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COMMISSION STAFF WORKING DOCUMENT

**EXECUTIVE SUMMARY OF THE IMPACT ASSESSMENT
ON INDIRECT LAND-USE CHANGE RELATED TO BIOFUELS AND BIOLIQUIDS**

Accompanying the document

**Proposal for a
Directive of the European Parliament and of the Council**

**amending Directive 98/70/EC relating to the quality of petrol and diesel fuels and
amending Directive 2009/28/EC on the promotion of the use of energy from renewable
sources**

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1. INTRODUCTION

The Renewable Energy and Fuel Quality Directives (the Directives)^{1,2} both include an obligation to review the impact of indirect land use change on greenhouse gas emissions associated with biofuels and if appropriate to accompany this review with a proposal on ways to minimise that impact. In response, the Commission published a report³ in December 2010 which (i) identified a number of uncertainties and limitations associated with the economic models used to estimate indirect land use change; (ii) acknowledged that the impact of indirect land use change can reduce greenhouse gas emissions savings associated with biofuels; and (iii) indicated that if action is required, indirect land use change should be addressed under a precautionary approach. That report also set out that the Commission would prepare an Impact Assessment based on the four options identified in the report, accompanied, if appropriate, by a legislative proposal to amend the Directives.

2. PROBLEM DEFINITION

Most of today's biofuels are produced from crops grown on agricultural land such as wheat and rapeseed. When agricultural or pasture land previously destined for the food, feed and fibre markets is diverted to the production of biofuels, the non-fuel demand will still need to be satisfied. Although this additional demand can be met through intensification of the original production, bringing non-agricultural land into production elsewhere is also possible. It is in the latter case that land use change occurs *indirectly*, (i.e. hence the term indirect land-use change). In the case that this production is realised through the use of additional land, its conversion could lead to substantial greenhouse gas emissions being released if high carbon stock areas such as forests are affected as a result.

Estimating the greenhouse gas impact due to indirect land-use change requires projecting impacts into the future, which is inherently uncertain, since future developments will not

¹ Article 7d(6) of Directive 2009/30/EC and Article 19(6) of Directive 2009/28/EC.

² The requirement in the Renewable Energy Directive also applies to bioliquids. References to "biofuels" in this document should also be taken as applying to bioliquids.

³ COM(2010) 811.

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 directly observe or measure. Therefore modelling is necessary to estimate indirect land-use change.

In the context of the requirement under the Directives for biofuels to achieve the greenhouse gas savings specified, and the 6% reduction in greenhouse gas intensity required by the Fuel Quality Directive, the key problem addressed in this Impact Assessment is whether greenhouse gas emissions associated with indirect land use change should be addressed, and if so in which way.

3. SUBSIDIARITY

The rationale for European action in the field of biofuels has already been decided with the adoption of the Fuel Quality and Renewable Energy Directives, which create a single market in renewable and lower greenhouse gas intensity energies for transport. As any measures proposed to deal with indirect land use change are likely to require modifications to existing Directives, these have to be coordinated and harmonized across the EU.

4. POLICY OBJECTIVES

As described in the introduction, this impact assessment is focused on the specific requirement in the Directives related to greenhouse gas emissions from indirect land use change and it does not consider any wider environmental and social impacts associated with the use of biofuels. As such, the general objectives presented in the Impact Assessment translate into the following specific/operational objective to:

Minimise the impact of indirect land-use change on greenhouse gas emissions of biofuels, within the wider policy objectives of the targets that by 2020 at least 10% of transport fuels are renewable and that greenhouse gas intensity in road transport fuels is reduced by at least 6% compared to 2010.

5. POLICY OPTIONS

The policy options considered in the impact assessment are described in the table below.

Options/sub-options and their combinations	Description
A) Taking no action for the time being while continuing to monitor ILUC	This option refers to the Commission's bi-annual monitoring and reporting of impacts, including indirect land use change, as required by the Renewable Energy Directive⁴, the first of which is due in 2012. The option also implies continued monitoring of the scientific developments related to estimating indirect land-use change emissions. During the latest consultation, Option A was preferred by those stakeholders who believed that the current state of development of the models was not appropriate to base policy approaches upon. This included most of the industry, farmers' associations and biofuel producing third countries.
B) increase the minimum	Option B aims at a) <i>compensating</i> for the estimated indirect land-use change

⁴ Article 23 of 2009/28/EC.

