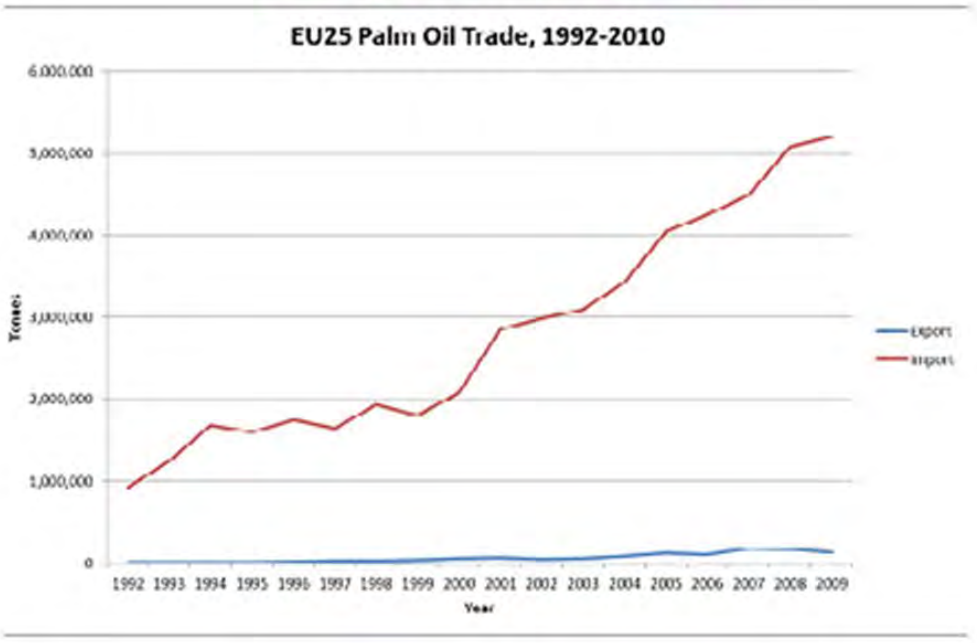
Current proposal

- Still ignores ILUC
- Failure to tackle ILUC bad for environment, industry and EU credibility
- Feedstock-specific ILUC factors, combined with smart grandfathering offer a way out
- This fits well with the current proposal that should be improved

