

Annex A**Terms of Reference****The indirect land use change impact of biofuels**1. Background

Commission policy proposals for a 10% renewable energy use in road transport fuels by 2020, of which biofuels is expected to be a significant part, were approved by the Council in March 2007. The Renewable Energy Directive (RED) concretises this policy and was decided in December 2008. The RED defines the environmental sustainability criteria that biofuels must adhere to in order to be counted as contributing towards the 10% target, including for direct land use change. That decision includes a requirement for the Commission to report by 2010 on indirect land use change (ILUC) and, where appropriate, make proposals on how to address this issue. The Fuel Quality Directive (FQD), adopted at the same time as the RED, also includes sustainability criteria and targets a reduction in lifecycle greenhouse gas emissions from fuels consumed in the EU by 6% by 2020.

Biofuels demand in the EU is expected to be satisfied through a mix of domestic production and imports. This will have an impact on world agricultural production and markets, and on agricultural land use. A similar impact can be expected from biofuels mandates in other major economies, including the US. Apart from quantity and price issues, there is a debate on sustainability criteria, domestic incentives schemes and the trade regime for biofuels. These three policy variables are interlinked. In particular, demand for biofuels is likely to increase agricultural land use; if this would include conversion of carbon-rich habitats into agricultural use, it may cause adverse carbon emission effects.

A first study on this subject was completed under this Framework Contract by CEPII/IFPRI in early 2009. That study used an extended version of the GTAP database and the Mirage model, including land use maps, an energy and land use module, detailed treatment of biofuels feedstocks and calculation of the greenhouse gas emissions. It focused on the overall economic and environmental impact of the EU biofuels policy, as well as the specific trade regime questions associated with that policy. This was a useful and independent assessment of the trade policy questions regarding biofuels, and complemented a number of existing studies from this specific trade angle. It also provided a first insight into the ILUC effects that the EU biofuels policy may generate.

In the course of 2009, the internal debate in the Commission on additional ILUC criteria in the RED has moved on and is now focused on the details of ILUC estimation methods. The CEPII/IFPRI biofuels study completed in early 2009 is so far the only internal Commission study available on this subject. It was scrutinized by an inter service working group composed of all relevant DG's (including TREN, ENV, AGRI, JRC, ECFIN, ENTR, DEV, RTD, SG and TRADE). The group formulated a number of comments and additional

questions with regard to the preliminary ILUC estimates that could not be answered during the first biofuels study given the state of the underlying database and the formulation of model. The group also agreed to launch a parallel partial equilibrium modelling approach to ILUC issues, using the AGRI/OECD partial equilibrium AgLink model outcomes and completing this with JRC land use change allocation and GHG emission data. The CGE and PE model outcomes will then be compared to arrive at an ILUC emission estimate that will be used for the purposes of the report on the issue of indirect land use change that is required under the RED. In addition, the JRC is conducting work aimed at comparing the results from a number of international modelling activities on indirect land use change. All this should be completed by fall 2009.

The purpose of this second phase biofuels study is to try to address the additional questions raised earlier by the inter-service working group on ILUC and produce a more detailed and reliable estimate, taking into account progress made in recent months in improving the extended GTAP database and the modelling of ILUC.

DG Trade has an interest in EU policy developments at the interface between climate change and trade policy, including biofuels that constitute an important issue in several trade negotiation fora, including the WTO DDA. Biofuels sustainability criteria constitute production process measures (ppms) that are a subject of debate within the WTO legal framework. Biofuels tariff regimes may have a significant impact on the economic costs and environmental benefits of biofuels. At the same time, trade regimes are closely linked to the sustainability of production of biofuels, both in the EU and in the EU's major biofuels trading partners.

2. Expected output and use in the policy process

The expected output from this study is a report that analyses the global agricultural production, trade and environment impact of the EU biofuels policy as concretised in the Renewable Energy Directive (RED). Particular attention should be paid to the indirect land use change (ILUC) effects of the main feedstocks used for biofuels production. Previous estimates of the first biofuels study need to be updated, taking into account improvements in the underlying database and model, including the addition of co-products, further differentiation between various types of feedstocks and improvements in the land use allocation module.

The objective of the study is to contribute to the impact assessment and report on ILUC, and possible Commission proposals on the methodology to deal with ILUC, as set out in the RED and the FQD. This includes an estimation of the ILUC effect of demand for different types of biofuels. The estimation of the likely ILUC effects will also inform the debate on trade policy options with respect to biofuels, in parallel to the debate on ILUC in the context of the RED and the FQD.

