



CHATHAM HOUSE

Chatham House, 10 St James's Square, London SW1Y 4LE

T: +44 (0)20 7957 5700 E: contact@chathamhouse.org

F: +44 (0)20 7957 5710 www.chathamhouse.org

Charity Registration Number: 208223

Energy, Environment and Resources EER PP 2013/04

Biofuel Policies and Feedstock in the EU

Ivetta Gerasimchuk

Global Subsidies Initiative of the International Institute for Sustainable Development

November 2013

Published in partnership with



Meridian Institute

Connecting People to Solve Problems

The views expressed in this document are the sole responsibility of the author(s) and do not necessarily reflect the view of Chatham House, its staff, associates or Council. Chatham House is independent and owes no allegiance to any government or to any political body. It does not take institutional positions on policy issues. This document is issued on the understanding that if any extract is used, the author(s)/ speaker(s) and Chatham House should be credited, preferably with the date of the publication or details of the event. Where this document refers to or reports statements made by speakers at an event every effort has been made to provide a fair representation of their views and opinions, but the ultimate responsibility for accuracy lies with this document's author(s). The published text of speeches and presentations may differ from delivery.

INTRODUCTION

The biofuel sector has a fundamental distinction from other sectors consuming agricultural commodities in terms of sustainability of supply chains. In the EU, United States and many countries governments created the biofuel sector artificially less than a decade ago. These political decisions resulted in additional and growing demand for feedstock.

Thus, for biofuels, the discussion is not about 'greening' the existing demand and supply chains, but about creating new adequate supply of sustainable feedstock that will not undermine, environmentally or socially, production and use of agricultural commodities in other sectors. To meet this goal, biofuel policies have to cross-cut through a complex of issues related to energy, agriculture, regional development and environment protection.

This paper was prepared for the workshop on 'US and EU policy options for trade in agricultural commodities: building on the expertise of the forest sector', jointly hosted by Chatham House and the Meridian Institute in Washington DC on 24 and 25 September 2013.

WHY BIOFUELS?

Biofuels are substitutes for fossil motor fuels and can, with no or relatively simple modifications, be used in engines of the existing transport fleet.¹ The key objectives of why governments decided to encourage increased use of biofuels in transport, according to the underlying legislation (e.g. the Energy Independence and Security Act of 2007 in the United States and the EU Renewable Energy Directive of 2009), are:

- improving energy security through diversification of energy sources;
- environmental sustainability, via abatement of greenhouse gas emissions and air pollution from fossil fuels; and
- regional economic development, particularly in rural areas.

Additionally, stimulation of innovation and reduction of trade deficits through cutting import of fossil fuels can also be referred to as desired benefits of biofuels' development.

There are two main types of biofuels used in road transport: ethanol (sometimes called 'bioethanol') that can be blended with or used instead of gasoline and biodiesel that can be a substitute for diesel. There is a debate on how to classify biofuels depending on whether technology maturity, greenhouse gas (GHG) emission balance or the feedstock is used to guide the distinction. The International Energy Agency (IEA) divides all biofuels into 'conventional' and 'advanced', other sources use terms such as 'first, second, third generation' of biofuels.

¹ The paper considers liquid biofuels used as motor fuels only.

EU LEGAL FRAMEWORK FOR BIOFUELS

The cornerstones of the EU legislation promoting the use of biofuels in member states are the Renewable Energy Directive (RED –Directive 2009/28/EC) and the Fuel Quality Directive (FQD – Directive 2009/30/EC, 2009). The RED establishes the target of 10 per cent of energy in road transport coming from renewable sources in each of the member states by 2020. At the current level of energy technologies' maturity 'renewable energy in road transport' is mostly synonymous with biofuels, though the term includes other energy types such as hydrogen or electricity from renewable sources.

The FQD requires that all fuel suppliers (oil companies) must meet a six per cent cut in GHG emissions by 2020 across all fuel categories supplied to the market. This is designed to be consistent with the 10 per cent use of biofuels and will tend to move demand toward biofuels with higher GHG savings).² In addition, the FQD limits ethanol blends to 10 per cent or less when ethanol is used as an oxygenate. Fuel specifications for biodiesel place limits on the palm oil and soy oil content of biodiesel.

Biofuels, whether imported or produced within the EU, have to meet the Sustainability Criteria to be taken into account for the emission reductions targets.

- On the life cycle basis, and excluding indirect land-use change effects (see below), the eligible biofuels' use should result in a reduction of GHG emissions of at least 35 per cent compared to fossil fuels. From 2017, the reduction has to be 50 per cent, and at least 60 per cent for new installations. Thus, different biofuel feedstock types perform differently with respect to this benchmark, as illustrated in Table 1.
- Feedstock cannot be grown on land with high biodiversity value such as primary forests and highly biodiverse grasslands, or land with high carbon stocks such as wetlands, peatland or continuously forested areas.
- Feedstock has to be produced in compliance with certain other environmental criteria for soil, water, air quality, and social standards such as adherence to conventions of the International Labour Organization.
- Second-generation biofuels receive double credit. This means that biofuels made out of ligno-cellulosic, non-food cellulosic, waste and residue materials will count double towards the goal. Calculations are made on an energy basis.