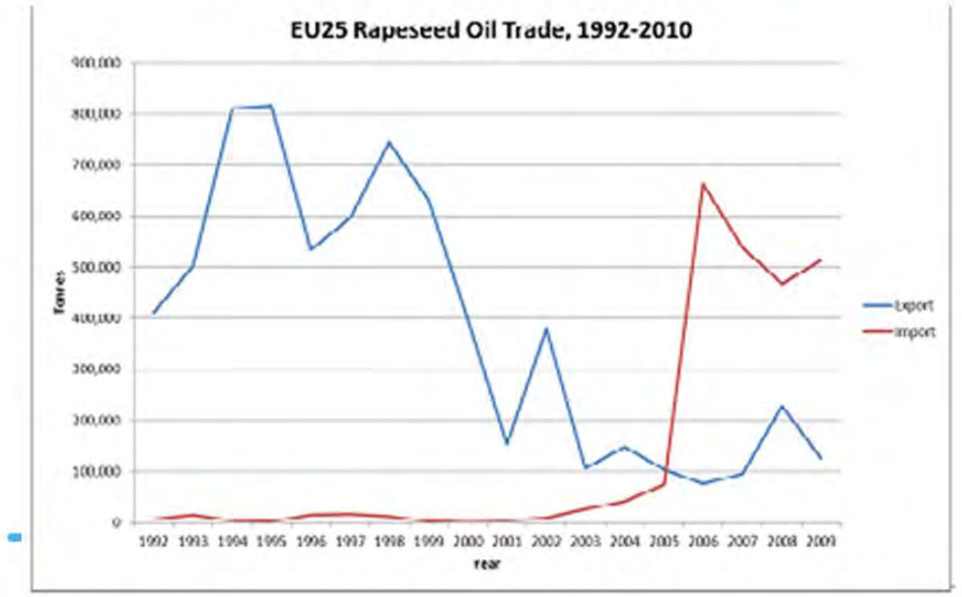
TRANSPORT & ENVIRONMENT

www.transportenvironment.org

EU palm oil trade



EU rapeseed oil trade



Cost efficiency of ILUC options

POLICY ALTERNATIVE	VARIANT	AVERAGE CARBON SAVING	COMMENTS	ABATEMENT COST*
1. No action/monitor the situation		5%	'Baseline' case	2,500 €/tCO2e
2. Raise the thresholds	a) to 50% immediately, but no long term increase	5%	This scenario treated as the same in 2020 as no action	2,500 €/tCO2e
	b) to 60% by 2020	14%	Unlikely to rule out any feedstocks completely	< 1,500 €/tCO2e
3. Additional sustainability criteria	a) country level	n/a	Option not assessed: low certainty of being effective	
	b) incentives for iLUC mitigation, but no iLUC penalties	11%	Requires relatively low volumes of low-iLUC biodiesel	< 1,250 €/tCO2e
	c) biodiesel treated as high risk – all biodiesel must be low-iLUC	47%	Requires high volumes of low-iLUC biodiesel	< 500 €/tCO2e
4. iLUC factors	a) with a 50% threshold	53%	Effectively only allow ethanol for compliance	< 400 €/tCO2e
	b) with a 35% threshold	50%	Effectively only allow ethanol for compliance	< 400 €/tCO2e
	c) with a 25% threshold	36%	Requires direct emissions savings for biodiesel	< 750 €/tCO2e
	d) with a 50% threshold and iLUC mitigation options	53%	Requires high volumes of low-iLUC biodiesel	< 550 €/tCO2e

6.10. Presentation by Mr Marc-Olivier Herman

EU BIOFUELS DEMAND: A KEY DRIVER OF INCREASE IN FOOD PRICES AND DEMAND FOR LAND

- DG Agri - EU agricultural markets 2012-2022 (December 2012):
  - Prices: "biofuels are the most dynamic demand factor"
  - Land: oilseeds production boom + EU strong net importer of soy and palm

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BIOFUELS: A KEY DRIVER OF INCREASE IN FOOD PRICE VOLATILITY

- Interagency report to G20 on food price volatility (FAO, IFAD, IMF,OECD, UNCTAD, WFP, World Bank, WTO – June 2011)

"G20 governments should remove national policies that subsidize or mandate biofuels production or consumption."

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BIOFUELS: A KEY DRIVER OF FOOD INSECURITY

- UN Committee on World Food Security - HLPE
  - Price volatility: "Limiting the use of food to produce biofuel is the first objective to curb demand. Mandated incorporation of biofuel and financial support, should be abandoned." (July 2011)
  - Biofuels: Supply has not kept up because of the scope and rate of the rise in demand for biofuels. Reduced food consumption by the food insecure "is substantial and could be extremely substantial". (Jan. 2013)

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BIOFUELS: A KEY DRIVER OF LARGE SCALE LAND & WATER ACQUISITIONS

International Land Coalition – Land Matrix (2012):

- **global land rush:** 625 deals (reliable), **43.7 million ha (> Germany)**
- **biofuels are a key driver**: non-food crops 26% (e.g. Jatropha: 5.5 million ha), flex crops 23% (soy bean, sugar cane, palm oil), multiple uses 17%
- **export-oriented**, domestic markets of marginal concern
- investors target countries in Africa, Asia and Latin America with **high incidence of hunger & weak land institutions**
- **high competition for land with existing users**: investors target easily accessible & densely populated areas
- **Free, Prior and Informed Consent is rare; compensation very low**

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REMOVING THE THREAT OF BIOFUELS TO GLOBAL FOOD SECURITY

- remove the 10% 2020 binding target for renewable energy in transport and national biofuel blending mandates
- remove all support to biofuels made from food crops and energy crops in direct competition with food for land and water

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AMENDING THE RED & FQD

- A genuine cap on the use of all land-based biofuels:
  - under both the RED and FQD
  - in the sustainability criteria: no state aid above the cap
- A lower cap: aiming a phase out of land-based biofuels by 2020 rather than maintaining current consumption levels
- Correct ghg-accounting for all biofuels: feedstock specific ILUC factors in the RED and the FQD for all land-based biofuels
- Binding social (food security, land and water rights!) and environmental sustainability criteria for all biofuels

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6.11. Presentation by Mr Sébastien Haye

RSB
ROUNDTABLE ON SUSTAINABLE BIOFUELS

Biofuels & Indirect Impacts: the RSB experience

Sébastien Haye, Standards Director

20 February 2013

EP Workshop on Sustainable Biofuels: addressing iLUC

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Disclaimer

The Roundtable on Sustainable Biofuels is a multi-stakeholder process led by a broad membership, which includes more than 100 organisations worldwide. RSB Members represent civil society, as well as private sector, government and non-governmental organisations.

Any change to the RSB Standard is based on a consensus among RSB Members. At present, a consultation process is ongoing to determine whether and how the RSB Standard might address indirect impacts. No formal decision has been taken yet.

This presentation attempts to share facts about the consultation organised by the RSB in 2012, but it does not necessarily reflect the views and opinions of all RSB Members. Thank you for your understanding.

