

**THE EU REGIME ON BIOFUELS IN TRANSPORT:
STILL IN SEARCH OF SUSTAINABILITY**

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**THE EU REGIME ON BIOFUELS
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STILL IN SEARCH OF SUSTAINABILITY**

Tania ZGAJEWSKI



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EXECUTIVE SUMMARY

Like other regions of the world, the EU is developing biofuels in the transport sector to reduce oil consumption and mitigate climate change. To promote them, it has adopted favourable legislation since the 2000s. In 2009 it even decided to oblige each Member State to ensure that by 2020 the share of energy coming from renewable sources reached at least 10% of their final consumption of energy in the transport sector. Biofuels are considered the main instrument to reach that percentage since the development of other alternatives (such as hydrogen and electricity) will take much longer than expected.

Meanwhile, these various legislative initiatives have driven the production and consumption of biofuels in the EU. Biofuels accounted for 4.7% of EU transport fuel consumption in 2011. They have also led to trade and investment in biofuels on a global scale.

This large-scale expansion of biofuels has, however, revealed numerous negative impacts. These stem from the fact that first-generation biofuels (i.e., those produced from food crops), of which the most important types are biodiesel and bioethanol, are used almost exclusively to meet the EU's renewable 10% target in transport. Their negative impacts are: socioeconomic (food price rises), legal (land-grabbing), environmental (for instance, water stress and water pollution; soil erosion; reduction of biodiversity), climatic (direct and indirect land-use effects resulting in more greenhouse gas emissions) and public finance issues (subsidies and tax relief).

The extent of such negative impacts depends on how biofuel feedstocks are produced and processed, the scale of production, and in particular, how they influence direct land use change (DLUC) and indirect land use change (ILUC) and the international trade.

These negative impacts have thus provoked mounting debates in recent years, with a particular focus on ILUC. They have forced the EU to re-examine how it deals with biofuels and submit amendments to update its legislation. So far, the EU legislation foresees that only sustainable biofuels (produced in the EU or imported) can be used to meet the 10% target and receive public support; and to that end, mandatory sustainability criteria have been defined. Yet they have a huge flaw. Their measurement of greenhouse gas savings from biofuels does not take into account greenhouse gas emissions resulting from ILUC, which represent a major problem.

The Energy Council of June 2014 agreed to set a limit on the extent to which first-generation biofuels can count towards the 10% target. But this limit appears to be less stringent than the ones made previously by the European Commission and the European Parliament. It also agreed to introduce incentives for the use of advanced

(second- and third-generation) biofuels which would be allowed to count double towards the 10% target. But this again appears extremely modest by comparison with what was previously proposed. Finally, the approach chosen to take into account the greenhouse gas emissions due to ILUC appears more than cautious. The Energy Council agreed that the European Commission will carry out a reporting of ILUC emissions by using provisional estimated factors. A review clause will permit the later adjustment of these ILUC factors.

With such legislative orientations made by the Energy Council, one cannot consider yet that there is a major shift in the EU biofuels policy. Bolder changes would have probably meant risking the collapse of the high-emission conventional biodiesel industry which currently makes up the majority of Europe's biofuel production. The interests of EU farmers would have also been affected.

There is nevertheless a tension between these legislative orientations and the new Commission's proposals beyond 2020. In any case, many uncertainties remain on this issue. As long as solutions have not been found to minimize the important collateral damages provoked by the first generation biofuels, more scientific studies and caution are needed.

Meanwhile, it would be wise to improve alternative paths towards a sustainable transport sector, i.e., stringent emission and energy standards for all vehicles, better public transport systems, automobiles that run on renewable energy other than biofuels, or other alternatives beyond the present imagination.

INTRODUCTION

Globally, transport systems have been built on an over-reliance on non-renewable fossil fuels – in particular, cheap oil.¹ The rise of oil prices and the growing instability of most oil providers have increased the consumer countries' vulnerability to 'oil shocks'. In parallel, the use of fossil fuels such as oil in the transport sector produces almost everywhere growing quantities of greenhouse gas (GHG) emissions that cause global warming. Thus, in an effort to reduce their oil dependency and GHG emissions in the transport sector, many countries around the world² are developing biofuels that are considered a 'cleaner and safer' alternative to oil. The European Union (EU) has also followed this path and has adopted favourable legislation to promote biofuels during the 2000s.

In addition, in 2009 the EU decided to oblige each Member State to ensure that by 2020 the share of energy coming from renewable sources reached at least 10% of the final consumption of energy in the transport sector. Biofuels are the main instrument to reach this percentage since they can be used with no or relatively simple modifications in current internal combustion engines. The other renewable technologies for the transport sector (such as hydrogen or green electricity) have enormous potential too but, unlike biofuels, they are far from attaining large-scale viability and require major changes to vehicle fleets and the fuel distribution system. It has been calculated that their roll-out and completion will probably take more than a decade.³

Meanwhile, thanks to these legislative initiatives, the biofuel industry has benefited from regular growth in the EU. In 2011 Biofuels accounted for 4.7% in EU transport fuel consumption compared to 4.4% in 2010, 3.1% in 2008 and 0.3% in 2001.⁴ The large-scale expansion of biofuels in the EU (and elsewhere in the world) has, however, also had negative impacts. These have provoked mounting debates in recent years. They have forced the EU to re-examine how to deal with biofuels and to submit amendments to update its legislation.

¹ One trend that has emerged since the 1950s concerns the growing share of transportation in the world's total oil consumption: transportation accounts for approximately 25% of world energy demand and for about 61.5% of all the oil used each year. According to the International Energy Agency's (IEA) world energy projections for 2035, 'transport oil demand rises by 25% to reach 59 mb/d, with one third of the increase going to fuel road freight in Asia' (*World Energy Outlook*, 2013).

² United States, Canada, Brazil, China, India, South Africa, Thailand and others.

³ See the AEA Technology plc-led study funded by the European Commission's Directorate-General for Climate Action entitled *EU Transport GHG: Routes to 2050 II. Developing a better understanding of the secondary impacts and key sensitivities for the decarbonisation of the EU's transport sector by 2050*, prepared by Nikolas Hill et al., July 2012, in particular p. vi.

⁴ See *EU energy in figures – Statistical pocket book – 2013*, p. 102. By comparison with these EU figures, biofuels represented 0.8% of global final energy consumption. See *United Nations World Water Development Report 2014*, vol. 1, p. 32. (<http://unesdoc.unesco.org/images/0022/002257/225741E.pdf>).

To understand this sensitive issue, one must first examine the precise definition and categories of biofuels (§ 1) and their benefit and inconveniences (§ 2). A brief summary of the evolution of EU legislation on biofuels will follow (§ 3). This allows a better understanding of the latest legislative proposals to minimize the negative impacts of biofuel production (§ 4). A glimpse of what is done in the research and development sector is also given (§ 5). This paper will not provide a comprehensive analysis of the biofuels issue nor take into account EU trade measures, PAC measures to help EU farmers growing energy crops or efficiency-enhancing measures, which are largely organized at Member States level.⁵

Tania ZGAJEWSKI

⁵ The documents used for this paper stop at the end of May 2014.

§ 1. BIOFUELS: WHAT ARE THEY?

Biofuels can replace petroleum-derived fuels (petrol, diesel, kerosene, bunker fuel) in engines either totally or partially in a blend. They can be used in all modes of transportation (road, maritime and air), with the exception of railways using electrical power.

Biofuels are renewable energy sources. They are liquid or gaseous fuels produced from biomass. Biomass is a biological material derived from living, or recently living organisms. In the context of energy, biomass is often used to mean both plant-based material and animal-derived material as well as their residues or by-products. So the categories of biomass materials can include, for instance, agricultural crops, municipal solid wastes, animal fats, agricultural and forestry by-products. There are several categories of biofuels.

1.1. 'First-generation biofuels' or 'conventional biofuels'

These biofuels are currently commercially available on a large scale and their production is based on agricultural crops that could also be used as food crops. Included in this category are bioethanol and biodiesel, meaning that their production requires large harvesting areas that may compete with other types of land use.

1.2. 'Second-generation biofuels' or 'advanced biofuels'

The production of second-generation biofuels is generally based on non-food crops (such as wastes, residues, etc.). Food crops can only act as second generation biofuels if they have already fulfilled their food purpose (e.g., waste vegetable oil which is no longer fit for human consumption). This category of biofuels is still at an early stage of commercialization, meaning that large-scale availability will take time.