The EU member states have employed various national-level subsidies to achieve these percentage targets, including tax incentives (exemptions from excise and pollution taxes, corporate tax breaks for biofuel producers) and support through blending mandates..³ Mandates act in the same way as other subsidy forms, driving up market clearing prices and setting the demand floor, thereby improving the competitiveness of otherwise unviable biofuel producers.⁴ Using the price-gap approach, the International Energy Agency estimated the value of biofuel subsidies in the EU in 2011 at €8.4 billion (\$11 billion), with the bulk of these subsidies going to biodiesel.⁵ Using the bottom-up inventory method, the International Institute for Sustainable Development (IISD) estimates the value of the government support to biofuels in the EU in the same year to be within the range of €5,5 billion to €6,9 billion.⁶

² US Department of Agriculture, 2013.

³ Gerasimchuk, Bridle, Beaton, & Charles, 2012.

⁴ Koplou, 2009.

⁵ IEA, 2012.

⁶ IISD - GSI, 2013. For more on IISD–GSI's extensive work on biofuel subsidies, both in the EU and globally, please consult <http://www.iisd.org/gsi/biofuel-subsidies>.

Table 1: GHG Savings Associated with Selected Biofuel Feedstock According to Directive 2009/28/EC (Indirect Land Use Change Effects Excluded)

Type of biofuel	Typical* GHG savings	Default** GHG savings
Rapeseed biodiesel	45%	38 %
Soybean biodiesel	40%	31%
Palm oil biodiesel (Process not specified)	36%	19%
Palm oil biodiesel (Process with methane capture at oil mill)	62%	56%
Corn ethanol, Community produced (natural gas as process fuel in CHP plant)	56%	49%
Sugar beet ethanol	61%	52%
Sugar cane ethanol	71%	71%
Waste vegetable or animal oil biodiesel	88%	83%

Source: Directive 2009/28/EC, Annex V.
 * Implies an estimate of the representative GHG emission saving for a particular biofuel production pathway.
 ** Implies a value derived from a typical value by the application of the pre-determined factors and that may, in circumstances specified in this Directive, be used in place of an actual value. If biofuels have been certified by one of the means provided by the Commission, it is possible to claim the default value without supporting documentation. It is also possible to claim higher GHG savings with additional supporting documentation.

Each member state is required to ensure the application of the biofuel Sustainability Criteria on its territory to biofuels produced in the EU and imported. This is ensured by certification schemes recognized by the European Commission. As of the summer 2013, there have been 13 such schemes: International Sustainability and Carbon Certification (ISCC), Bonsucro EU, Roundtable on Responsible Soy EU RED (RTRS EU RED), Roundtable on Sustainable Biomaterials EU RED (RSB EU RED), Biomass Biofuels Voluntary Scheme (2Bvs), Abengoa RED Bioenergy Sustainability Assurance (RBSA), Greenergy Brazilian Bioethanol verification programme, Ensus (for bioethanol), Red Tractor (for combinable crops and sugar beet), Scottish Quality Farm Assured Combinable Crops (SQC), Red Cert, NTA 8080, and Roundtable for Sustainable Palm Oil RED (RSPO RED).⁷

In October 2012 the commission proposed to revise the EU legislation regulating biofuels in view of the mounting criticism of low efficacy in meeting the stated objectives of current policies and of the unintended effects resulting from stimulated demand for biofuels in the EU.⁸

Before discussing the commission's proposal and reactions to it by different stakeholder groups, and proceeding to recommendations, it is important to take a closer look at the implications of the current EU biofuel policies as they have been described above.

⁷ US Department of Agriculture, 2013.