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The RSB Standard & Certification System

- Initiated by EPFL Energy Center in 2007
- Developed and approved by more than 100 **members from more than 30 countries**. Strong NGO support.
- **RSB is a full ISEAL Member.**

- **Differentiate** better biofuels from unsustainable pathways
- Covers **entire supply chain** (From farm to tank)
- Applies worldwide and to **all feedstocks and supply chains (adaptations possible)**
- **Certification** performed by accredited 3rd-party auditors
- **RSB Tool** incorporates global GHG calculators for various international regulations
- No requirement on Indirect Impacts at present

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Structure of the RSB Standard

Principles & Criteria

- Describe requirements on sustainability, chain of custody, risk, claims, etc…
- Comprehensive on sustainability aspects: Biodiversity, Food Security, Land Rights, Water, Soil, etc.
- Minimum vs Progress Requirements. Distinction based on size and screening results

Implementation

- How operators demonstrate compliance: internal records, maps, field survey, impact assessments, etc…
- Guidance and Guidelines on technical issues such as land rights, food security, poverty, biodiversity, water, etc.
- Group certification regime, sample size, policy for waste, etc…

Assurance

- Accreditation of Certification Bodies
- Qualifications of Auditors
- Training and Exams of Auditors

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RSB Audit process for crop-based biofuels

Required Compliance	Feedstock Production	Trade/ Transport	Feedstock Processing	Trade/ Transport	Biofuel Production	Trade/ Transport	Biofuel Blending	Trade/ Transport	Final Consumer
ENV/SOC	✓		✓		✓				
GHG (LCA)	✓		✓		✓		✓		
CoC	✓	✓	✓	✓	✓	✓	✓	✓	✓

Indirect impacts of biofuel production = ?

- Many experts agree that biofuels *have* an impact on global land use change and commodity prices.
- There is no agreement on the *magnitude* of that impact attributable to increased biofuel production.
- Many voices (incl from industry) call for action on this issue to generate investor confidence and clarity
- At the same time, concerns are raised over the scientific accuracy of modeling and quantification of indirect impacts.