1.3. 'Third-generation biofuels'

This is a recent development which refers to biofuels derived from algae. Previously, algae were categorized as second-generation biofuels. However, when it became apparent that algae are capable of much higher yields with lower resource inputs than other feedstock, many suggested that they be moved to their own category. Algae can produce a diversity of fuels.

The list of fuels that can be derived from algae is impressive (biodiesel, gasoline, methane, ethanol, jet fuel, etc.). Algae has, however, an enormous disadvantage that needs to be resolved. Even when grown in waste water, algae require large amounts

of water, nitrogen and phosphorus to grow. So much in fact that the production of fertilizer to meet the needs of algae used to produce biofuel would produce more GHG emissions than were saved by using algae-based biofuel to begin with. It also means the cost of algae-based biofuel would be much higher than fuel from other sources. This single disadvantage means that the large-scale implementation of algae to produce biofuel will certainly not occur for a long time, if at all.⁶

⁶ To learn more, see <http://biofuel.org.uk/third-generation-biofuels.html>.

§ 2. ADVANTAGES AND INCONVENIENCES

2.1. Advantages

There is a vital difference between biomass and fossil fuels. Biomass takes carbon out of the atmosphere while it is growing⁷ and returns it as it is burned. If it is managed on a sustainable basis, biomass is thought to be able to maintain a closed carbon cycle with no net increase in atmospheric CO² levels. Fossil fuels (such as coal, oil and gas) are also derived from biological material but this biological material absorbed CO² from the atmosphere many millions of years ago. These fossil fuels, which are not renewable, offer higher energy density⁸ than biofuels or electricity, but making use of that energy involves burning the fuel, with the oxidation of the carbon to carbon dioxide and of the hydrogen to water (vapour). Unless they are captured and stored, these combustion by-products are usually released to the atmosphere, returning carbon sequestered millions of years ago and thus contributing to increased atmospheric concentrations.

2.2. Inconveniences

The large-scale development of first-generation biofuels produced for a substantial part in emerging and developing countries from food crops, such as grains, sugar cane and vegetable oil, seems to have engendered a number of negative environmental consequences. The latter need, however, to be treated with caution as they are contested or nuanced. Here are the main ones.

Food price rises

The first consequence of biofuel production becoming a competitor to food production can be food price rises which affect the poorest consumers most.⁹ This impact

⁷ Indeed, biomass is carbon based and is composed of a mixture of organic molecules containing hydrogen, usually including atoms of oxygen, often nitrogen and also small quantities of other atoms. The carbon used to construct biomass is absorbed from the atmosphere as carbon dioxide (CO²) by plant life, using energy from the sun. Plants may be eaten by animals and thus converted into animal biomass.

⁸ Fossil fuels carry enough energy in a small enough space to make them very practical for a number of uses, most importantly transportation. The same cannot be said for many biofuels or for electricity. Feedstock to produce biofuels like corn and soybeans do not produce enough energy per acre to meet current fuel needs without seriously threatening food supply. For this reason, higher density energy crops such as algae and jatropha are being considered. Electricity requires large and cumbersome batteries that generally only provide a fraction of the energy density of fossil fuels.

⁹ See in particular the 2011 report coordinated by FAO and OECD entitled *Price in volatility in food and agricultural markets: policy responses*, notably p.10: (http://www.wto.org/english/news_e/news11_e/igo_10jun11_report_e.pdf). See also the Institute for European Environmental Policy (IEEP) 2012 report entitled *EU biofuel and agricultural commodity prices: a review of the evidence base*, prepared by B. Kretschmer et al., in particular pp. 13-14. See also the article of D. McNair, 'Food prices: reining in volatile markets' published in the *Guardian* on 17 March 2014.

of biofuels on food prices has often, however, been either contested¹⁰ or nuanced,¹¹ depending on the models and approaches used¹² as well as on the type of biofuels produced.¹³

Local suitability

The problem with growing crops to produce biofuels is that they take up land that could be used for food crops. Biofuel crops also need water and in places where water is limited, consumption of water for biofuel crops enters into competition with water needed for food production for local consumption.¹⁴ This is a second negative consequence. In some local areas, food and water shortages have developed as land is taken over for biofuel production.¹⁵ Biofuel production and water scarcity have also been invoked beyond the local level.¹⁶

¹⁰ The opinion of the World Bank concerning the impact of biofuels on food prices seems to fluctuate as time goes by. The World Bank concluded in its 2008 policy research working paper entitled *A note on rising food prices*, no. 4682, pp. 16-17, that subsidized biofuel production (in particular in the United States and the EU) was a major driver of food prices. This opinion was refined by its 2010 policy research working paper *Placing the 2006/2008 commodity price boom into perspective*, no. 5371, in particular p. 2. In this 2010 paper the World Bank suggested that the effect of biofuels on food prices was not as large as originally thought. The use of commodities by financial investors was also partly responsible. More recently, in a 2013 policy research working paper *Long-term drivers of food prices*, no. 6455, in particular p. 3, the World Bank concludes that food price increases are sparked largely by crude oil price jumps, not biofuels.

¹¹ See *Biofuels – OECD-FAO agricultural outlook 2013-2022*, in particular p. 34-35 and 45-47: (http://www.keepeek.com/Digital-Asset-Management/oeed/agriculture-and-food/oeed-fao-agricultural-outlook-2013_agr_outlook-2013-en#page1). This report indicates that biofuels policies are a component of the increase of food prices. By comparison, see the 2013 JRC report *Impacts of the EU biofuel target on agricultural markets and land-use. Modelling assessment with AGLINK-COSIMO (2012 version)* prepared by S. Hélaïne et al. According to this JRC report (pp. 10-12), the impact of the withdrawal of EU policy support for biofuels on world prices would be particularly significant for vegetable oils. The price of food stuffs such as vegetable oils would be much lower in Europe than elsewhere in the world. The other feedstock prices would be at most 5% below the base. This 2013 JRC report has, however, been contradicted by a 2013 Ecofys report (see in particular the summary, p. iii), published almost at the same period entitled *Biofuels and food security – Risks and opportunities*, prepared by C. Hamelinck. On the question of the impact of biofuels on food prices, it is also interesting to compare the 2013 JRC report with the 2013 *European Commission Renewable Energy Report – COM (2013) 175 final*, in particular pp. 11 and 12 as well as a 2012 Ecofys report entitled *Renewable energy progress and biofuels sustainability*, in particular the executive summary (p. vi). The questions for written answers E-009707/12 and E-009708/12 to the Commission by Ramon Tremosa i Balcells (ALDE) (24 October 2012) and the answers given by Mr Ciolos on behalf of the Commission (26 November 2012 and 4 December 2012) (OJEU 25.10.2013, C 310 E/83 and 85) are also worth reading.

¹² To have a better understanding of the different models, see the 2010 JRC report entitled *Impacts of the EU biofuel target on agricultural markets and land-use: a comparative modelling assessment*, prepared by Maria Blanco Fonseca et al. (http://ec.europa.eu/energy/renewables/studies/doc/land_use_change/study_jrc_biofuel_target_iluc.pdf).

¹³ See the article of G. van Kote, published on 9 October 2013 in *Le Monde*, entitled 'Les politiques de soutien aux agrocarburants sont trop rigides' (http://www.lemonde.fr/planete/article/2013/10/09/les-politiques-de-soutien-aux-agrocarburants-sont-trop-rigides_3492650_3244.html).

¹⁴ See the United Nations Human Rights Council's *Note on the impact of the EU biofuels policy on the right to food* dated 23 April 2013 which is very severe towards the EU biofuel policy.

¹⁵ See the 2013 report funded by the EU entitled *Assessing the impact of biofuels production on developing countries from the point of view of policy coherence for development* prepared by Demba Diop et al., in particular pp. 1-2. See also the 2012 and 2013 ActionAid reports entitled respectively *Fuel for thought – Addressing the social impacts of EU biofuels policies* and *Broken promises. The impacts of Addax Bioenergy in Sierra Leone on hunger and livelihoods?*, in particular pp. 7-10.

¹⁶ For instance, see an article entitled 'Biofuel production and water scarcity: A drink-or-drive issue?' published in *ScienceDaily* and dated 11 May 2009 (<http://www.sciencedaily.com/releases/2009/05/090501204627.htm>).

This said, the water-related consequence is particularly worrying when one knows that water demand continues to rise globally (notably for energy production¹⁷) and that the world's freshwater ecosystems have already been significantly degraded due to water overuse and contamination.¹⁸

Land-grabbing

Potential infringements on land rights outside the EU ('land-grabbing') linked to the demand for biofuels, with negative impacts on local communities, have also been reported¹⁹ but the transparency, the availability or the reliability of data on this matter are lacking according to the European Commission.²⁰ It is thus difficult to judge the extent of the problem.