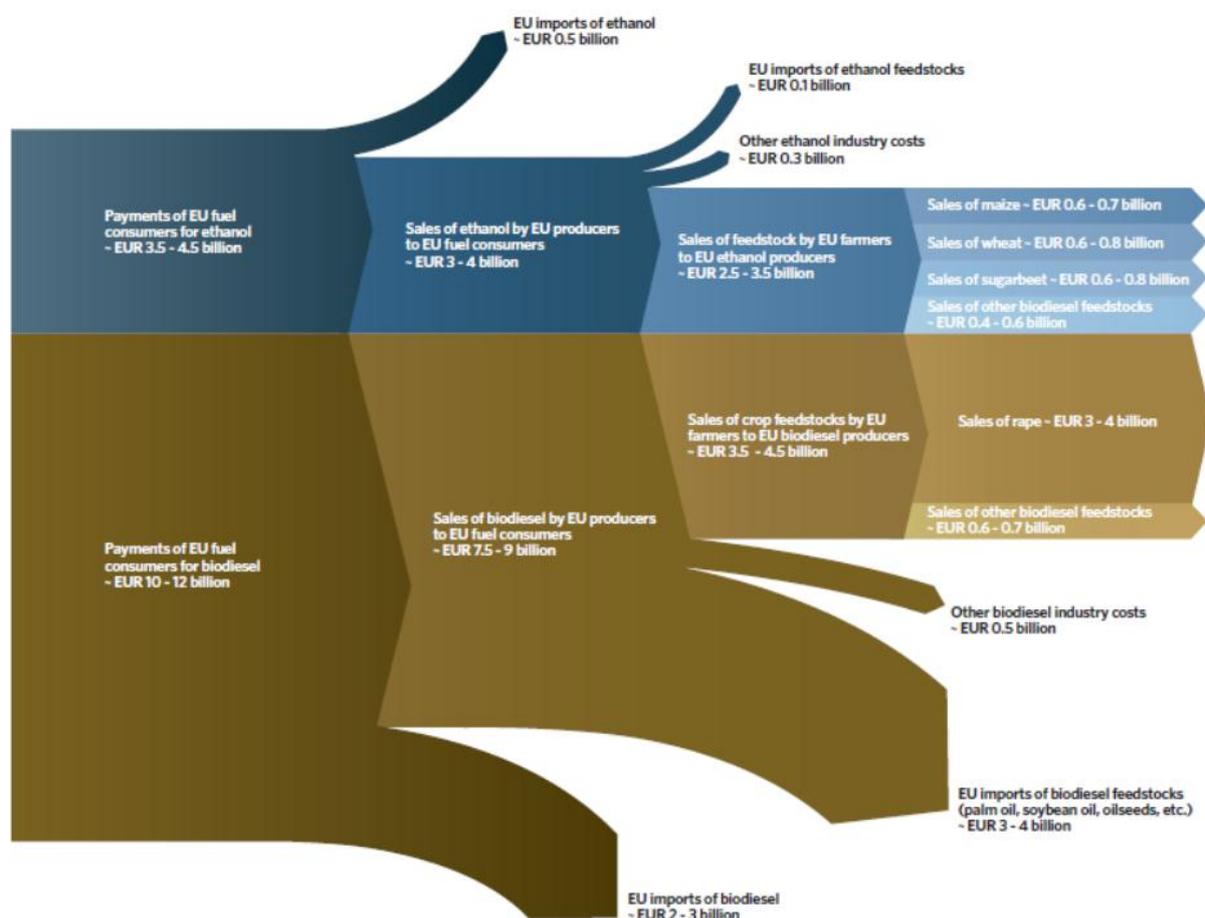
⁸ Proposal for a directive of the European Parliament and of the Council amending Directive 98/70/EC, 2012.

ORIGIN OF FEEDSTOCK UNDERLYING THE EU BIOFUEL CONSUMPTION

In 2010 the EU agricultural commodity production covered around 80 per cent of its feedstock needs for ethanol, but only around 60 per cent of its feedstock needs for diesel, according to the modelling officially prepared for the European Commission.⁹ To understand the importance of biofuel feedstock import for the EU it is also important to bear in mind that biodiesel is the main biofuel for road transport in the EU, accounting for about 70 per cent of the biofuels market on volume basis in 2012.¹⁰

There are two avenues for foreign feedstock to underlie consumption of biofuels in the EU: import of ready-made biofuels, and import of feedstock for biofuels made in the EU. Figure 1 shows these avenues by setting out cash flows associated with market turnover for biofuels and feedstock in the EU.

Figure 1: Biofuel-Related Cash Flows in the EU in 2011–12. All Values on Annual Basis within an Estimated Range



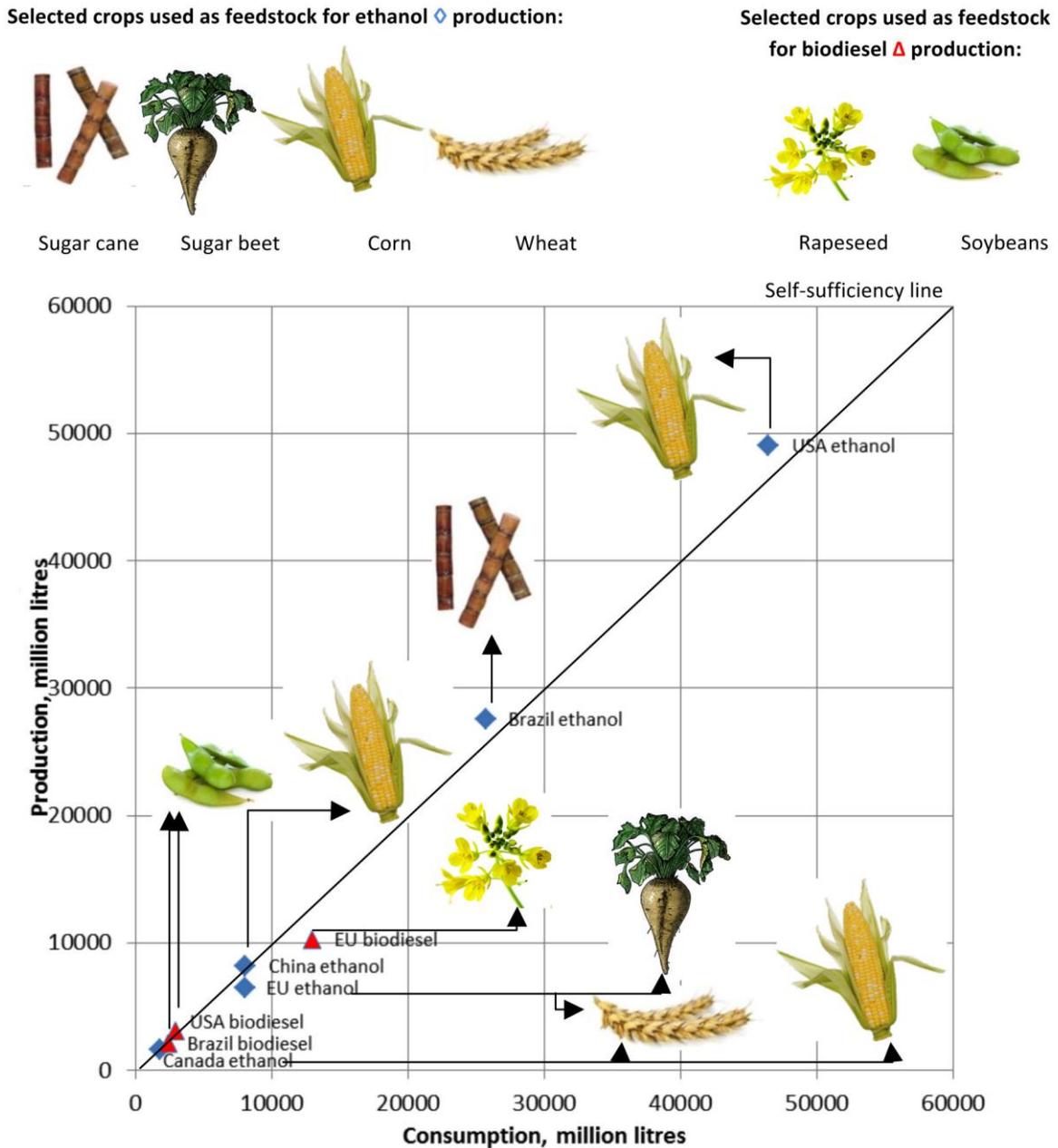
Source: Charles, Gerasimchuk, Bridle, Moerenhout, Asmelash, & Laan, 2013, p. 21.