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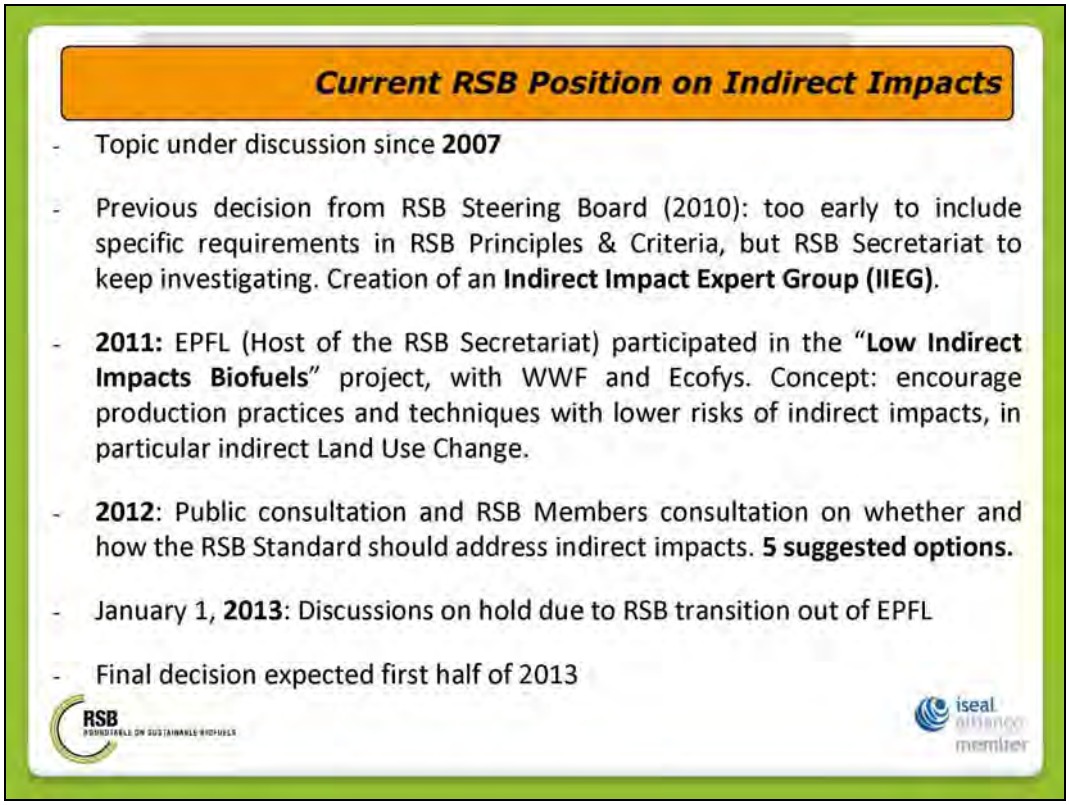
Current RSB Position on Indirect Impacts
- Topic under discussion since 2007
- Previous decision from RSB Steering Board (2010): too early to include specific requirements in RSB Principles & Criteria, but RSB Secretariat to keep investigating. Creation of an Indirect Impact Expert Group (IIEG).
- 2011: EPFL (Host of the RSB Secretariat) participated in the "Low Indirect Impacts Biofuels" project, with WWF and Ecofys. Concept: encourage production practices and techniques with lower risks of indirect impacts, in particular indirect Land Use Change.
- 2012: Public consultation and RSB Members consultation on whether and how the RSB Standard should address indirect impacts. 5 suggested options.
- January 1, 2013: Discussions on hold due to RSB transition out of EPFL
- Final decision expected first half of 2013