Land-use change

A fourth important consequence is that all biofuels have land-use effects (direct or indirect). Some are more drastic than others for the environment. Two examples follow.

The first example is related to direct land-use change (DLUC) – that is to say, the conversion of land not previously used for crop production into land used for a particular biofuel feedstock production – and to the two main first-generation biofuels: biodiesel and bioethanol. Biodiesel (made from oil crops such as palm oil, rapeseed, soybean, jatropha) causes more GHG emissions than normal diesel and than bioethanol (made from starchy or sugary crops such as sugar cane or sugar beet, wheat, corn).²¹ So the level of GHG emissions produced will depend on the feedstock

¹⁷ See the United Nations' *World Water Report 2014*, vol. 1, in particular p. 2 and chapter 3, 'Energy thirst for water,' beginning on p. 28.

¹⁸ Sarah Hughes, Lena Partzsch, Joanne Gaskell, 'The development of biofuels within the context of the global water crisis', *Sustainable Development Law and Policy*, Spring 2007, pp. 58-77. See also an article by Claire Provost entitled 'Growing global thirst for energy threatens water supplies' published in the *Guardian* on 21 March 2014.

¹⁹ See the United Nations Human Rights Council's *Note on the impact of the EU biofuels policy on the right to food*, dated 23 April 2013 which is very critical of EU biofuel policy. See two articles published in the *Guardian* on 9 November 2012 and on 7 January 2014 respectively entitled 'EU must ensure biofuel producers in Indonesia respect land rights' (<http://www.theguardian.com/global-development/poverty-matters/2012/nov/09/eu-biofuel-indonesia-land-rights>) and 'Honduras and the dirty war fuelled by the west's drive for clean energy' (<http://www.theguardian.com/global/2014/jan/07/honduras-dirty-war-clean-energy-palm-oil-biofuels>).

²⁰ See the 2013 *European Commission Renewable Energy Report – COM (2013) 175 final*, in particular p. 11 as well as the July 2013 Ecofys report, prepared by C. Hamelinck, on land grabs for biofuels driven by EU biofuels policies. This maintained that, according to the biofuel industry, 'there really isn't any, absolutely zero, land-grabbed biofuel being exported to Europe'. See the article published on 29 April 2013 in *EurActiv* entitled 'Biofuels: Who's subsidizing whom?'

²¹ See a 2013 JRC technical report entitled *Well-to-tank report version 4.0 – JEC well-to-wheels analysis*, in particular p. 45. A 2013 JRC study entitled '...'confirms previous findings that fuels made from cereals and sugar crops have much lower carbon emissions than those from vegetable oils such as rapeseed oil, palm oil from Malaysia or soyoil from the Americas. Emissions from one litre of biodiesel made from imported soyoil are equivalent to burning up to two litres of diesel from fossil fuel. According to the *Biofuels – OECD-FAO agricultural outlook 2013-2022*, *op.cit.*, p. 46-47, by 2022 world ethanol production is expected to increase by almost 70% compared to the average for 2010-2012 and global biodiesel production is expected to increase slightly faster. By 2022, biofuel production is projected to consume a significant amount of the total world production of sugar cane (28%), vegetable oils (15%) and coarse grains (12%).

used to produce biofuels. In Europe in particular, this problem seems compounded by the fact that Europe's transport system and political incentives remain thus far in favour of biodiesel. And by 2020, it has also been estimated that the demand for biofuel in the EU will be met by biodiesel rather than bioethanol.²² European farmers have rushed to plant rapeseed to meet the surge in demand for biodiesel but it seems it has become increasingly difficult for them to compete with unsustainable imported palm oil for biodiesel uses, given the low relative price of the latter.²³ The competition between biofuel producers is also strong in Europe. This said, if biodiesel is dirtier than bioethanol, the latter raises grave concerns too, as shown by a quite recent analysis,²⁴ strongly contested by the biofuel industry.²⁵

The second example is related to indirect land-use change (ILUC). Where pasture or agricultural land previously destined for the food, feed and fibre markets is diverted to biofuel production, the non-fuel demand will still need to be satisfied either through intensification of current production or by bringing non-agricultural land into production elsewhere. The latter case represents ILUC and when it involves the conversion of high carbon-stock land (such as forests or grasslands) it can lead to significant GHG emissions.²⁶ Discussions are ongoing to decide on amendments to EU legislation that take account of ILUC while the biofuel industry argues that the science around ILUC is too unclear for lawmaking since there is no scientific consensus to measure them.

²² See confirmation in the IEEP 2011 report entitled *Anticipated indirect land use change associated with expanded use of biofuels and bioliquids in the EU – An analysis of the National Renewable Energy Action Plans*, prepared by C. Bowyer and updated by B. Kretschmer, in particular p. 8. See also a confirmation in the *Biofuels – OECD-FAO agricultural outlook 2013-2022, op.cit.*, p. 47, which indicates that by 2022 the biodiesel markets should be dominated by the EU (major producer and user) and more marginally covered by the United States, Argentina and Brazil.

²³ See the 2013 report of the International Institute for Sustainable Development (IISD) entitled *The EU biofuel policy and palm oil: cutting subsidies or cutting rainforests?* prepared by I. Gerasimchuk and Peng Yam Kohn (https://www.foeurope.org/sites/default/files/publications/iisd_eu_biofuel_policy_palm_oil_september2013_0.pdf). See also Dr. R. Delzeit et al. *Assessing the land use change consequences of European Biofuel policies and its uncertainties*, Review of International Food Policy Research Institute (IFPRI) study, p. 13.

²⁴ See the 2013 report *Understanding the biofuel trade-offs between indirect land-use change, hunger and poverty* prepared by T. Searchinger et al. for Friends of the Earth Europe (http://www.foeurope.org/sites/default/files/press_releases/searchinger_paper_foee_briefing_understanding_biofuel_trade-offs_july2013.pdf). According to this report, ethanol can only succeed in reducing GHG emissions if two things happen: farmers produce exceptionally high yields above and beyond the normal trajectory of yield growth, and/or people reduce their food consumption.

²⁵ See the article dated 10 July 2013 published by *EurActiv* entitled 'Le Parlement s'interroge sur le bien-fondé des biocarburants'. See also the critics of the Global Renewable Fuels Alliance (<http://globalrfa.org/news-media/friends-of-the-earth-and-searchinger-still-wrong-about-biofuels>). In addition, see the 2013 Biomass Research report entitled *Analysing the effect of biofuels expansion on land use in major producing countries*, prepared by J. W. A. Langeveld et al.

²⁶ See the IEEP 2011 report entitled *Anticipated indirect land use change associated with expanded use of biofuels and bioliquids in the EU – An analysis of the National Renewable Energy Action Plans*, prepared by C. Bowyer and updated by B. Kretschmer, in particular p. 2. See also a 2011 JRC report entitled *Critical issues in estimating ILUC emissions. Outcomes of an expert consultation, 9-10 November 2010, ISPRA, Italy*, prepared by L. Marelli et al. See also the EEA report no. 6/2013 entitled *EU bioenergy potential from a resource efficiency perspective*, in particular pp. 22-23. See also the 2013 Joint Research Centre technical report entitled *Carbon accounting of forest bioenergy – Conclusions and recommendations from a critical literature review*, prepared by A. Agostini et al.

In addition to ILUC, other environmental impacts result from biofuel production.

Other negative consequences

The large-scale farming model which is favoured to produce biofuels²⁷ is generally seen as contributing to environmental degradation given its heavy reliance on fertilizers (nutrients are needed for plants to grow); soil erosion and water pollution caused by intensive farming; the consumption of petrol in mechanized farms and the negative impact of monoculture (it is easier to grow a large quantity of a single crop if it is uniform) on biodiversity. These recurring criticisms are related to the cost-effectiveness of biofuels.²⁸ Biofuels are more expensive to produce than fossil fuels and their profitability depends heavily on public support.²⁹ Mandates requiring that a certain percentage of road transport fuels must come from biofuels are also, according to these critics, a powerful market intervention that provides the biofuel industry with important financial benefits in the form of market security.

In the EU, all these reproaches to biofuels have called into question the current EU target of deriving 10% of transport fuel from renewable energy by 2020. Indeed, this target accelerates the use of biofuels when one knows that they will inevitably be the main contributor to meet it since no other convincing alternative exists in the short-

²⁷ This is because economies of scale are essential for biofuel production to be profitable. Biofuel production by smallholders does not seem to be economically viable at present. Involving smallholders in the production of feedstock reduces competitiveness due to the transaction costs involved and to the reduced economies of scale. See A. Einde, *The right to food and the impact of liquid biofuels (agrofuels)*, FAO, 2008, p. 17. See also I. Maltsoğlu and Y. Khwaja, *The BEFS Analysis for Tanzania, 2010*, p. 4.

