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CONFERENCE ON AVIATION AND ALTERNATIVE FUELS

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Agenda Item 1: Environmental sustainability and interdependencies

SUSTAINABILITY CRITERIA FOR THE USE OF BIOFUELS IN THE EUROPEAN UNION AND LIFE CYCLE ASSESSMENT

(Presented by the European Commission)

SUMMARY

This document summarises the sustainability criteria for the use of biofuels in the European Union, including in the international context, and presents some reflections on life cycle assessment.

1. INTRODUCTION

1.1 Air transport needs effective measures to reduce its climate change impact, otherwise the expected traffic increase will not only produce more emissions, but likely also a higher share of aviation as contributor to climate change, in particular as other sectors successfully reduce their impact. In addition there are air quality and noise challenges to be overcome, prone to become ever more critical as traffic grows.

1.2 The European Union has committed itself to an ambitious set of targets to foster energy and environmental improvements: it aims at a reduction of greenhouse gas emissions of 20%, a general improvement of energy efficiency by 20% and the target market share of renewable energy sources of 20%, all to be achieved by the year 2020. The EU is committed to increase this to a 30% reduction in the context of a fair and ambitious global agreement in Copenhagen, if other developed countries commit themselves to comparable reductions, and if economically more advanced developing countries contribute adequately according to their responsibilities and respective capabilities.

1.3 Moreover, the EU has established a target of 10% for the use of renewable energies in transport by 2020, which includes biofuels. Both the 20% target for the overall market share of renewable energy sources, as well as the 10% for transport are mandatory targets set out in the Directive 2009/28/EC on the promotion of the use of energy sources from renewable sources, to be achieved through common efforts of Member States, industry and citizens.

1.4 These global objectives also cover air transport. The question is what contribution can we expect from aviation to combat its growing environmental impact and how can this be delivered? The European Union considers that binding reduction targets for international aviation would form an important part of the overall strategy to achieve limiting the global average temperature increase to not more than 2°C above pre-industrial levels, as agreed by the G8 and Major Economies Forum.

1.5 Alternative fuels, notably biofuels are emerging as a new interesting option for aviation to reduce or to even close the gap between emission targets and the growth scenarios, as part of a comprehensive package of measures in combination with technological progress and energy efficiency improvements, operational measures and market based measures.

1.6 In the European Union, biofuels in aviation must comply with the sustainability criteria established in the Directive on the use of renewable energy sources in order to contribute to fulfilling the 10% target and to be able to benefit from national support schemes.

2. SUSTAINABILITY CRITERIA FOR BIOFUELS IN THE EUROPEAN UNION

2.1 The Directive on the use of renewable energy sources establishes sustainability criteria in the form of minimum greenhouse gas emission savings from the use of biofuels (calculated on a life cycle basis) and the methodology how to calculate them. The calculation methodology is based on the methodology developed in the JEC Well-to-Wheels study[1] for the greenhouse gas assessment of fuels. The methodology takes land use and land use change into account, and considers co-products from the production and use of fuels. The proposed default values for certain parameters will be updated and revised on the basis of evolving scientific knowledge. Further, a review is being made to investigate the importance of indirect land use change and how this should be adequately addressed, if this is needed.

2.1.1 The full text of Directive 2009/28/EC on the promotion of the use of energy sources from renewable sources is available in all official EU languages at http://eur-lex.europa.eu (see hyperlink in Annex).

2.1.2 The required greenhouse gas emission savings from the use of biofuels shall be at least 35%. As of 2017 it shall be at least 50%. As of 2018 it shall be at least 60% when produced in installations in which production started after the beginning of 2017.

2.2 For the calculation of the greenhouse gas impact the Directive proposes default values for a selected number of production pathways, where these could be established on the basis of results from scientific work, or requires the calculation of actual values in accordance with the prescribed methodology. The European Commission will update and expand the data as appropriate, taking into account evolving scientific evidence. Where the default value for greenhouse gas emission savings from a production pathway lies below the required minimum level of greenhouse gas emission savings, producers wishing to demonstrate their compliance with this minimum level are required to show that actual emissions from their production process are lower than those that were assumed in the calculation of the default values.