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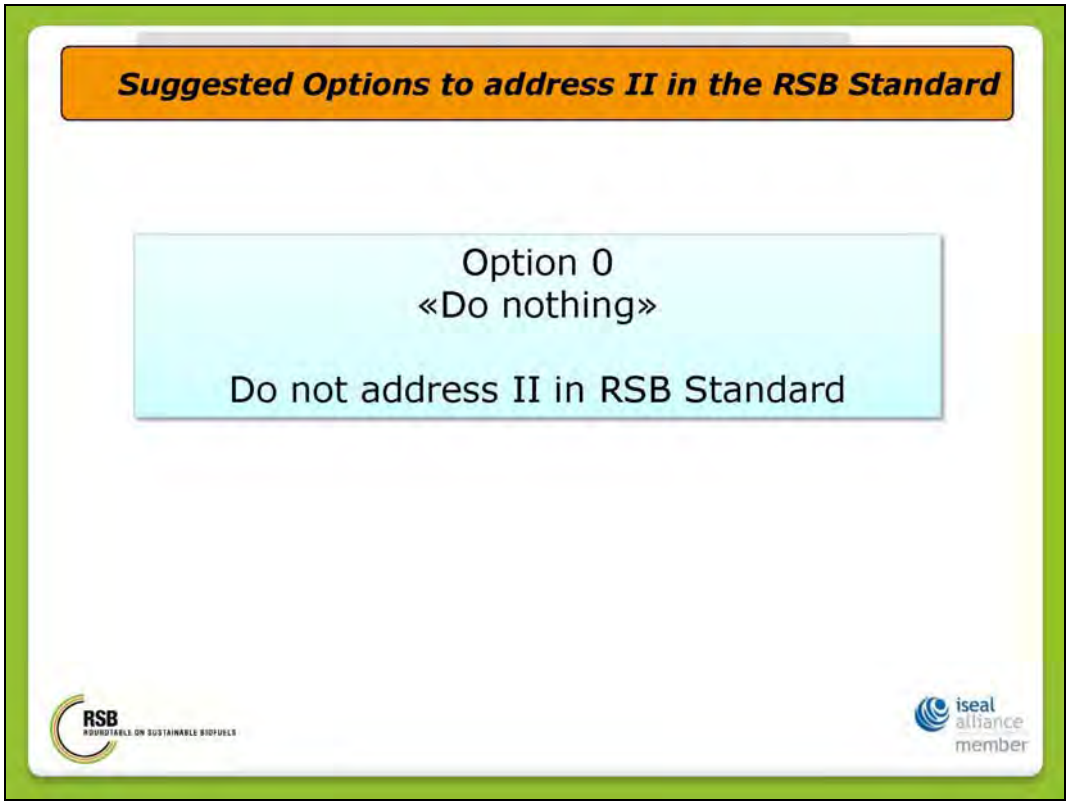
Suggested Options to address II in the RSB Standard
Option 0
«Do nothing»
Do not address II in RSB Standard
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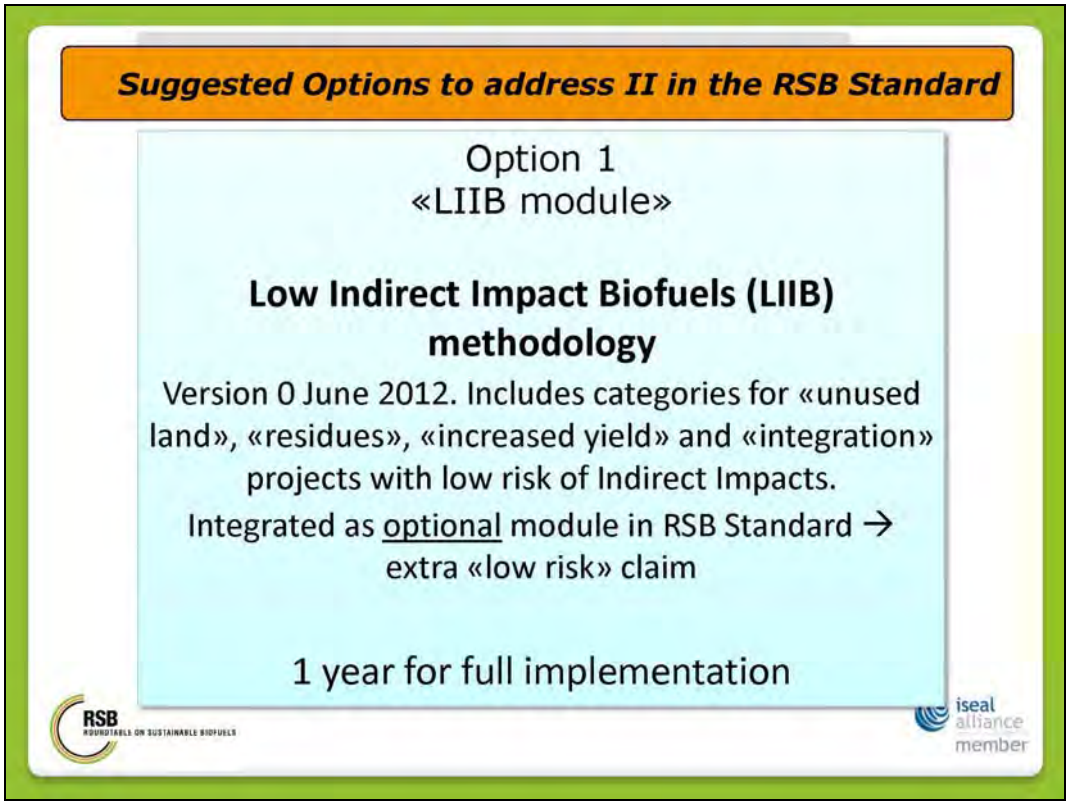
Suggested Options to address II in the RSB Standard
Option 1
«LIIB module»
Low Indirect Impact Biofuels (LIIB) methodology
Version 0 June 2012. Includes categories for «unused land», «residues», «increased yield» and «integration» projects with low risk of Indirect Impacts.
Integrated as optional module in RSB Standard → extra «low risk» claim
1 year for full implementation
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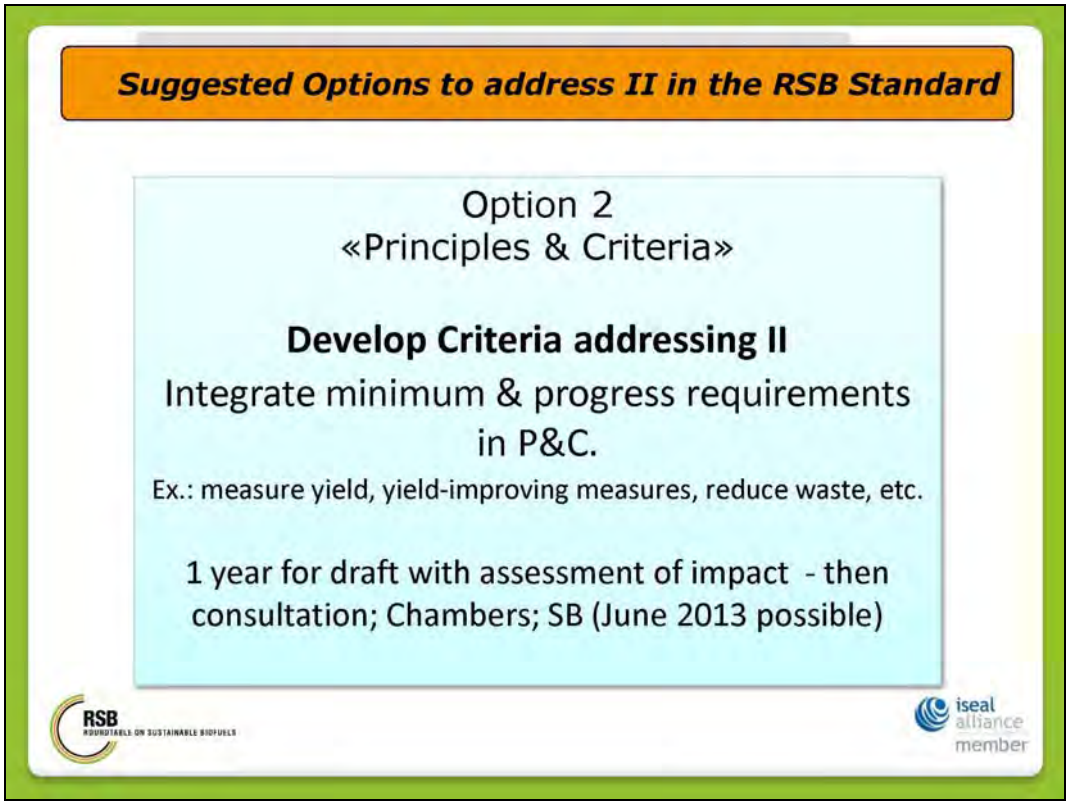
Suggested Options to address II in the RSB Standard
Option 2
«Principles & Criteria»
Develop Criteria addressing II
Integrate minimum & progress requirements in P&C.
Ex.: measure yield, yield-improving measures, reduce waste, etc.