²⁸ See the abstract of a 2011 paper entitled *Biofuel economics in a setting of multiple objectives and unintended consequences*, prepared by W. K. Jaeger et al., Department of Agricultural and Resource Economics, Oregon State University, pp. 32-34. This analysis raises doubts about biofuels in relation to the specific objectives for which they have been promoted: (<http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/25614/JaegerWilliam.AgResourcesEconomics.BiofuelEconomicsSetting.pdf?sequence=1>). Some doubts are also expressed in the 2012 AEA Technology plc-led study funded by the Commission's Directorate-General for Climate Action entitled *EU Transport GHG: Routes to 2050 II. Developing a better understanding of the secondary impacts and key sensitivities for the decarbonisation of the EU's transport sector by 2050*, prepared by Nikolas Hill et al., July 2012, in particular pp. v to vii. See also a different point of view in a 2013 study entitled *Meeting global temperature targets – the role of bioenergy with carbon capture and storage* prepared by C. Azar et al, in the journal *Environmental Research Letters*, 8, 034004. According to this study, the bioenergy and Carbon Capture and Storage (CCS) method is the most effective way of tackling carbon emissions. However, the combination of bioenergy and CCS would need to be combined with a huge expansion in renewable energy or nuclear power. It should be noted that this study has a general scope and does not deal specifically with the transport sector (http://iopscience.iop.org/1748-9326/8/3/034004/pdf/1748-9326_8_3_034004.pdf).

²⁹ See the 2007 report of the IISD entitled *Biofuels – At what cost? Government support for ethanol and biodiesel in the European Union?* (G. Kutas et al.) updated in 2010 (Anna Jung et al.). These reports found that total transfers in support of biofuels reached €3.7 billion in 2006 and €3.01 billion in 2008. In April 2013, the IISD issued a new report (accompanied, after review of data by Ecofys, by an addendum published in September of the same year) entitled *Biofuels at what cost? A review of costs and benefits of EU biofuel policies*, prepared by C. Charles et al. which found that in 2011 between €5.5 and €6.9 billion of public money subsidized the use of conventional biofuels and a small portion of advanced biofuels development (p. 34). By comparison, the IEA *World Energy Outlook 2012* (p. 235) estimated EU biofuel subsidies to have been at USD 11 billion (€8.4 billion) in 2011. Industry experts have strongly criticized the IISD reports. See notably the article published on 29 April 2013 (updated 30 April 2013) in *EurActiv* and entitled 'Biofuels: Who's subsidizing whom?'

term. However, as already mentioned, in 2011 biofuels had already supplied almost half of the 10% target.³⁰

Additionally, somewhat unexpectedly, the EU strategy has also provoked a substantial rise of biofuels imports: 'When 2012 net imports of liquid biofuels are compared with 2008, net imports have doubled; and increased nearly 10 times since 2005. This trend indicates that import dependency for liquid biofuels could become a genuine concern in the longer term, as is already the case for fossil fuels today.'³¹

³⁰ The *Biofuels – OECD-FAO agricultural outlook 2013-2022, op.cit.*, p. 112, suggests that the EU will remain shy of its objective of 10% renewable fuel in the transport sector by 2020 and assumes that only 7.6% can be reached by 2022 from first-generation biofuels. However, since each consumed unit of second-generation biofuels (whose production will remain very limited) counts double for the purpose of the RES Directive, this percentage should become 8.6% in 2022. This OECD-FAO analysis is confirmed by the recent JRC 2013 report entitled *Impacts of the EU biofuel policy on agricultural markets and land use – Modelling assessment with AGLINK-COSIMO (2012 version)*, elaborated by S. Hélaïne et al. (<http://static.euractiv.com/sites/all/euractiv/files/a%20JRC%20report.pdf>).

³¹ Eurostat, May 2014.

§ 3. THE OLD EU REGIME ON BIOFUELS

3.1. The 2000 Green Paper on the security of energy supply

The 2000 *Green Paper*³² on the security of energy supply raised concerns about Europe's dependence on energy imports. It also underlined the fact that transport was in a precarious situation as it relies heavily on imported oil and this dependence on oil could bring severe risks of social and economic disruption if supplies weaken. It identified indigenous, diversified renewable energy sources as a key component of Europe's energy strategy, with biofuels as an attractive option. It proposed for road transport a 20% substitution of conventional fuels by alternatives such as biofuels, natural gas and hydrogen, by 2020. Favourable fiscal measures were also envisaged to avoid the 20% by 2020 target remaining a dead letter.

3.2. The 2003/30/EC Directive on biofuels and other renewable fuels

In 2003, the EU adopted Directive 2003/30/EC³³ with the objective of boosting both the production and consumption of biofuels and other renewable fuels to replace diesel or petrol (derived from oil) for transport purposes.

Directive 2003/30/EC (also wrongly referred to as the 'Biofuel Directive') did not take up the 20% target proposed in the Green Paper. It only established a *reference value* of a 2% share for biofuels and other renewable fuels in petrol and diesel consumptions in 2005 and 5.75% in 2010 for the EU. Member States had to set their own indicative targets that took account of these European reference values. The national indicative targets set by Member States for 2005 were not ambitious, translating to an EU share of 1.4%. The share achieved was even lower, at 1%.³⁴ In 2007, Member States were due to adopt their national indicative targets for 2010. However, taking into account the low share achieved by Member States in 2005, the European Commission deemed in advance that the 2010 target established by Directive 2003/30/EC would not be achieved.³⁵

³² European Commission 2000 *Green Paper – Towards a European strategy for the security of energy supply* [COM (2000) 769 final].

³³ OJ 2003, L 123/42. This Directive was later amended by Directive 2009/28/EC (OJ 2009, L 140/16). A consolidated version dated 01.04.2010 (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2003L0030:20100401:EN:PDF>).

³⁴ See the *European Commission biofuels progress report* – COM (2006) 845, dated 10.01.2007, p. 6. Because the function of this report was to report on progress up to 2006, it does not cover the states that acceded to the Union in 2007 (Romania and Bulgaria) and in 2013 (Croatia).

³⁵ COM (2006) 848, p. 7. See also COM (2006) 845 dated 10.01.2007, p. 6.

3.3. The 2003/96/EC Directive on energy taxation

To help Member States attain targets, Directive 2003/30/EC was accompanied by Directive 2003/96/EC³⁶ restructuring the Community framework for the taxation of energy products and electricity (also referred to as the 'Energy Taxation Directive'). The latter, currently under legislative revision, makes it possible for Member States to grant tax reductions/exemptions in favour of biofuels, under certain conditions.³⁷ These tax concessions are considered to be state aids, which may not be implemented without prior authorization by the European Commission. The Commission's assessment has the aim of avoiding undue distortions of competition and is based on the Community guidelines on state aid for environmental protection.³⁸ In the meantime, because the link between environmental and energy policy has intensified, these guidelines on state aid for environmental protection have been transformed into environmental and energy aid guidelines (EEAG).³⁹

So in the initial years of biofuels policies, one can say that tax incentives were the main drivers for the growth of biofuels.

³⁶ OJ 2003, L 283/51.

³⁷ On tax reductions/exemptions in favor of biofuel, see the written parliamentary question by Caroline Lucas (Greens/EFA) to the European Commission dated 6 January 2006 and the answer given by Mr Piebalgs dated 16 February 2006 (OJ 2006, C 327, 30.12.2006).

³⁸ OJ 2008, C82/1. See in the guidelines, in particular, point 109, Option 1, c). (http://ec.europa.eu/competition/state_aid/legislation/environmental_aid_issues_paper_en.pdf).

³⁹ Communication from the Commission on guidelines on state aid for environmental protection and energy 2014-2020 [Brussels, xxx – C(2014)2322]. These guidelines were adopted on 9 April 2014. They have applied since July 2014 and will remain applicable until 31 December 2020. They can be found on the following website: http://ec.europa.eu/competition/sectors/energy/eeag_en.pdf.