9 Ecofys et al., 2013. There are significant discrepancies among different sources (Eurostat and European Commission, industry associations, FAOSTAT, national statistics of countries exporting to the EU) with respect to trade flows underlying consumption of biofuels in the EU. The discrepancies may be explained by different approaches to accounting for third-party trade in feedstock and biofuels (re-export and re-import), inconsistencies in application of the Harmonized Trade Schedule codes, as well as differences in methodology (bottom-up reporting from industry versus customs statistics).

10 US Department of Agriculture, 2013.

Figure 2 shows the state of play on biofuels' production and consumption in major markets, based on data from the UN Food and Agriculture Organization (FAO), and indicating the basis for trade in biofuels among them (i.e. how much data points deviate from the self-sufficiency line).

Figure 2: Biofuels' Principle Feedstock, Production and Consumption in Selected Economies in 2010.



Source: IISD–GSI visualization of data from OECD/FAO, 2012; F.O. Licht, 2012.

However, the trade flows are much more complex when it comes to biofuel feedstock. Tables 2 and 3 present the results of the modelling of these to determine the ultimate origin of feedstock underlying the EU biofuel consumption, i.e. consumption of biofuels produced in the EU using EU-grown feedstock, biofuels produced in the EU using imported feedstock and biofuels fully imported to the EU.

Table 2: Ultimate Origin of Feedstock Underlying the EU Consumption of Biodiesel in 2010, Kilotonnes of Oil Equivalent

	Rapeseed	Soybean	Palm oil	Sunflower seed	Tallow	RVO	Other	Total
EU	4,098	87	5	444	159	1,182	3	5,977
Argentina		1,191						1,191
Indonesia			814					814
Brazil		417			1			419
Canada	212	44			13	22		292
Ukraine	252	14						266
US	7	221			12	5		245
Malaysia			212					212
Paraguay	3	185						188
Russia	80	45						124
China		1				67		67
Other	99	14	13			1		126
Total	4,751	2,220	1,043	444	184	1,276	3	9,922

Source: Ecofys et al., 2013.

The principal feedstock for biodiesel grown in the EU is rapeseed. Initially, EU rapeseed production increased to meet the new demand from the biofuels industry, from 16 million tonnes in 2006 to 21.4 million tonnes at its maximum in 2009.¹¹ However, since this increase (and despite the quickly increasing prices for rapeseed), European production has remained stable and is forecast to remain at the same level – ‘within the range of 19 to 21 million tonnes per year – ‘in 2014–15.¹² Further, to keep up with the demand from the biofuels industry, the EU increased its rapeseed import from 0.7 million tonnes in 2006 to 2.7 million tonnes in 2011.¹³

¹¹ FEDIOL, 2012.

¹² FEDIOL, 2012; European Commission, 2013.

¹³ FEDIOL, 2012.

Table 3. Ultimate Origin of Feedstock Underlying the EU Consumption of Ethanol in 2010, Kilotonnes of Oil Equivalent

	Wheat	Maize	Barley	Rye	Triticale	Sugar beet	Wine	Sugar cane	Other	Total
EU	581	344	58	81	20	733	101		33	1,951
Brazil		8						234		242
USA	2	122								124
Peru								26		26
Switzerland	25									25
Bolivia								20		20
Ukraine	6	7				2				15
Egypt								15		15
Guatemala								14		14
Argentina		2						5		7
Cuba								6		6
Other	10	7						16	2	34
Total	623	490	58	81	20	735	101	336	35	2,480

Source: Ecofys et al., 2013.

