

Specification of petrol, diesel and gas-oil: mechanism to monitor and reduce greenhouse gas emissions from fuels. "Fuel Quality Directive"

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The Commission presents a report on indirect land-use change related to biofuels and bioliquids. It recalls that Directive 2009/28/EC (the "Renewable Energy Directive") and Directive 2009/30/EC ("the Fuel Quality Directive") require the Commission to review the impact of indirect land-use change on greenhouse gas emissions and address ways to minimise that impact. Although land-use change can have a wide range of positive and negative impacts (i.e. greenhouse gas emissions, biodiversity, social issues, etc), this report focuses on the consequences for the greenhouse gas emissions of biofuels, as required by the Directives.

The basic driver for indirect land-use change is the increased demand for agricultural crops in a situation where both suitable agricultural land availability and potential yield increases are limited. Some other key factors, such as achieving maximum profit from the production and complying with related legislation in place, are also likely to play a role in determining how the increased demand is to be realised.

The limited availability of low-carbon stock land in other parts of the world and the lack of more stringent protection of forests and carbon rich areas are factors that can contribute to damaging indirect land-use change. If conversion of carbon rich areas were to be limited or if more agriculture commodities were subject to sustainability criteria comparable to those laid down for biofuels, indirect land-use change could be limited. The reason for this is that the indirect land-use change effect of biofuels is the direct land-use change of another commodity.

Estimating the greenhouse gas impact due to indirect land-use change: this requires projecting impacts into the future, which is inherently uncertain, since future developments will not necessarily follow trends of the past. Moreover, the estimated land-use change can never be validated, as indirect land-use change is a phenomenon that is impossible to observe directly or measure. Therefore modelling is necessary to estimate indirect land-use change. The Commission describes in the report the analytical exercises and review of existing literature on the subject of indirect land-use change which it carried out during 2009 and 2010. It sets out the results of various consultation exercises with the wider community, and considers, in particular two reports involved separate modelling exercises. The first was carried out by IPTS, used the **AGLINK-COSIMO model**. This modelling assumed that the 10% renewable energy in transport target would be met using 7% conventional biofuels and 1.5% advanced biofuels that would be double counted. Although this model considered the impacts from the additional demand of conventional biofuels needed to meet the target, it did not consider any impacts resulting from additional demand for either advanced biofuels or bioliquids. The bioethanol-biodiesel shares considered were identical to the shares of petrol and diesel, i.e. approximately 35% and 65%, so that the share of biofuel in petrol and diesel were each respectively approximately 8.5%. The final conclusion of the modelling was that the additional demand resulting from the policy compared to a counterfactual 2020 scenario, equalled to 21 Mtoe, which would result in an increase of the total land area required for crops of 5.2 million hectares globally, one quarter of which is in the EU. This modelling did not provide a calculation of the greenhouse gas impacts of this land conversion.

The second modelling exercise was carried out using the **MIRAGE model** by the IFPRI. This modelling was based on the assumption that the 10% renewable energy in transport target would be met using 5.6% conventional biofuels with the remainder met in other ways, including a contribution of 1.5% from advanced biofuels, under current trade policy and assuming full trade liberalisation. Additional demand for advanced biofuels and bioliquids was not modelled. The conclusion of the modelling was that the additional demand resulting from the policy compared to a counterfactual 2020 scenario, equalled to 8 Mtoe, which would result in an increase of total land area required for crops of 0.8 and 1 million hectares globally, under the business as usual and free trade scenarios, respectively. Converted into greenhouse gas emissions this compares to 18 grams of CO₂-eq. per MJ of energy (subsequently written as g/MJ). The bioethanol-biodiesel shares were set as 45% and 55% respectively. The overall land requirements increased to 2.8 million hectares globally in the scenario using 8.6% conventional biofuels, resulting into average emissions of 30g/MJ.

The split between bioethanol and biodiesel turned out to be of great importance for the (indirect) land-use change impact estimated using the IFPRI MIRAGE model. In a further IFPRI MIRAGE model run using the 5.6% scenario, and a 25% bioethanol/75% biodiesel split gave average (indirect) land-use change emissions of around 45 g/MJ.

The report notes that model results vary considerably across feedstocks and trade assumptions. It describes a **number of key factors not considered in the models**. Notwithstanding these conceptual limitations, it can be argued that the best available methodology to estimate (indirect) land-use change is still through economic models where decisions are made based on relative prices. However, within this framework of economic modelling, there will always be a range of unsolved issues, which influence the results considerably.

The report goes on to discuss [developments in international regulatory actions to address \(indirect\) land-use change](#). It also presents a summary of the consultation responses.

Preliminary conclusions and next steps: renewable energy, including biofuels, is an essential element of the EU's energy and climate strategy. In this context the stable and predictable investment climate created by the Renewable Energy Directive, which already contains strict sustainability criteria for biofuels and bioliquids, including on their green house gas performance, needs to be preserved, as well as respect for the Fuel Quality Directive's ambitious reduction target in the greenhouse gas intensity of fuels used in transport.

As far as indirect land-use change is concerned, based on the work carried out to date, the Commission believes it is possible to draw a number of conclusions. It recognises that a number of deficiencies and uncertainties associated with the modelling, which is required to estimate the impacts, remain to be addressed, which could significantly impact on the results of the analytical work carried out to date. Therefore, the Commission will continue to conduct work in this area in order to ensure that policy decisions are based on the best available science and to meet its future reporting obligations on this matter.

However, the Commission acknowledges that indirect land-use change can have an impact on greenhouse gas emissions savings associated with biofuels, which could reduce their contribution to the policy goals, under certain circumstances in the absence of intervention. As such, the Commission considers that, **if action is required, indirect land-use change should be addressed under a precautionary approach.**

The Commission is finalising its impact assessment, which would focus on the assessment of the following policy options:

- take no action for the time being, while continuing to monitor;

- increase the minimum greenhouse gas saving threshold for biofuels;
- introduce additional sustainability requirements on certain categories of biofuels;
- attribute a quantity of greenhouse gas emissions to biofuels reflecting the estimated indirect land-use impact.

The Commission will present the Impact Assessment, if appropriate together with a legislative proposal for amending the Renewable Energy Directive and the Fuel Quality Directive as necessary no later than by July 2011.