§ 4. THE CURRENT REGIME ON BIOFUELS

4.1. 2006 EU comprehensive strategy for biofuels

The disappointing results mentioned above led the European Commission to adopt in 2006 a comprehensive strategy for developing the biofuels sector.⁴⁰ In this strategy, the Commission defined the role that biofuels processed from biomass (a renewable source) may play in the future as an alternative fuel for transport, alongside other alternatives such as liquid natural gas (LNG), compressed natural gas (CNG), liquefied petroleum gas (LPG) and hydrogen. It also proposed measures to promote the production and use of biofuels. This strategy complemented the Biomass Action Plan⁴¹ adopted at the end of 2005. It responded to a threefold objective: (a) further promotion of biofuels in the EU and in developing countries; (b) preparation for the large-scale use of biofuels; and (c) exploration of the opportunities for developing countries – including those affected by the reform of the EU sugar regime at that time – in the production of biofuel feedstocks and biofuels as well as definition of a cooperation with developing countries in the sustainable production of biofuels.

This 2006 strategy was followed by a 2007 Commission communication entitled *Renewable Energy Roadmap – Renewable energies in the 21st century: building a more sustainable future*.⁴² This 2007 communication proposed the imposition of legally binding minimum targets for biofuels in transport which would be fixed for 2020 at 10% of overall consumption of petrol and diesel in transport.⁴³ This led to the endorsement by the March 2007 European Council of a 10% binding minimum target to be achieved by all Member States for the share of biofuels in overall EU transport petrol and diesel consumption by 2020.⁴⁴ It also stated that the binding character of the biofuel target was appropriate as far as the production was sustainable, second-generation biofuels were commercially available and Directive 98/70/EC relating to the quality of petrol and diesel fuels was amended to allow for adequate levels of blending.

The March 2008 European Council insisted in addition that it was essential to develop and fulfill sustainability criteria for the production of biofuels and reiterated the necessity to ensure the commercial availability of second generation biofuels. It also requested that the Energy Taxation Directive was brought more closely into line with the EU's energy and climate change objectives.⁴⁵ The June 2008 European

⁴⁰ COM(2006) 34.

⁴¹ COM (2005) 628.

⁴² COM (2006) 848.

⁴³ COM (2006) 848, p. 10.

⁴⁴ Brussels European Council of 8-9 March 2007, Presidency Conclusions [doc. 7224/1/07 REV 1 of 2 May 2007, p. 21].

⁴⁵ Brussels European Council of 13-14 March 2008, Presidency Conclusions [doc. 7652/1/08 REV 1 of 20 May 2008, pp. 13 and 15].

Council repeated this message in a slightly different way, announcing not a reversal, but a softening of what had been said previously. It was important to ensure the sustainability of the biofuel policies, by setting sustainability criteria for the production of *first-generation biofuels* and by *encouraging* the development of the second-generation biofuels. It also subtly underlined the need to rapidly assess the possible impacts of biofuels production on agricultural food products and to take action, if necessary, to address shortcomings. It also stated that further assessment should be made of the environmental and social consequences of the production and consumption of biofuels, both within the EU and beyond it.⁴⁶ Legislative proposals followed.

4.2. Directive 2009/28/EC (the ‘Renewable Energies or RES Directive’)

4.2.1. Main rules on biofuels

In 2009, the EU adopted Directive 2009/28/EC⁴⁷ on the promotion of the use of energy from renewable sources (the ‘Renewable Directive’). It was part of the Climate/Energy Package, which repealed Directive 2003/30/EC with effect from 1 January 2012.

Directive 2009/28/EC⁴⁸ obliges each Member State to ensure that the share of energy from renewable sources (thus not exclusively biofuels) in transport in 2020 is *at least* 10% of its final consumption of energy in transport. However, due to current technological and regulatory constraints that prevent the commercial use of biofuels in aviation, partial exemption is foreseen for some Member States which have a large share of aviation in their gross final consumption. The fulfillment of this 10% target is supported in each Member State by the forecast of a National Renewable Energy Action Plan (NREAP).

This Directive also establishes the rules to be applied to biofuels consumed in the EU.⁴⁹ Only sustainable biofuels (produced within the EU or imported from outside the EU) can be used to meet the national target and only such biofuels can receive national public support like, for example, tax relief. To that end, mandatory sustainability criteria are defined by the Directive.⁵⁰ Without entering into all the finer details, the criteria are outlined as follows.

⁴⁶ Brussels European Council of 19-20 June 2008, Presidency Conclusions [doc. 11018/1/08 REV 1 of 17 July 2008, p. 8].

⁴⁷ OJ 2009, L 140/16-62. This Directive repealed with effect from 1 January 2012 Directive 2003/30/EC on the promotion of the use of biofuels or other renewable fuels for transport (OJ 2003, L 123/42).

⁴⁸ OJ 2009, L 140/16-62.

⁴⁹ Article 3(4), al. 1 of Directive 2009/28/EC.

⁵⁰ Article 17 of Directive 2009/28/EC.

First, biofuels must save at least 35% of GHG emissions compared to the conventional fossil fuels they replace and this threshold will rise to 50% from 2017 and from 2018 to 60%, but only for installations in which biofuel production started on or after 1 January 2017.⁵¹ These green safeguards, however, only cover direct land-use change. The methods for evaluating the savings are determined in the Directive itself; notably, default values for GHG savings are used.⁵² Second, there are types of land that should certainly not be used for biofuel production: land of high biodiversity value, high carbon stocks or peatlands. Third, if biofuels emanate from agricultural raw materials cultivated in the EU, their production must comply with EU environmental requirements on agricultural production and social requirements. The verification of these sustainability criteria by economic operators is also described in the Directive.⁵³ In brief, the latter have to demonstrate that the sustainability criteria have been fulfilled and to do that they are obliged to use a 'mass balance system'.⁵⁴ For their part, Member States must take measures to ensure that economic operators submit reliable information and make available the data that were used to develop the information when requested.

The conclusion by the EU of 'bilateral or multilateral agreements with third countries containing provisions on sustainability criteria that correspond to those of Directive 2009/28/EC' is also envisaged by the Directive.⁵⁵ The European Commission may then decide whether those agreements demonstrate that biofuels produced from raw materials cultivated in those countries comply with the sustainability criteria in question. It must be anticipated that the conclusion of such agreements on the conditions imposed by the EU may raise important questions in the framework of the WTO.⁵⁶

Moreover, the Commission may decide that voluntary national or international schemes setting standards for the production of biomass products or measuring GHG emission savings contain accurate data, provided that the scheme in question meets adequate standards of reliability, transparency and independent auditing.⁵⁷ When an economic operator provides proof or data obtained in accordance with a scheme that has been subject to a Commission decision, a Member State cannot require the

⁵¹ According to Article 23(8), a), of RES Directive, the Commission must present by 31 December 2014 a review of the minimum GHG emission saving thresholds to apply from the date referred.

⁵² Article 19 and different Annexes of Directive 2009/28/EC. In particular, Part A of Annex V contains default values for GHG savings for different fuel production pathways. On the subject of default values, see the report under reference COM (2010) 427 final.

⁵³ Article 18 of Directive 2009/28/EC.

⁵⁴ See the report of Jasper van de Staij et al. (ECOFYS) dated 30 November 2012 concerning an analysis of the operation of the mass balance system and alternatives.

⁵⁵ Article 18(4), of Directive 2009/28/EC.

⁵⁶ See S. Switzer and J. McMahon, *EU biofuels policy – Raising the question of WTO compatibility* (April 30 2010). UCD working papers in law, criminology & socio-legal studies research paper no. 26/2010. More recently, see the new WTO complaint on EU biodiesels policies by Argentina: (<http://ictsd.org/i/news/biores/164643/>).

⁵⁷ Article 18(4), (2) of Directive 2009/28/EC.

supplier to provide further evidence of compliance with the sustainability criteria nor other data.⁵⁸ Currently, there are 14 recognized voluntary schemes.⁵⁹ Finally, a specific provision for energy from biofuels in transport requires that when the percentage of biofuels, blended with mineral oil derivatives, exceeds 10% by volume, Member States have to require that this is indicated at sales points.⁶⁰

4.2.2. Implementation measures

A 2010 European Commission communication⁶¹ sets out in a non binding way how Member States and economic operators can implement the sustainability criteria and the Renewable Energy Directive's counting rules for biofuels. It is designed to assist Member States and facilitate a consistent implementation of the sustainability criteria. It is accompanied by another communication on voluntary schemes and default values in the EU biofuels and bioliquids sustainability scheme,⁶² and also by Decision 2010/335/EU⁶³ establishing guidelines for the calculation of land carbon stocks for the purpose of Annex V to Directive 2009/28/EC.