[1] EUCAR, CONCAWE, JRC Well-to-Wheels, first issued 2006, latest update 2008 available on http://ies.jrc.ec.europa.eu/WTW

2.3 The life cycle assessment methodology accounts for land use and land use change to produce biofuels. Biofuels can qualify for the incentives only when it can be guaranteed that they do not originate in biodiverse areas, in areas designated for nature protection purposes or for the protection of rare, threatened or endangered species, or it is certified that the production of the raw material does not interfere with those purposes. The EU Directive defines biodiverse lands which include primary forests, certain grasslands, both temperate and tropical, including highly biodiverse savannahs, steppes, scrublands and prairie. The European Commission will establish appropriate criteria and geographical ranges to define such highly biodiverse grasslands in accordance with the best available scientific evidence and relevant international standards.

2.4 In addition, the Directive's sustainability scheme should promote the use of restored degraded land, and accompanying measures should be introduced to encourage an increased rate of production on land already used for crops, in combination with sustainability requirements in biofuel-consuming countries.

2.5 The change in land use and the intensification can be expected to increase greenhouse gas emissions, but the scale of the increased emissions is very uncertain and controversial. The European Commission is reviewing the impact of indirect land-use change on greenhouse gas emissions and is asked to develop a concrete methodology to minimise greenhouse gas emissions caused by indirect land-use changes.

2.6 In order to make sustainability criteria effective through changes in the behaviour of market actors, sustainable fuels should yield a price premium. This is supported through the mass balance method of verifying compliance. In addition, other verification methods should be reviewed.

2.7 The EU Member States are responsible for the implementation of the 10% target and are currently preparing their national renewable energy action plans which will describe their plans and measures to achieve the 10% target for renewable energies in transport. They will be notified to the European Commission by 30 June 2010.

2.8 In this context, the Member States are encouraged to pursue appropriate forms of cooperation at all levels, bilaterally or multilaterally, within the Community and beyond.

2.9 The incentives provided for in the Directive will encourage increased production of biofuels worldwide. In order to encourage and assure that the production of sustainable fuels respects minimum environmental or social requirements, the Community encourages the development of multilateral and bilateral agreements and voluntary international or national schemes that cover key environmental and social considerations.

2.10 Europe will encourage the development of multilateral and bilateral agreements and voluntary international or national schemes that set standards for the production of sustainable biofuels and bioliquids, and that certify that the production of biofuels and bioliquids meets those standards.

3. INTERNATIONAL DISCUSSIONS ON BIOFUELS AND SUSTAINABILITY CRITERIA

3.1 The International Biofuels Forum (IBF), initiated by Brazil in 2006 is an international discussion forum on promotion of biofuels and includes the USA, India, China, South Africa and the European Commission as members. The Forum has in particular facilitated work between the EU, US and

Brazil for a roadmap towards international technical standards for biofuels (used in road transport), but it has not at a similar level discussed sustainability criteria.

3.2 The Global Bio-energy Partnership (GBEP) is a G8 initiative from 2005 and registered as a UN CSD partnership. Its main goal is to promote a global policy dialogue on bioenergy and facilitate international cooperation. The G8+5 countries are involved in it and more countries have joined. Several UN institutions and other international institutions are a member. The European Commission is an observer since late 2007 and has been invited to join. GBEP has established a Task Force on Greenhouse Gas Methodologies for Bioenergy which has produced a 'Common methodological framework for GHG lifecycle analysis of bioenergy, version zero'. It has also established a Task Force on Bioenergy Sustainability which is discussing concrete sustainability criteria for bioenergy policy.