1 year for draft with assessment of impact - then consultation; Chambers; SB (June 2013 possible)
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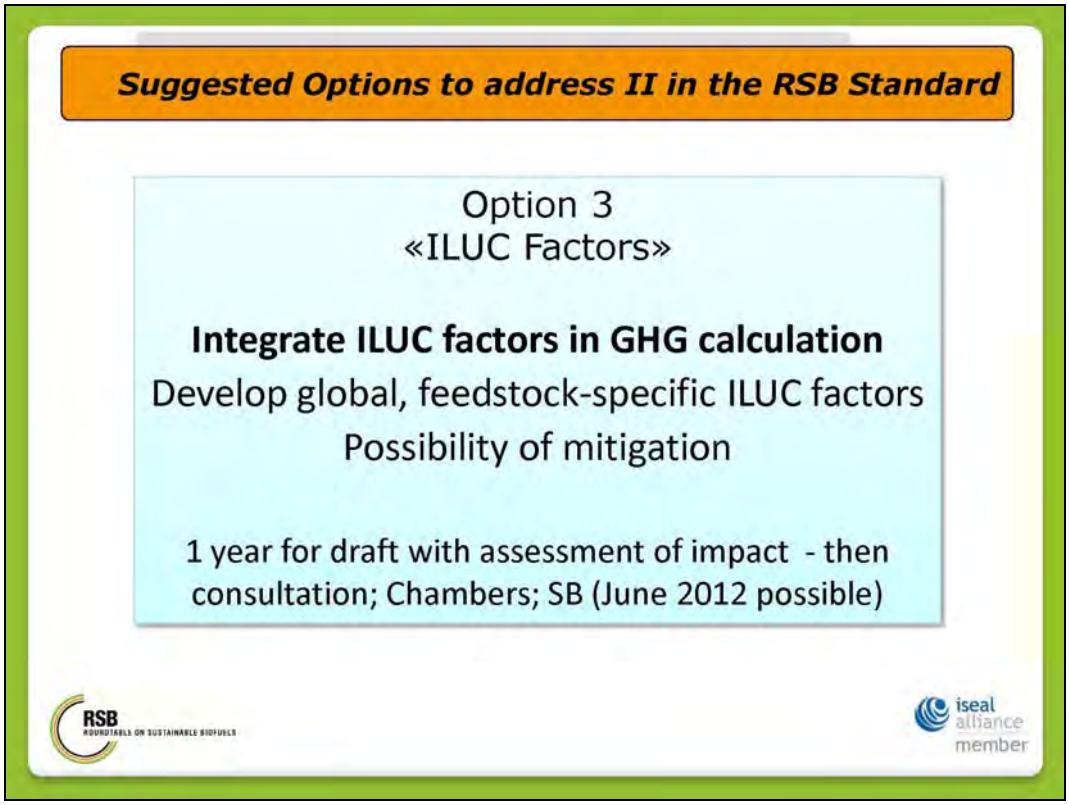
Suggested Options to address II in the RSB Standard
Option 3
«ILUC Factors»
Integrate ILUC factors in GHG calculation
Develop global, feedstock-specific ILUC factors
Possibility of mitigation
1 year for draft with assessment of impact - then consultation; Chambers; SB (June 2012 possible)
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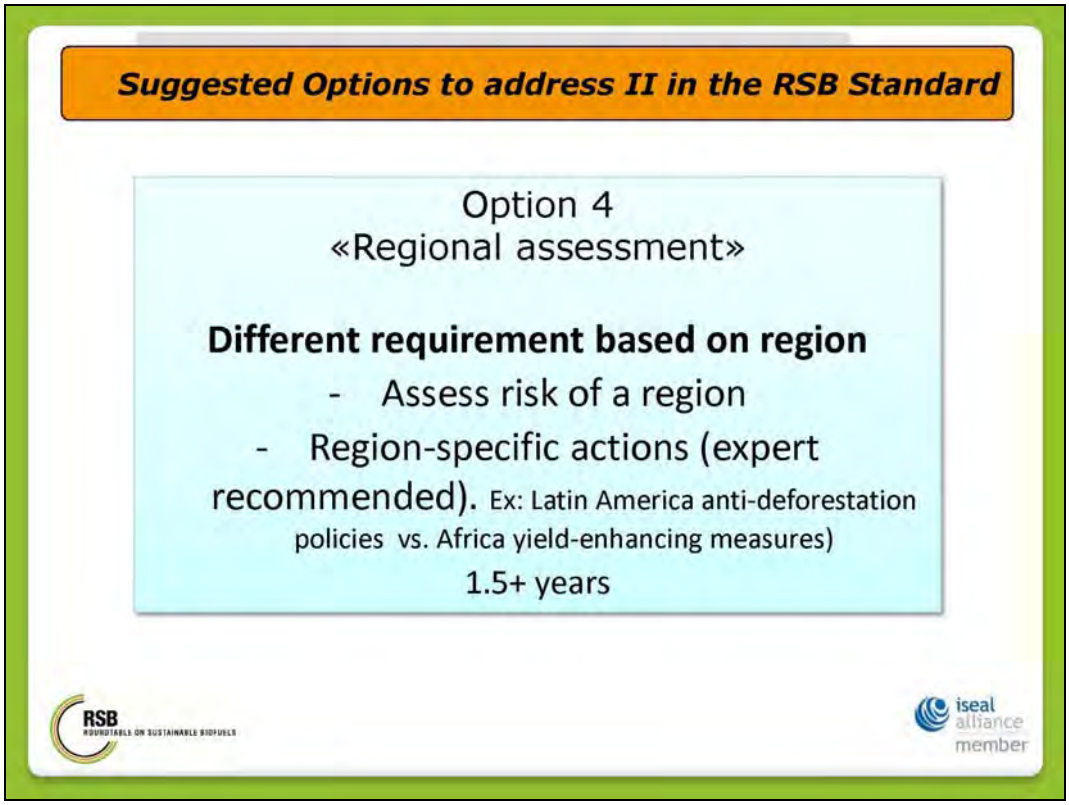
Suggested Options to address II in the RSB Standard
Option 4
«Regional assessment»
Different requirement based on region
- Assess risk of a region
- Region-specific actions (expert recommended). Ex: Latin America anti-deforestation policies vs. Africa yield-enhancing measures)
1.5+ years
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Suggested Options to address II in the RSB Standard