Commission Decision 2011/13/EU concerned certain types of information about biofuels and bioliquids to be submitted by economic operators to Member States and was also adopted in 2011.⁶⁴

4.2.3. Monitoring

The monitoring on biofuels is based on scores of reports that the European Commission must submit regularly to the Council and the European Parliament.⁶⁵ Among all these reports, one presents particular importance. As already indicated above, the sustainability criteria include minimum GHG emission savings. So far these savings only count direct GHG emissions. The GHG emissions associated with indirect changes in land use (ILUC) are not taken into account. For that reason, Directive 2009/28/EC invites the Commission to submit a report reviewing the impact of ILUC on GHG emissions and, if appropriate, to propose ways to minimize it while respecting existing investments made in biofuels production.⁶⁶ The report complying with this invitation was submitted by the Commission in December 2010.⁶⁷ This report: (i) identifies a number of uncertainties and limitations associated with the

⁵⁸ Article 18(7), of Directive 2009/28/EC.

⁵⁹ See the 2013 ValBiom report entitled *Modification de la législation UE sur les biocarburants: conséquences pratiques et opportunités pour la Région wallonne*, in particular p. 9 and Annex I.

⁶⁰ Article 21(1), of Directive 2009/28/EC.

⁶¹ OJ 2010, C-160/8-16.

⁶² OJ 2010, C 160/1-7.

⁶³ OJ 2010, L 151/19-41.

⁶⁴ OJ 2011, L 9/11-12.

⁶⁵ See, for instance, Article 17(7); Article 18(2); Article 18(9); Article 19(4-6); Article 23(1) of RES Directive.

⁶⁶ Article 19(6), of Directive 2009/28/EC.

⁶⁷ COM (2010) 811.

economic models used to estimate ILUC; (ii) acknowledges that the impact of ILUC can reduce GHG emissions savings associated with biofuels; and (iii) indicates that if action is required, ILUC should be addressed under a precautionary approach. This report also proposed 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 Directive 2009/28/EC and Directive 98/70/EC.

In the wake of this report, a legislative proposal⁶⁸ accompanied by an impact assessment⁶⁹ was tabled in 2012 by the Commission to bring amendments to Directive 2009/28/EC but also to Directive 98/70/EC.

4.3. Directive 98/70/EC (the ‘Fuel Quality Directive’)

In 2009 Directive 98/70/EC⁷⁰ was also amended. It requires fuel suppliers to reduce by at least 6% by 31 December 2020⁷¹ (compared to 2010 levels) the GHG intensity⁷² of fuels used in road transport and non-road mobile machinery.⁷³ The blending of biofuels is one of the methods available for fossil fuel suppliers to reduce GHG intensity. So sustainability criteria similar to those foreseen in Directive 2009/28/EC are also set out for biofuels in the Directive.⁷⁴ Notably, life-cycle GHG emission saving from the use of biofuels must reach at least 35%. From 2017, this percentage will rise to at least 50% and from 2018 to at least 60%, but only for installations in which biofuel production started on or after 1 January 2017. This Directive has been under legislative revision since 2012, as mentioned above.

4.4. Directive 2003/96/EC (the ‘Taxation Directive’)

Directive 2003/96/EC continues to be applied but has been under legislative revision since 2011 (see point 3.3).⁷⁵

⁶⁸ COM(2012) 595 final.

⁶⁹ SWD(2012) 343 final. This impact assessment relies mainly on the work by the IFPRI: a March 2010 report entitled *Global trade and environmental impact study of the EU biofuels mandate*, prepared by P. Al-Riffai, B. Dimaranan and D. Laborde. This report was updated in October 2011 by D. Laborde and renamed *Assessing the land-use change consequences of the European biofuel policies*.

⁷⁰ OJ 1998, L 350/58. This Directive was amended several times. See last consolidated version of 22.06.2011 (<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:1998L0070:20110622:EN:PDF>).

⁷¹ This 6% reduction by 2020 is accompanied by indicative intermediate targets: 2% in 2014 and 4% in 2017.

⁷² The GHG intensity of fuels is calculated on a life-cycle basis, meaning that the emissions from the extraction, processing and distribution of fuels are included.

⁷³ Article 7a(2a) of Fuel Quality Directive. Member States may require this reduction to comply with the following intermediate targets: 2% by 31 December 2014 and 4% by 31 December 2017.

⁷⁴ Article 7b of Fuel Quality Directive.

⁷⁵ COM(2011) 169/3.

4.5. The European advanced biofuels flightpath

In aviation, advanced biofuels are the only low-CO² option to replace kerosene. The compatibility of bio-kerosene with today's planes has been proven. Cost, however, has to become competitive. The launch in 2011 of the Flightpath 2050⁷⁶ initiative aims to reduce CO² emissions by 75% and nitrogen oxide (NOx) emissions by 90%. The action is scheduled to have 2 million tons of sustainable biofuels used in the EU civil aviation sector by the year 2020.

This said, an overview, not an analysis, of the use of biofuels in commercial aviation can be found in a September 2012 International Energy Agency Bioenergy report.⁷⁷ According to this report, the International Air Transport Association (IATA) predicts commercial aviation will grow annually by 5% until 2030. This implies that fuel consumption and emissions will continue to rise. To answer these challenges but also achieve a carbon neutral growth, the IATA sees biofuels as one of the best short- and medium-term options. The question is obviously this: can the aviation sector continue its expansion and meet carbon goals without putting aviation's carbon burden on other sectors, which include some already under pressure to curb carbon emissions? Indeed, so far the aviation sector has been more difficult to decarbonize than other sectors of the economy. It has also cleverly used the global nature of the problem to avoid action by arguing that one cannot act nationally or regionally because one will just displace the planes and airports elsewhere. In 2012 it also refused the EU plans to place a tax on flights in and out of Europe, putting the EU ETS on pause. However, at the latest round of negotiations at the International Civil Aviation Organization (ICAO), an in-principle deal with the EU to put a carbon price on global aviation by 2020 was agreed. Although it is an encouraging sign, success on this front is still not guaranteed. Work has just begun to prepare a global agreement. In the meantime, aviation's climate impact will continue to grow.

⁷⁶ *Flightpath 2050, Europe's vision for aviation*. Report of the High Level Group on aviation research. Luxembourg: Publications Office of the European Union, 2011.

⁷⁷ 'The potential role of biofuels in commercial air transport – Biojetfuel', September 2012 (<http://www.bioenergytrade.org/downloads/T40-Biojetfuel-Report-Sept2012.pdf>).

§ 5. THE FUTURE REGIME ON BIOFUELS

5.1. The proposal to amend Directives 2009/28/EC and 98/70/EC

In 2012 a legislative proposal was tabled by the European Commission to bring amendments to Directives 2009/28/EC⁷⁸ and 98/70/EC (see points 2.2. and 4.2). As explained, these amendments result from a 2010 report (see point 4.2 above), which acknowledges the importance of addressing ILUC given that the entire biofuel production of 2020 is expected to come mainly from crops grown on land that could be used to satisfy food and feed markets.

Scientific work, forecasts of biofuel demand provided by Member States and estimates of ILUC emissions for different biofuel feedstocks show that it is likely that GHG emissions linked to ILUC are significant and can negate some or all of the GHG savings of individual biofuels. The aim of the proposal is thus to prepare the transition to biofuels that deliver substantial GHG savings and minimize ILUC impacts in the period to 2020. The main changes of the Commission's proposal were as follows.

Where Directive 2009/28/EC is concerned

- Limit the contribution that conventional biofuels (with a risk of ILUC emissions) make towards attainment by Member States of their 10% target. In this perspective, it is proposed that the share of energy from biofuels produced from cereal and other starch-rich crops, sugar and oil crops be limited to 5% (the estimated share at the end of 2011) of their final consumption of energy in transport in 2020.⁷⁹
- Modify the GHG saving thresholds. For biofuels produced in installations in operation on or before 1 July 2014, the minimum GHG saving achieved must be of at least 35% until the end of 2017 and of at least 50% from 2018 on. For biofuels produced in installations starting operation after 1 July 2014, the minimum GHG saving achieved must be at least 60%.⁸⁰

Where Directive 98/70 is concerned

- Improve the reporting of GHG emissions by obliging fuel suppliers to report the estimated ILUC emissions of biofuels annually to the Commission.⁸¹

⁷⁸ COM (2012) 595 final and COM (2012) 595 final/2. The proposal was strongly criticized by the European Economic and Social Committee. See its opinion on the proposal for a Directive of the European Parliament and the Council amending Directive 98/70/EC concerning the quality of petrol and diesel fuels and amending Directive 2009/28/EC concerning the promotion of the use of energy from renewable sources [doc. TEN/502 Indirect land-use change (ILUC) biofuels dated 17 April 2013].