Some industry experts have suggested that ‘there is not enough acreage in the EU to raise production sufficiently to satisfy requirements for oilseeds and products, grains and other agricultural commodities’.¹⁴ However, it has also been argued that ‘although it would be agronomically possible to grow all the feedstock needed to reach the policy goals domestically, the E[uropean] C[ommission] believes that 30 per cent of the feedstock and biofuels will have to be imported to reduce price pressures on EU feedstock’.¹⁵

Therefore, import of biofuel feedstock in the EU is set to grow under a business-as-usual scenario. In particular, a recent IISD-GSI study has used the Oil World dataset to show that palm oil consumption in the EU biodiesel sector may be much higher than previously thought, despite the Sustainability Criteria listing palm oil as the least preferred feedstock for biodiesel. The EU biofuels industry has increased its use of palm oil almost five-fold over 2006–12, from 0.4 to 1.9 million tonnes per year. Further, the Oil World data are consistent with a unit increase in biodiesel production corresponding to a 0.11 unit increase in palm consumption in the EU biodiesel sector. In other words, for every extra tonne of biodiesel produced in the EU in 2006–12, there was an increase of 110 kilos of palm oil consumed as biodiesel feedstock. It has to be noted, however, that biodiesel production actually decreased in 2010, and, though it increased in 2011 and 2012, it still did not return to its 2009 peak. Palm oil consumption in the biofuel sector in Europe steadily increased over the observed period.¹⁶

If there is no policy change and this trend persists, by 2020 the EU biodiesel sector will consume around 2.6–2.7 million tonnes of palm oil, or 40 per cent more than in 2012. Additionally, under a business-as-usual scenario, the EU will also increase imports of biodiesel, a significant share of which is based on palm oil.¹⁷

¹⁴ Mielke, 2013.

¹⁵ U.S. Department of Agriculture, 2012, p. 2.

¹⁶ Gerasimchuk & Koh, 2013.

¹⁷ Gerasimchuk & Koh, 2013.

UNINTENDED EFFECTS OF THE EU INCREASING IMPORT OF BIOFUEL FEEDSTOCK

The EU biofuel policy has been criticized for low efficacy in meeting its stated objectives¹⁸ but this discussion is outside the scope of the present paper. From the point of view of sustainability of soft commodity supply chains, it is more important to focus on the unintended effects of the EU biofuel policies.

The adverse effects of these policies include the impacts of the stimulated demand for biofuels on the level and volatility of agricultural commodity prices¹⁹, carbon dioxide emissions derived from indirect land-use change caused by expansion of demand for biofuel feedstocks²⁰ and potential infringements on land rights outside the EU (so-called 'land grabbing').²¹

The indirect land-use change (ILUC) presents arguably the most difficult challenge to policy-makers who seek to exclude unsustainable feedstock from the EU biofuel market. The difficulty lies with the fact that certifications and other sustainability requirements do not address this challenge. Even if biofuel companies procure feedstock certified as 'sustainable,' they may be diverting it from other uses where it will be replaced by commodities produced in an unsustainable way. This is particularly the case with vegetable oils used as feedstocks for biodiesel, because the cheapest substitute for vegetable oils, including palm oil, certified as 'sustainable', is non-certified palm oil. In this sense, palm oil acts as a 'marginal oil' on the market (see Box 1).

Demand for palm oil from established certified plantations may be leading to expansion of other palm oil plantations onto forested land. Alternatively, a palm oil company may plant palm trees on agricultural land that was used to grow other crops, but since the demand for these original crops remains, they may be planted on new land formerly under forest. The latter ILUC observation is also an argument that applies to all vegetable oils, including rapeseed oil, used as feedstock for biodiesel production in the EU.²²

Box 1: Why palm oil acts as a 'marginal oil'

There are two interrelated reasons why palm oil can act as a 'marginal' vegetable oil in Europe and in the rest of the world. First, it is increasingly available on the world market due to increasing production area and the high yields of oil palm. According to the FAO, on average, land planted with palm oil produces five to 10 times more oil per hectare (including palm kernel oil) than any other vegetable crop: 3.41 metric tonnes per hectare for palm oil, compared with just 0.68 metric tonnes for rapeseed and 0.36 tonnes for soy. Further, compared to soybean or rapeseed oil, palm oil derives a much larger share of its value from the oil, as opposed to the oilmeal used as animal feed. Thus, when demand for fats and oils increases independently of additional demand for livestock, that imbalance will favour increased production of palm oil to address the shortfall.*

Second, and as a result of its increasing production and availability, palm oil has been by far the cheapest vegetable oil on the world market. For instance, in July 2013 a tonne of palm oil was 27 per cent cheaper than a tonne of rapeseed or soybean oil **