Option 5
«II Fund»

Offset risk by contributing to fund

Operators donate (money, know-how, time) to a fund dedicated to help developing country farmers improve their yield

Requires multi-organizational collaboration

2+ years

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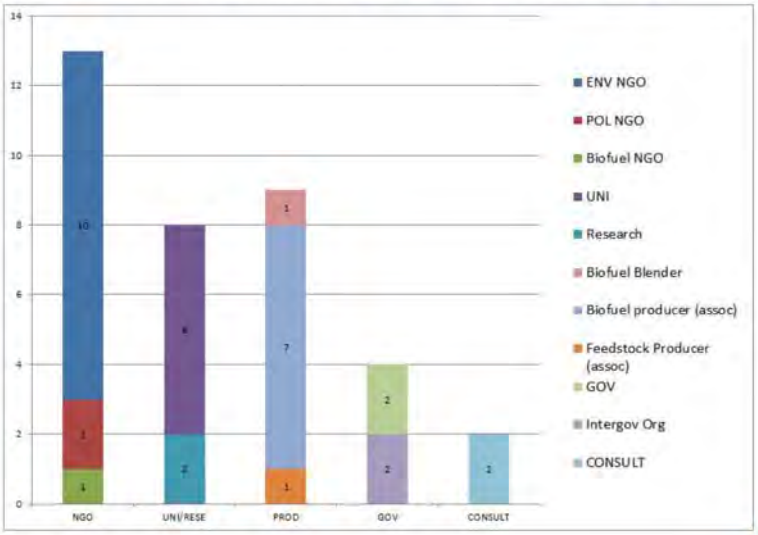
Public consultation – Results (1)

- 36 organizations responded (plus peer reviewers)