⁷⁹ Article 2(2), (b) and (c), ii of the legislative proposal – COM (2012) 595 final/2.

⁸⁰ Article 2(5) of the legislative proposal – COM (2012) 595 final/2.

⁸¹ Article 1(1), (a) of the legislative proposal – COM (2012) 595 final/2.

- Modify the GHG saving thresholds. For biofuels produced in installations in operation on or before 1 July 2014, the minimum GHG saving achieved must be of at least 35% until the end of 2017 and of at least 50% from 2018 on. For biofuels produced in installations starting operation after 1 July 2014, the minimum GHG saving achieved must be at least 60%.⁸²

The amendments to Directives 2009/28/EC and 98/70/EC contained in the legislative proposal also encouraged a greater market penetration of advanced (low-ILUC) biofuels⁸³ by allowing such fuels to contribute more to Member States' target than conventional biofuels.⁸⁴ They also adapted both Directives to the entry into force of the Treaty on the Functioning of the EU (TFEU), notably the conferral of powers to the European Commission to adopt acts in accordance with Articles 290 and 291 of the TFEU. Finally, the legislative proposal also aimed to protect existing investments until 2020. It did not take a position on the need for financial support for biofuels before 2020. However, the Commission was of the view that after 2020 food-based biofuels should not be subsidized.⁸⁵

The Commission's legislative proposal was submitted to the Environment, Public Health and Food Safety (ENVI) and Industry, Research and Energy (ITRE) Committees of the Parliament. They decided in July 2013 to set the cap for first-generation biofuels at a higher percentage (5.5% for ENVI⁸⁶ and 6.5% for ITRE⁸⁷) than the one proposed by the Commission. In addition, ENVI called for the inclusion of ILUC factors to estimate the indirect emissions of first generation biofuels while ITRE recommended ILUC factors not be included until the methodology for measuring indirect emissions was more reliable.

In September 2013, at first reading, the European Parliament in plenary reached the following compromise:⁸⁸

⁸² Article 1(2), (a) of the legislative proposal – COM (2012) 595 final/2.

⁸³ Biofuels defined as 'advanced' by the Commission are liquid fuels, including those manufactured from biogenic rubbish/waste or algae.

⁸⁴ Article 1(3), (a), '6 and Article 2(7), (c) of the legislative proposal – COM (2012) 595 final/2.

⁸⁵ Article 3 of the legislative proposal – COM (2012) final/2 to be read in combination with point 2 in fine of its explanatory memorandum (p. 3).

⁸⁶ Report on the 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 dated (A7-0279/2013 dated 26.07.2013), in particular, Amendment 81, p. 59.

⁸⁷ Opinion on the 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 (2012/0288(COD) dated 04.07.2013), in particular recital 9, p. 10.

⁸⁸ See the European Parliament legislative resolution of 11 September 2013 on the 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, which can be found on the following website: <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P7-TA-2013-0357+0+DOC+XML+V0//EN&language=EN>

1. Adoption of a 6% cap for first-generation biofuels to meet the mandate of a 10% target for energy in transport by 2020.
2. Insertion of a sub-target which aims to ensure that in a Member State the share of energy from renewable sources in petrol in 2020 be at least 7.5% of its final consumption of energy in petrol.⁸⁹
3. Insertion of a specific target of at least 2.5% for second-generation biofuels to meet the overall 10% target for energy in transport by 2020.⁹⁰
4. For the first time, insertion of the ILUC issue into EU legislation while taking due account of the need to protect investments already made.^{91 92}
5. Insertion of a provision stressing that the biofuels taken into account shall not be made from land-based raw material unless third-parties' legal rights regarding use and tenure of the land are respected, inter alia by obtaining the free prior and informed consent of the third parties, with the involvement of their representative institutions.⁹³
6. Slight reinforcement of the provisions concerning, on the one hand, the conclusion of bilateral or multilateral agreements with third countries and, on the other hand, the voluntary schemes.⁹⁴

In December 2013, the Transport, Telecommunications and Energy Council was unable to adopt a common position, despite the fact that the Lithuanian presidency had proposed an agreement to raise the threshold of the first-generation biofuels to 7%. Therefore the Council's preparatory bodies continued to work further on the proposal with a view to facilitating a political agreement. Finally, in June 2014, the Council reached a political agreement.⁹⁵ It caps the amount of first-generation biofuels that can be counted toward meeting the EU's 10% renewable energy target for transport at 7% (as proposed previously by the Lithuanian presidency) whereas the Commission had proposed 5% and the European Parliament had voted for 6%. To encourage the move to advanced biofuels, it inserts a 0.5% sub-target to be set at national level. Member States can however set a lower sub-target under certain circumstances. Needless to say that this is less stringent than what was proposed by the Parliament in its compromise. Double counting to reach targets is also authorized for advanced biofuels in view to enhance their deployment and market penetration. The political agreement on ILUC is not ambitious either. Indeed, it only foresees a reporting of ILUC emissions to be carried out by the Commission on the basis of data reported by Member States. For that purpose, provisional estimated ILUC factors are included in new Annexes to the RES and Fuel Quality Directives. A review clause that

⁸⁹ Amendment 152/rev of the legislative resolution.

⁹⁰ Amendment 152/rev of the legislative resolution.

⁹¹ Amendment 60 of the legislative resolution.

⁹² Amendments 106 and 107 of the legislative resolution.

⁹³ Amendment 49 of the legislative resolution.

⁹⁴ Amendments 55 and 100 to 103 of the legislative resolution.

⁹⁵ Document of the Council of the European Union of 13 June 2014 [doc. 7550/14 – PRESSE 138].

includes the possibility of introducing adjusted estimated ILUC factors into the sustainability criteria has also been introduced. To finish, the political agreement establishes exceptions where food and feed crop-based biofuels are little or not associated with ILUC risks (low-ILUC risk biofuels) and reinforces provisions related to voluntary schemes.

The issue will be considered by the newly elected Parliament in Autumn. It is not certain that this Parliament follows the position adopted before by its predecessor.

5.2. Proposal to amend Directive 2003/96/EC

In 2011 a legislative proposal was tabled to amend the energy taxation Directive in order to align it more closely with EU energy and climate change objectives as requested by the March 2008 European Council.⁹⁶ The proposal notably revised the minimum level of taxation to reflect CO₂ emissions and energy content (including biofuels which do not respect the sustainability criteria). The proposal has been discussed in the Council's working party on tax questions on several occasions under different EU presidencies. Several compromise proposals were presented. Since then, the debate in Council has continued.⁹⁷

5.3. 2013 alternative fuels strategy

In 2013, the European Commission published a communication entitled *Clean power for transport: a European alternative fuels strategy*.⁹⁸ This strategy is thus also linked to the EU policy on biofuels. It advocates support for sustainable advanced biofuels produced from lignocellulosic feedstocks and wastes, as well as algae and microorganisms. It recommends ending public support for first generation biofuels produced from food crops after 2020. In its proposal for a 2030 climate and energy framework, the Commission also insisted that 'Food-based biofuels should not receive public support after 2020.'⁹⁹ To a certain extent, the new guidelines¹⁰⁰ introduced in 2014 on state aid for renewable energy (including biofuels) already implement this recommendation.

⁹⁶ COM (2011) 169/3 (http://ec.europa.eu/taxation_customs/resources/documents/taxation/com_2011_169_en.pdf).

⁹⁷ To have a state of play on the proposal, see the EU Council doc. 10825/13, FISC 124, ENER 283, ENV 553 dated 12 June 2013 (<http://register.consilium.europa.eu/pdf/en/13/st10/st10825.en13.pdf>). The latest text of the proposal under discussion and its addendum can be found under two EU Council documents, both dated 9 July 2013: EU council doc. 12037/13, FISC 144, ENER 352, ENV 679 and EU council doc. 12037/13 ADD 1, FISC 144, ENER 352, ENV 679. See also Council's document of 20 September 2013 11420/13 ADD 1 REV 1, PV/ CONS 34, ECOFIN 620.

⁹⁸ COM (2013) 17.

⁹⁹ COM (2014) 15, pp. 6 to 7.

5.4. The new EU climate and energy strategy post-2020

In January 2014, the European Commission proposed a new strategy linking climate and energy after 2020.¹⁰¹ In a nutshell, this new proposed strategy reflects the growing doubts about the 2008 one. This document in fact constitutes a strong indictment of the previous EU orientations.