greenhouse gas saving threshold for biofuels	emissions through requiring higher <i>direct</i> savings, and thereby improving the greenhouse gas performance of the biofuels consumed and; b) <i>reducing</i> indirect land-use change emissions through raising the threshold to such a level that many of the biofuels with estimated large indirect land-use change emissions are excluded. Option B was not preferred by any specific stakeholder group during the latest consultation.
C) introduce additional sustainability requirements on certain categories of biofuels	Option C consists of introducing additional sustainability requirements aimed at mitigating the risk of indirect land-use change emissions. Option C1 aims to do so through introducing requirements to reduce deforestation that Member States and third countries supplying biofuels to the EU would need to comply with, as well as measures aimed at increasing the availability of feedstocks in a sustainable manner; Option C2 measures are instead targeted at criteria for producing biofuels through practices with minimal risk of causing indirect land use change emissions. As well as options C1 and C2 being assessed in isolation, option C2 is assessed in combination with option D (where the biofuel production has to comply with requirements under option D unless it is produced under the conditions described in option C2). During the latest consultation on policy options, most stakeholders supported the use of international action to address indirect land-use change emissions, although not necessarily in the same terms as outlined in option C1. Most NGOs supported option C2 as a potential exemption from the application from option D.
D) attribute a quantity of greenhouse gas emissions to biofuels reflecting the estimated indirect land-use change impact	Option D is the option referred to in the Directives, and involves incorporating the estimated indirect land use change emissions values in the existing greenhouse gas methodology for biofuels. Relevant exemptions are provided in situations that do not trigger indirect land-use change emissions (i.e. non-land using feedstocks such as waste and algae, and when direct land use change is caused). Most NGOs and a few industrial stakeholders from the non-biofuel sectors supported this option during the last consultation. This was also the most supported option during the international scientific expert workshop organised by the Joint Research Centre in November 2010.
E) limit the contribution from conventional biofuels to the Renewable Energy Directive targets.	Option E aims at minimising the indirect land use change impacts of biofuels by limiting the amount of conventional biofuels that can be counted towards the Renewable Energy Directive targets to current production levels at 5%. This is done through a) limiting the consumption of biofuels with a risk of indirect land use change and b) increasing the amount of advanced biofuels, with lower risks, needed to achieve the 10% Renewable Energy Directive transport target. Although Option E was not included as one of the shortlisted options by the Commission in the last consultation exercises, options aimed at limiting the amount of conventional biofuels while increasing the incentives for advanced biofuels were favoured by NGOs and certain industrial stakeholders.

6. ASSESSMENT OF THE POLICY OPTIONS

On the basis of the analytical work presented in this Impact Assessment, it is possible to draw a number of conclusions:

- (1) the estimated indirect land-use change emissions are, despite the better understanding and recent improvements in the science, vulnerable to the modelling framework and the assumptions made;

- (2) the use of biofuels in the EU saves emissions, also when estimated indirect land-use change emissions are included. In addition, the models indicate a hierarchy of biofuel types according to their indirect land-use change impacts, these being considerably higher for typical biodiesel feedstocks (oil crops), than for bioethanol feedstocks (cereals, and sugar crops);
- (3) given the strong reliance on conventional biodiesel, and to a lesser extent conventional bioethanol, in projected biofuel volumes to 2020, there is a high risk that the estimated indirect land-use change emissions will significantly reduce the expected savings from the policy if no action is taken to mitigate indirect land-use change emissions; and;
- (4) the development of advanced biofuels, using low-value resources as straw, wood and forestry residues is slower than previously expected, as the costs associated with producing such fuels is higher than the alternative conventional biofuels.

There are reasonable grounds to believe that indirect land-use change emissions could partly undermine the greenhouse gas savings offered by using biofuels. In application of the precautionary principle, option A) is therefore discarded.

Consideration has also been given to options for introducing additional sustainability requirements on certain categories of biofuels, including certain actions that could be implemented at both country and project level. With regard to country-wide sustainability criteria, the assessment showed that this option would need to be implemented globally in order to be fully effective. In respect of project level actions, the Impact Assessment showed that although biofuels produced under these conditions could be effectively promoted through being considered as exemptions to the application of ILUC factors, these criteria are insufficiently developed at this time to be included in legislative proposal as no certification scheme currently exists. As such, option C) must also be discarded.