4. LIFE CYCLE ASSESSMENT

4.1 Since 1997, Life Cycle Assessment (LCA) is an internationally standardised method and management tool (ISO 14040 series). LCA helps quantify the emissions, resources consumed and environmental and health impacts that are associated with products (goods and services). LCAs take into account the product's full life cycle: from the extraction of resources, production, use, and recycling, to the disposal of wastes. Indicators help quantify the contributions to environmental and health impacts such as climate change, smog, acidification, and cancer effects as well as the resources consumed and their scarcity.

4.2 The "European Platform on Life Cycle Assessment"[2] is a project of the European Commission, carried out by the Commission's Joint Research Centre, Institute for Environment and Sustainability (JRC-IES) in collaboration with DG Environment, Directorate for Sustainable Development and Integration. The purpose is to improve credibility, acceptance and practice of LCA in business and public authorities, by providing reference data and recommended methods for LCA studies. Main deliverables are:

- European Reference Life Cycle Database (ELCD) with European scope inventory data sets;
- an internationally coordinated and harmonized International Life Cycle Database (ILCD) Handbook of technical guidance documents for LCA; and
- LCA information hub to ease the access to data and methods and to facilitate knowledge exchange, comprising among others also a global LCA Resources Directory with software, database and service providers.

4.3 In the EU, work continues to update data and to refine the LCA for the calculation of overall energy consumption and environmental and climate change impact of alternative fuels, taking into account the whole supply chain from "well to wheel" or, for aviation from "well to wake".

4.4 Life cycle assessment (LCA) is the widely accepted approach to assess the environmental and climate change impacts and is recommended also for evaluating alternative fuels in aviation. However, methodologies, the modelling approach and data input of different LCA studies may vary

[2] http://lct.jrc.ec.europa.eu/eplca

considerably, leading to different results. Therefore, when comparing different studies and their results, a careful analysis of the methodology and data input is needed, as the differences may render them incomparable.

4.5 Further research is needed with a view to embracing environmental and social sustainability in a holistic approach, in particular regarding factors with considerable degree of variety, uncertainty and interdependencies. Land use and land use change are not the only important considerations as to whether for example a biofuel option will be better or worse than the fossil-based options.

4.6 Water use, agricultural techniques and practices, social impact, the question if parameters are local characteristics or can be aggregated at higher (regional, national etc.) level (geographic representativeness) and in particular the possibility of indirect "knock-on" effects determine the outcome. Other parameters concern the assumptions behind the fuel production process, feedstock characteristics, the calculation methodology, the consideration of different emissions such as NOx or the time horizon considered in the study, just to mention some.

4.7 In addition to certainty about the technical feasibility (as established for certain fuels through fuel standardisation and approval) and the environmental and social sustainability, also the economic dimension of the use of sustainable fuels will need to be considered when preparing roadmaps or policy decisions.

4.8 These issues are all addressed in the monitoring and reporting requirements of the Renewable Energy Directive, which requires the European Commission to report at regular intervals on the positive and negative impacts of biofuels on land use, commodity prices, food security, environmental costs and benefits, security of supply implications, economic impacts and social impacts.

5. CONCLUSIONS

5.1 For the EU, compliance with sustainability criteria is essential for support to biofuels. In order to encourage that the production of biofuels respects minimum environmental and social requirements the EU welcomes the development of multilateral and bilateral agreements and voluntary international or national schemes that cover key environmental and social considerations, that set standards for the production of sustainable biofuels, and that certify that the production of biofuels meets those standards. Sustainability criteria for aviation fuels should be consistent with any general sustainability criteria for biofuels and bioliquids.

5.2 Further research is needed in order to refine the assessment methodologies, in particular to address factors with high uncertainties including indirect "knock-on" effects such as on land and water use, the relationship with food markets, social factors etc. .

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APPENDIX

DIRECTIVE 2009/28/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL OF 23 APRIL 2009 ON THE PROMOTION OF THE USE OF ENERGY FROM RENEWABLE SOURCES AND AMENDING AND SUBSEQUENTLY REPEALING DIRECTIVES 2001/77/EC AND 2003/30/EC

Please see: http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32009L0028:EN:NOT

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