Firstly, the Commission proposes to abandon the establishment of any new target in that field: ‘The Commission does not think it appropriate to establish new targets for renewable energy or the greenhouse gas intensity of fuels used in the transport sector or any other sub-sector after 2020. The assessment of how to minimise indirect land-use change emissions made clear that first generation biofuels have a limited role in decarbonising the transport sector.’

Secondly, it considers that ‘food-based biofuels should not receive public support after 2020.’ This has been confirmed, as already indicated, by the adoption of the Commission’s guidelines on state aid for environmental protection and energy 2014-2020.

Thirdly, according to this document,

‘an improved biomass policy will also be necessary to maximize the resource efficient use of biomass in order to deliver robust and verifiable greenhouse gas savings and to allow for fair competition between the various uses of biomass resources in the construction sector, paper and pulp industries and biochemical and energy production. This should also encompass the sustainable use of land, the sustainable management of forests in line with the EU’s forest strategy and address indirect land use effects as with biofuels.’

This should help inhibit the biofuels’ collateral consequences on land use.

¹⁰⁰ Communication from the Commission on guidelines on state aid for environmental protection and energy 2014-2020 – C(2014) 2322 (http://ec.europa.eu/competition/sectors/energy/eeag_en.pdf). In the communication, see point 3.3. ‘Aid to energy from renewables’ and in particular:

(112) In view of the overcapacity in the food-based biofuel market, the Commission will consider that investment aid in new and existing capacity for food-based biofuel is not justified. However, investment aid to convert food-based biofuel plants into advanced biofuel plants is allowed to cover the costs of such conversion. Other than in this particular case, investment aid to biofuels can only be granted in favour of advanced biofuels.

(113) Whilst investment aid to support food-based biofuel will cease with the entry into force of these Guidelines, operating aid to food-based biofuels can only be granted until 2020. Therefore such aid can only be granted to plants that started operation before 31 December 2013 until the plant is fully depreciated but in any event no later than 2020.

(114) In addition, the Commission will consider that the aid does not increase the level of environmental protection and can therefore not be found compatible with the internal market if the aid is granted for biofuels which are subject to a supply or blending obligation, unless a Member State can demonstrate that the aid is limited to sustainable biofuels that are too expensive to come on the market with a supply or blending obligation only.’

¹⁰¹ COM (2014) 15, pp. 6-7.

As some have rightly concluded:

‘in essence this amounts to the wholesale scrapping of the current policy framework leading to biofuel promotion at EU level. Given the controversies, major political difficulties and pressure placed on the Commission from governments and others regarding these policies, it is perhaps not surprising that a retreat in this area might be desired. Some aspects of it are clearly to be welcomed. With the loss of the current framework, however, there would be critical gaps in terms of the future regulation of low carbon transport fuels and the promotion of those biofuels that can make a genuine contribution towards decarbonising the EU transport sector.’¹⁰²

¹⁰² IEEP, *Re-examining EU biofuels policy: a 2030 perspective*, 2014, p. 5-6.

§ 6. SUPPORTING RESEARCH AND DEVELOPMENT

The EU tries to foster research and development activities in the biofuels field via various initiatives. Firstly, until the end of 2013, the Seventh Programme for Research and Technological Development gave priority to biofuel research to further strengthen the competitiveness of the EU biofuel industry. This program is now replaced by Horizon 2020, the new EU's Programme for Research and Innovation and several calls for advanced biofuels have already been launched. Secondly, the industry-led European Biofuels Technology Platform (EBTP) aims to provide and implement a common European vision and strategy for the production and use of biofuels, in particular for transport applications. Other relevant activities include support for the market introduction and dissemination of proven biofuel technologies through the Intelligent Energy Europe programme (part of the Competitiveness and Innovation Framework Programme) or international cooperation with developed and developing countries to further exploit mutual benefits and technology transfer. Additional Funding also comes from the New Entrance Reserve (NER) 300 Programme.

In 2013, the European Commission published a communication on energy technologies and innovation.¹⁰³ The aim is to update the existing Strategic Energy Technology Plan (SET-Plan). The SET-Plan technologies also focuses on bioenergy (bioethanol, biodiesel and biogas). The financing needs for the development of bioenergy was estimated at €9 billion. The new plan should be financed through Horizon 2020 and other sources such as the European Investment Bank and the Connecting Europe Facility. Funding should also come from the Member States and the private sector.

¹⁰³ COM(2013) 253 and SWD (2013) 157.

CONCLUSION

The EU has devoted numerous texts to biofuels. It began to pay serious attention to biofuels with a view to reducing its dependency on imported oil and GHG emissions in 2001, when the European Commission brought forward the legislative proposals that were adopted in 2003 in the form of the Biofuels Directive and the Energy Taxation Directive. However, targets at that time were only indicative and thus not binding for Member States.

Since 2009, a new EU legislative framework on biofuels is applicable. The main features of this framework are the following:

1. Combination of domestic biofuel production with imports.
2. Use at EU and national level of mandatory targets of at least 10% as well as sustainability criteria to limit direct land use change (and thus ineffective to avoid ILUC) that biofuels consumed in the EU have to comply with – and higher levels of biofuel in blends than before.
3. Use of tax reductions/exemptions for biofuel to compensate the lack of competitiveness towards fossil fuels – albeit that the lack of progress on the adoption by the Council of the new legal framework on the subject is problematic, since the scope to use tax incentives would expire by 2020 under the current legal framework and biofuels which do not respect sustainability criteria can benefit from the reductions/exemptions.
4. Improvements of the means to support research and development.

This EU policy has driven the production and consumption of biofuels in the EU. It has also led to trade and investment in biofuels on a global scale. Now, however, the EU institutions want to change the established rules in the wake of a series of studies and reports that have caused controversy over the negative consequences of biofuel production at local or global levels. One main negative consequence is the fact that many biofuels are NOT carbon neutral as they are subsidized to help with decarbonization (even if they reduce the external dependency in oil). Some are less sustainable than others when direct land-use factors are considered. That is why it is important that policies encourage the uptake of the ‘right’ types of biofuel. Another important negative consequence is related to the potential impact that ILUC could have on the GHG benefits of using biofuels in transport.

In order to mitigate these negative consequences, the EU institutions do not intend to diminish the initial 10% target in transport. First generation biofuels produced mainly from food and feed crops remain the key means to reach this percentage, even if there is a desire to cap their contribution at 7% and progressively reduce subsidies. The promotion of advanced biofuels – whose commercialization at large scale still depends for most of them on technological advances and on the possibility

to consume them – appears to the EU institutions to be the surest way to make biofuels credible. This is confirmed by the new April 2014 state aid guidelines for environmental protection and energy as well as by the different research and innovation programmes which currently favour them. Yet, the latest Council’s political agreement is extremely modest where advanced biofuels are concerned (maybe because that is an industry that is only just beginning).

There also seems to be a tension between the Council’s political agreement and the Commission’s proposals beyond 2020. With the present Council orientations, the EU could take the risk, if progress is not rapid enough, of maintaining a dependence on agricultural commodities for a large part of biofuel production. In addition, this risk-taking is compounded by the very cautious approach proposed so far to take into account the GHG emissions due to ILUC. Yet the prevention of the negative impacts due to ILUC appears to be a key element in preserving a low-carbon footprint. Sustainability criteria are not touched upon, though they only cover certain dimensions of the various environmental and socioeconomic impacts raised. Additionally, they seem to have only a marginal effect, probably due so far to a weak monitoring performance. As a whole, these proposed legislative changes thus remain modest. They cannot yet be considered as a major reorientation of EU biofuels policy. On the other hand, bolder changes may risk the collapse of the high-emission conventional biodiesel industry, which makes up the majority of Europe’s biofuel production. The interests of EU farmers would have also been affected.

In any case, the results of the numerous studies and reports allow some uncertainties to remain about biofuels which could lead to underestimations of their potential negative impact. This is particularly worrying if biofuel use is to increase by an order of magnitude beyond today’s levels and if biofuels are also used for applications other than transport (electricity, heat, materials and chemicals). These remaining uncertainties indicate that much work remains to be done and that the EU biofuel strategy should not focus exclusively on transport only but should be positioned in a broader context.

To conclude, there is a need for further studies, and more caution, for as long as the proposed solutions have not been found to minimize the important collateral damages provoked by the first generation of biofuels. Otherwise this could make it much more difficult to backtrack in the future, should that be required, and also more costly. Meanwhile, it would be wise to improve alternative paths towards a sustainable transport industry, i.e., stringent emission and energy standards for all automobiles, better public transport systems, cars that run on renewable energy other than biofuels, or other alternatives beyond the present imagination.