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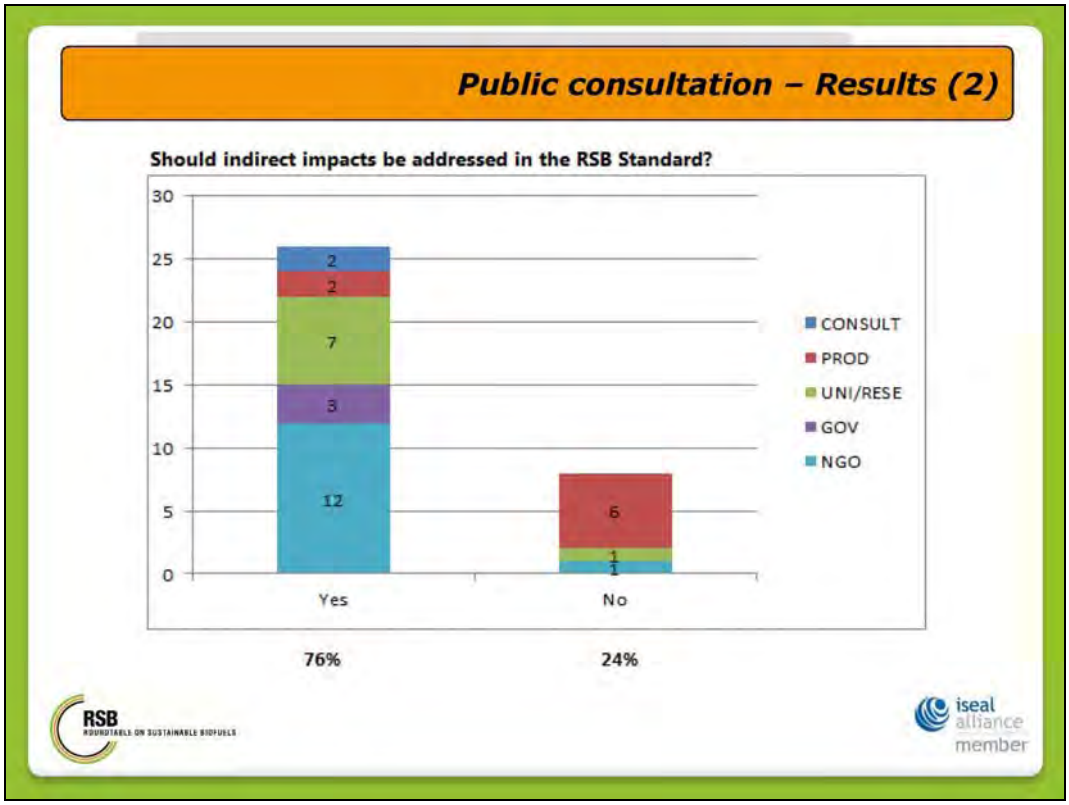
Public consultation – Results (2)
Should indirect impacts be addressed in the RSB Standard?
30
25
20
15
10
5
0
2
2
7
3
12
6
1
1
CONSULT
PROD
UNI/RESE
GOV
NGO
Yes
No
76%
24%
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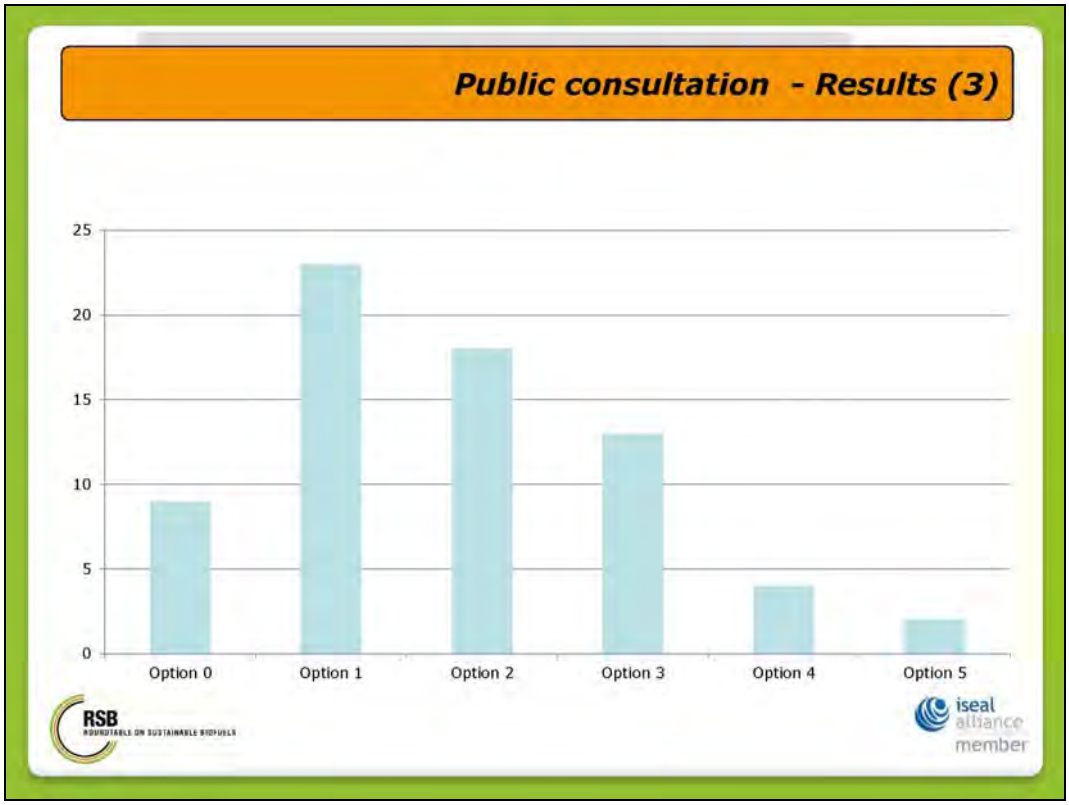
Public consultation - Results (3)
25
20
15
10
5
0
Option 0
Option 1
Option 2
Option 3
Option 4
Option 5
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Conclusions

Public consultation and consultation of RSB Members show the following **trends** (no official decision yet):

- Indirect Impacts should be addressed in RSB Standards
- A preference exists for the "LIIB" approach (Option 1), followed by a modification of the RSB Principles & Criteria (Option 2) and iLUC Factors (Option 3). Ideally, **a combination of several solutions**.
- Ongoing discussions over the decision-process, in relation to legislation changes in the EU.

RSB to complete its consultation in 2013 and decide on a way forward.

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Thank you!

For More Information

Sebastien.haye@rsb.org

RSB Secretariat
http://www.rsb.org

RSB Services
http://www.rsbservices.org

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CATALOGUE BA-31-13-674-EN-C

DIRECTORATE-GENERAL FOR INTERNAL POLICIES

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