With regards to a threshold increase, as described for option B), this option would seem effective in reducing indirect land-use change as long as it leads to the replacement of those biofuels with estimated high indirect land-use change emissions (i.e. vegetable oils) by those with estimated low emissions (i.e. cereals, sugars and advanced biofuels). However, the effectiveness of a threshold increase to 60% (i.e. a reduction of indirect land-use change emissions of 70%, from 46 Mt of CO₂-eq./yr to 14 Mt CO₂-eq./yr in 2020) would be reduced by two thirds if further improvements in the greenhouse gas balance of main vegetable oil crops to levels which seem technologically feasible, can be achieved. As such, the uncertainty around the effectiveness of this approach would always remain high unless much higher thresholds are applied across the board, which would discriminate against biofuels with low estimated indirect land-use change emissions. This option in isolation has therefore been discarded.

Option D concerns the introduction of factors to demonstrate compliance with the sustainability criteria as well as the reporting of greenhouse gas emissions towards emission reduction targets. This would seem the most effective option in reducing indirect land use change emissions (i.e. a reduction of indirect land-use change emissions of 85%, from 46 Mt of CO₂-eq./yr to 8 Mt CO₂-eq./yr in 2020). However, the application of this option in isolation would require major industrial adjustment which does not seem achievable in the period to 2020. This is because it would require a) the exclusion of all vegetable oil biodiesel which

today represents the vast majority of the market; b) unrealistic levels of bioethanol given the current blend limits; and c) unrealistic levels of advanced biofuels coming into the market. Moreover, the introduction of factors in the sustainability criteria would not take into account the limits of the modelling in the policy design. As such, the application of this option in isolation has been discarded.

The remaining option E, i.e. limiting the amount of conventional biofuels counting towards the Renewable Energy Directive transport target to current production levels, would also be effective in reducing indirect land-use change (i.e. a reduction of indirect land-use change emissions of 55%, from 46 Mt of CO₂-eq./yr to 21 Mt CO₂-eq./yr in 2020). In addition, this option would require moderate industrial adjustment as it would only exclude vegetable oil biodiesel beyond current production levels in the run up to 2020 and would not necessarily pose a technical challenge from a blending limit perspective, while providing a strong incentive for increasing the share of advanced biofuels. The incentives for producing advanced biofuels would be strong, as the amount of double counted advanced biofuels would need to increase significantly⁵. Option E thus appears to provide a basis of a suitable way forward.

This Impact Assessment shows that a balanced approach based on option E, accompanied by complementary elements of options B and D and additional incentives for advanced biofuels, would be the best way to minimise estimated indirect land-use change emissions. This is because

- (1) option E avoids any additional ILUC-impacts to happen for the period up to 2020 as it limits the use of conventional biofuels to current production levels, while at the same time the targets for renewable energy of the Renewable Energy Directive remain achievable;
- (2) it protects existing investments, while giving a clear message that after 2020 only advanced biofuels will be supported. This provides the needed certainty for new investments in the sector as no further changes would occur up to 2020;
- (3) it distinguishes between feedstocks according to their estimated indirect land-use change impacts which would be reported, thereby providing more transparency;
- (4) sustainability of biofuels remains a question of verifiable and measureable direct emissions;
- (5) the enhanced incentives and accounting for advanced non-land using biofuels to four times the contribution of conventional biofuels will spur development of such biofuels with zero risk of indirect land-use change emissions, as no land is used for their production.

Although it has not been possible to assess the effectiveness of this package of measures under the current methodology, it is expected to reduce indirect land-use change emissions

⁵ Around 2-3 % of the 10% target of double counted advanced biofuels would be needed. This is equivalent to 6 to 9 Mtoe, For comparison, the US RFS2 is requiring 36 billion gallons by 2022, of which at least 16 billion gallons have to be advanced biofuels from cellulosic material. 16 billion gallons of ethanol is equivalent to around 30 Mtoe, i.e. an energy quantity similar to what is required to reach the 10% transport target of the Renewable Energy Directive.

significantly. As a minimum, the package of measures will reduce indirect land use change emissions as option E in isolation (55% by 2020). However, it is expected that the additional incentives for advanced biofuels will lead to a further shift away from biofuels with high estimated indirect land-use change emissions.

In conclusion this combination would minimise the risks of indirect land-use change emissions, while protecting existing investments and, at the same time, acknowledging and taking into account in the policy design the limits of the modelling.