3. Work to be carried out:

The work will be carried out on the extended GTAP database already used for the previous biofuels study, and the extended CGE Mirage model developed by CEPII and IFPRI. The following revisions will be built into the first phase database and model:

1. The baseline scenario will be updated with the latest IEA energy price forecast and the OECD/FAO agricultural production and price forecasts. OECD updated forecasts for economic growth over the next years should also be included.
2. The policy scenario will target a 7% use of first generation biofuels in road transport in the EU by 2020.
3. The Armington elasticities for biofuels in the model will be adjusted to reflect a homogenous product rather than a significant degree of heterogeneity assumed in the previous version.
4. The integration of two biofuel sectors (bioethanol and biodiesel) in the GTAP database was already done in the first phase study. In this second phase, the database and model will be improved by including the full separation and identification of the following feedstocks: maize, wheat, sugar beet, sugar cane (for bioethanol) and soya, rapeseed, sunflower, palm oil, other oils, oil seeds (for biodiesel), so that marginal ILUC can be estimated for each of these feedstocks separately. Where relevant, the land-saving co-products of these biofuel feedstocks will be identified separately. Energy saving co-products (without land use effects?) will be accounted for in the direct emission reduction effects of the biofuels production process, not in indirect effects.
5. A decomposition of land use was introduced in the first phase study. For the present study, the consultants will take another look at the land use module, especially as far as the use of idle land is concerned (idle land and land moving to idle status in the baseline scenario). This will include recently deforested land and recently abandoned arable land. They will also investigate the effects of using different land use change allocation methods, including the JRC-proposed methodology of allocation on the basis of agronomical suitability. In the previous phase, deforestation estimates per region and their environmental impact were based on historical records; this may also be subject to modifications. Care should be taken to avoid double-counting of land use effects in the model (direct and indirect land use change).
6. The possibility to identify peat-land separately in the model will be investigated and implemented, if possible.
7. The marginal ILUC effect (in terms of tons of CO₂ emissions per metric ton and per Giga Joule of biofuel) will be estimated separately for each feedstock at different points along the supply curve: for the baseline supply volume and for the supply when the 7% target is reached, and for at least five intermediate volumes. This will enable an assessment of possible variability in marginal ILUC. Systematic sensitivity analysis (similar to the type available in GEMPACK) will also be carried out on these marginal ILUC values, including with respect to changes in the volume of demand for biofuels outside the EU.
8. The yields module in the model will be examined again. The yield effects of the introduction of a biofuels policy will be separated out. The role of fertilizer use and, if possible, induced technological progress in yields, and possibly in emissions, will also be examined.
9. The baseline should be updated to the post-Health Check situation for the EU CAP.
10. The model will use the percentages for direct CO₂ emission reduction effects in the biofuels production process that were calculated by means of the substitution method. While the model uses an average direct emission reduction coefficient that is based on

an assumption about the weight of different production pathways, the consultants will also carry out sensitivity analysis with respect to changes in these weights – including a gradual move toward the most efficient production pathways only, in line with the relevant provisions in the RED.

Greenhouse gas emission impact will be assessed through emissions of GHG from energy consumption and emission of GHG linked to direct and indirect land use change (using a vector of carbon stock loss per land type). Sensitivity tests may be carried out, taking into account various estimates of GHG carbon stocks per type of land, and various assumptions on the spreading of carbon stock losses over different time periods (20 years as defined in the RED, and other possible values as available in the scientific community).

Once the model is modified, the following scenarios will be implemented:

- A European mandate on the consumption of biofuels for the purpose of road transportation.
- The above plus a full elimination of import duties on biofuels, on a bilateral basis with Mercosur (and possibly other relevant countries/regions), and on an MFN basis in the DDA.

4. Timeline:

Policy simulation data set: The consultants will deliver to DG Trade a complete set of data, both for the revised baseline and policy scenarios, in the form of a set of tables (and possibly graphs), not later than 14 September 2009. These data will be accompanied by the necessary technical explanations, especially with respect to data and mechanisms modified, compared to the first biofuels study. Quantity and price effects will be separated in the tables, where appropriate.

DG Trade will submit the policy simulation data for discussion to the inter-service working group on ILUC. Requests for clarifications and possible modifications will be answered by the consultants within 10 working days. The consultants will also give a presentation of the results at a workshop in Brussels, to be organised by DG Trade.

First draft report: A first full draft report on these policy simulations will be presented not later than 19 October 2009. The report will highlight the changes made to the database, model and scenarios compared to the previous biofuels study.

DG Trade and the inter-service working group on ILUC will comment on this draft report. A draft final version of the report is due within 30 days of receipt of the comments from DG Trade.

End of contract: 31 December 2009