* Martin, 2013

** IMF (n.d.)

18 Doornbosch & Steenblik, 2007.

19 FAO et al, 2011.

20 Laborde, 2011.

21 Kelly, 2012.

22 Laborde, 2011; Malins, 2013.

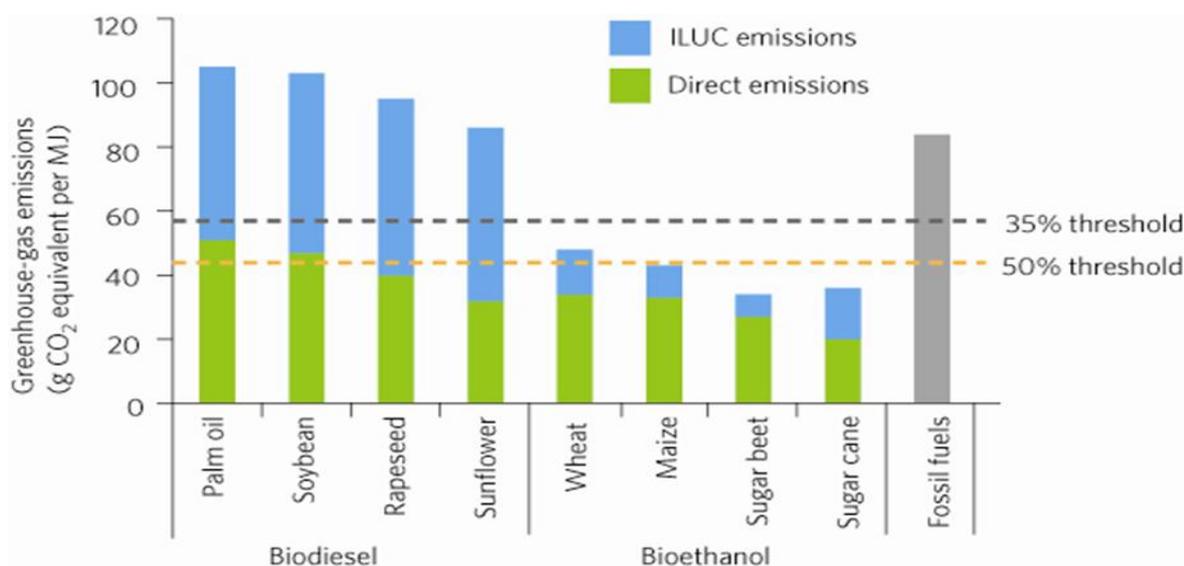
PROPOSED MEASURES TO ADDRESS THE BIOFUEL SUSTAINABILITY CHALLENGES IN THE EU

On 17 October 2012 the European Commission made a legislative proposal to amend the Renewable Energy Directive and the Fuel Quality Directive. The objective was to reduce the contribution of food-based biofuels towards the EU target of renewable energy in transport by 2020 to five per cent from the current 10 per cent target.²³ The proposal also includes an increase of the minimum GHG saving threshold for new installations to 60 per cent as of July 1, 2014 as well as including ILUC factors in the reporting by fuel suppliers and member states.

On 11 September 2013 the European Parliament voted on the proposal following heated discussions. The result of the vote mean that there will be a second reading, and the existing legislation will remain active at least until after European parliamentary elections in May 2014. The parliamentarians have voted in favour of moving the target to six per cent (instead of the proposed five per cent) and introducing the ILUC reporting, but further changes may be introduced at later stages of the legislative process.²⁴

Introducing ILUC considerations into estimates of GHG savings can turn the tables for many biofuel feedstocks. Figure 3 below shows that all conventional biodiesel feedstocks fail to meet the RED GHG saving criteria if emissions associated with ILUC are added to direct emissions – they exceed both the 50 per cent and 35 per cent threshold lines. In Figure 3, the estimates of emissions caused by ILUC come from the modelling work of the International Food Policy Research Institute²⁵ and are not the only ones available, thus subject to heated discussions on the accuracy of modelling. For instance, the European biofuel industry has commissioned its own modelling of ILUC impacts, and came with much higher estimates of GHG savings.²⁶ Overall, the biofuel industry has argued that the science around ILUC is not mature enough to serve as a basis for policymaking.

Figure 3: Estimated Direct Emissions and Emissions Associated with ILUC for Selected Biofuel Feedstocks



Source: von Renssen, 2011.

²³ Proposal for a directive of the European Parliament and of the Council amending Directive 98/70/EC, 2012.

²⁴ European Parliament, 2013.

²⁵ Laborde, 2011.

²⁶ European Biodiesel Board, 2013.

CONCLUSION

The European Commission and the European Parliament are in the process of trying to incorporate the ILUC considerations into the biofuel sector legislation. The commission is also in the process of updating and refining the Sustainability Criteria for biofuels. But as these frameworks and regulations become increasingly complicated, so does their enforcement. More loopholes may emerge, for instance, through mixing or re-labelling of 'conventional' feedstock as 'advanced'.

A more direct, although also politically more challenging way to deal with the issue is phasing out government support to conventional biofuels through blending mandates and other subsidies. Development of biofuels, especially conventional biofuels, is not the only way of achieving the stated policy objectives of RED (GHG emissions reduction, innovation, rural development, and energy security). In particular, removing subsidies to fossil fuels and making their price reflect the social cost of carbon will similarly promote GHG emissions reductions and energy security. The avenues to achieve the stated objectives of the EU biofuel policies are further set out in Table 4.

There are a number of steps to which government should commit and that, if implemented, will help promote more sustainable biofuel policies.

- **Raising the political profile of economic, environmental and social costs and benefits of biofuels.** The remaining uncertainty about the exact mechanics of adverse effects of biofuel expansion should not serve as an excuse for inaction by governments and other stakeholders with respect to addressing these negative impacts. Projected climate change impacts, combined with a growing world population, mean policy-makers must act to ensure cohesion between energy and agricultural markets.
- **Reporting annually the value of subsidies granted to conventional and advanced biofuels in a detailed and consistent manner.** Reporting can be based on the existing reporting tools, such as the OECD template for producer and consumer support estimates.
- **Abstaining from introducing new forms of government support to conventional biofuels.**
- **Establishing and implementing a plan for phasing out national policies that support consumption or production of biofuels that compete with food uses for the same feedstock crops or/and have negative impacts on the environment.**

In the meantime, the discussions around the EU biofuel policies may offer valuable insights for sustainability policies with respect to other agricultural commodities. Lessons learned include:

- The need to **improve aggregation of trade data** through enforcement of the Harmonized System codes' application whereby origin of feedstock can be reported by importers and exporters as cargo crosses the national border.
- **Debate itself may have a positive impact.** Even though application of sustainability certifications and other regulations is complicated, the debate around them and ILUC has been very important to raise awareness and encourage long term-oriented policy making. Same may apply to other agricultural commodities.
- **ILUC exists for many products based on agricultural commodities, not just for biofuels.** Both non-certified and certified products may have ILUC. It is possible to develop, even if just for research and debate purposes, a set of ILUC factors for relevant goods, preferably using the same categories as described in the Harmonized System codes'. This exercise can draw on ILUC codes for different types of biofuels currently examined by the EU policy-makers.
- It is important to **focus on a small number of goods with potential for high-impact initiatives**, e.g. consider ILUC factors and sustainability policies for animal feed. For instance, oil meals and dried distiller grains with solubles (DDGS) can be of particular

interest as they account for a significant share of demand for agricultural commodities. In the meantime, both oil meals and DDGS are often co-products of biofuel processing, hence there may be considerable spillovers with existing biofuel certifications and regulations.

Table 4: First- And Second-Best Options to Meet Selected Policy Objectives and the Role of Biofuel Policies among these Options

	Is there a market failure in resource allocation?	What can be the first-best approach, based on the free international market?	What can be the second-best approach (government interventions)?
Reduction of greenhouse gas emissions and air pollution	Yes, market prices do not reflect these negative environmental externalities.	 <ul style="list-style-type: none"> • Phase out support to fossil fuels; • Internalize negative externalities through an effective cap-and-trade or carbon tax 	 <ul style="list-style-type: none"> • Support a mix of low-carbon policies such as climate-friendly biofuels and renewable energy sources, fuel-efficiency, electric cars, public transport, etc. or purchase emission reductions internationally • Case for support specifically to climate-friendly biofuels for uses where there are fewer alternatives to liquid fuels
Stimulation of innovations	There is both academic and practical debate whether or not there is a market failure, but overall government support for R&D is considered to be legitimate given that private R&D is generally less than optimal.	 <ul style="list-style-type: none"> • Phase out support to mature technologies and industries, including conventional biofuels; • Improve conditions under which innovators can internalize positive externalities resulting from their work 	 <ul style="list-style-type: none"> • Support a mix of innovations and infant industries • Case for support to specific cases is complicated as it is difficult for governments to 'pick the right winners,' e.g., choose between specific advanced biofuels and specific advanced public transport solutions
Agricultural and rural development	Generally there is no market failure, although there are exceptions that are accounted for by the WTO rules.	 <ul style="list-style-type: none"> • Regular government functions, including compliance with WTO rules 	
Diversification from oil as the base for liquid fuels in the interests of energy security	No, the market prices for oil have an upward trend, reflecting their depletion.	 <ul style="list-style-type: none"> • Regular government functions, including Improving transparency over the remaining fossil fuels reserves 	

Source: Gerasimchuk, Bridle, Charles, & Moerenhout, 2012.

BIBLIOGRAPHY

Charles, C., Gerasimchuk, I., Bridle, R., Moerenhout, T., Asmelash, E., & Laan, T. (2013). *Biofuels – At What Cost? A review of costs and benefits of EU biofuel policies*. Geneva: IISD-GSI.

Directive 2009/28/EC. (2009). 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. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32009L0028:EN:NOT>

Directive 2009/30/EC (2009). Directive 2009/30/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions and amending Council Directive 1999/32/EC as regards the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC. <http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0088:0113:EN:PDF>

Doornbosch, R., & Steenblik, R. (2007). *Biofuels: Is the cure worse than the disease?* Paris: OECD.

Ecofys et al. (2013). *Renewable Energy Progress and Biofuels Sustainability*.

European Biodiesel Board (2013). 'European biodiesel industry worried that immature and doubtful ILUC', September 11.

European Commission (2013, July 29). *Oilseeds Balance Sheet*. Retrieved August 17, 2013, from http://ec.europa.eu/agriculture/cereals/balance-sheets/oilseeds/overview_en.pdf

European Parliament (2013). 'European Parliament backs switchover to advanced biofuels. Brussels'. 11 September. <http://www.europarl.europa.eu/news/en/news-room/content/20130906IPR18831/html/European-Parliament-backs-switchover-to-advanced-biofuels>

F.O. Licht (2012). *World Ethanol & Biofuels Report*. 11(5), 5 November.

FAO, IFAD, IMF, OECD, UNCTAD, WFP, World Bank, WTO, IFPRI & UN HLTF. (2011). *Price volatility in food and agricultural markets: Policy responses*.

FAOSTAT (n.d.). <http://faostat.fao.org>

FEDIOL(2012). 'Evolution1980–2011'. http://www.fediol.eu/web/evolution%201980%20_%202011/1011306087/list1187970161/f1.html

Gerasimchuk, I. & Koh, P. Y. (2013). *The EU Biofuel Policy and Palm Oil: Cutting subsidies or cutting rainforest?* Geneva: IISD-GSI.

Gerasimchuk, I., Bridle, R., Beaton, C., & Charles, C. (2012,). 'State of Play on Biofuel Subsidies: Are Policies Ready to Shift?', June, http://www.iisd.org/gsi/sites/default/files/bf_stateplay_2012.pdf

Gerasimchuk, I., Bridle, R., Charles, C. & Moerenhout, T. (2012). *Cultivating Governance: Cautionary Tales for Biofuel Policy Reformers*. Geneva: IISD-GSI.

IEA (2011). *Technology Roadmap Biofuels for Transport*. Paris: OECD/IEA.

IEA (2011). *Technology Roadmap Biofuels for Transport*. Paris: OECD/IEA.

IEA (2012). *World Energy Outlook 2012*. Paris: OECD/IEA.

IISD–GSI (2013). *Addendum to Biofuels – At What Cost? A review of costs and benefits of EU biofuel policies*. Geneva: IISD - GSI.

IMF. (n.d.). 'Primary Commodity Monthly Prices database, 1980–2013'. <http://www.imf.org/external/np/res/commod/index.aspx>

Kelly, R. (2012). *The Hunger Grains*. Oxfam.

Koplow, D. (2009). *A boon to bad biofuels: Federal tax credits and mandates underwrite environmental damage at taxpayer expense*. Friends of the Earth and Earth Track.

Laborde, D. (2011). *Assessing the Land Use Change Consequences of European Biofuel Policies*. IFPRI.

Malins, C. (2013). *Vegetable oil markets and the EU biofuel mandate*. International Council on Clean Transportation.

Martin, J. (2013). *E-Docket Submission on behalf of the U.S. Union of Concerned Scientists to the U.S. Environmental Protection Agency's 'Regulation of Fuels and Fuel Additives: 2013 Renewable Fuel Standards' 78 Fed. Reg. 9282 (February 21, 2013) [EPA-HQ-OAR-2012-0546]*.

Mielke, T. (2013). Questions & Answers during the presentation 'Supply And Demand Outlook of Palm and Laurics Oils for 2nd Half 2013', Palm Oil Internet Seminar (Pointers). 23 July.

OECD/FAO. (2012). *OECD-FAO Agricultural Outlook 2012-2021*.

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. (17 October 2012).

Purkus, A., Gawel, E., & Thrän, D. (2012). 'Bioenergy governance between market and government failures: A new institutional economics perspective', *UFZ-Diskussionspapiere* (13), September.

US Department of Agriculture. (2013). *EU-27 Biofuels Annual Report*.

von Renssen, S. (2011). 'A biofuel conundrum', *Nature Climate Change*, pp. 389–0.

ABOUT IISD

The International Institute for Sustainable Development (IISD) contributes to sustainable development by advancing policy recommendations on international trade and investment, economic policy, climate change and energy, and management of natural and social capital, as well as the enabling role of communication technologies in these areas. We report on international negotiations and disseminate knowledge gained through collaborative projects, resulting in more rigorous research, capacity building in developing countries, better networks spanning the North and the South, and better global connections among researchers, practitioners, citizens and policy-makers.

IISD's vision is better living for all – sustainably; its mission is to champion innovation, enabling societies to live sustainably. IISD is registered as a charitable organization in Canada and has 501(c)(3) status in the United States. IISD receives core operating support from the Government of Canada, provided through the Canadian International Development Agency (CIDA), the International Development Research Centre (IDRC), and from the Province of Manitoba. The Institute receives project funding from numerous governments inside and outside Canada, United Nations agencies, foundations and the private sector.

International Institute for Sustainable Development
Head Office, 161 Portage Avenue East, 6th Floor, Winnipeg, Manitoba, Canada R3B 0Y4
Tel: +1 (204) 958-7700 | Fax: +1 (204) 958-7710 | Web site: www.iisd.org



ABOUT GSI

GSI is an initiative of the International Institute for Sustainable Development (IISD). GSI puts a spotlight on subsidies – ‘transfers of public money to private interests – ‘and how they impact efforts to put the world economy on a path toward sustainable development. In cooperation with a growing international network of research and media partners, GSI seeks to lay bare just what good or harm public subsidies are doing; to encourage public debate and awareness of the options that are available for reform; and to provide policy-makers with the tools they need to secure sustainable outcomes for our societies and our planet.

Global Subsidies Initiative
International Environment House 2, 9 chemin de Balexert, 1219 Châtelaine, Geneva, Switzerland
Tel: +41 22 917-8373 | Fax: +41 22 917-8054



ABOUT THE AUTHOR

Ivetta Gerasimchuk is Research Officer with IISD's Geneva-based Global Subsidies Initiative. Her research focus is on energy policies, including reform of biofuel and fossil-fuel subsidies. Before joining IISD, Ivetta conducted policy-oriented research and project work as senior advisor and head of the trade and investment program for WWF-Russia and leading research fellow at the Institute for Natural Resource Economics and Environmental Policy of the Higher School of Economics in Moscow. Ivetta holds a PhD in Economics (2006), a Master of Management (2003) and a Bachelor of International Relations (2001) degrees from the Moscow State Institute of International Relations.