Reality check - 10 things you didn't know about EU biofuels policy

October 2017

Executive Summary

The negotiations of the new Renewable Energy Directive for 2020-2030 have re-launched the debate on renewable energy in transport, notably on food-based biofuels. The impacts of the EU biofuels policy on climate and environment are poorly informed and understood. This briefing provides a reality check on 10 things that decision makers and citizens do not know about biofuels:

1. Four in every five litres of biofuel in the EU is biodiesel
2. Around half of EU production of crop biodiesel is based on imports of feedstock, not crops grown by EU farmers
3. A third of EU crop biodiesel is made from palm oil, making drivers the top consumers of palm oil in Europe
4. EU biodiesel production growth since 2009 has been based on imports and waste oils
5. Of all EU rapeseed oil, 60% is consumed in the biodiesel sector
6. Palm biodiesel is three times worse for the climate than fossil diesel
7. Phasing out palm oil alone is not going to fix the biofuels policy
8. The co-production of animal feed cannot justify the support for crop biofuels
9. There is an acute lack of transparency about the biofuels used in the EU with data either unavailable or very hard to access
10. Most drivers don't know and are not told they are filling up their car tanks with vegetable oils and other food crops

Introduction

The current Renewable Energy Directive (RED) promotes biofuels by requiring Member States to provide 10% of renewable energy in transport by 2020. The Fuel Quality Directive (FQD) sets a carbon intensity reduction target of 6% on fuel suppliers in 2020. Both directives did not take into account the GHG emissions linked to Indirect Land Use Change (ILUC) and have driven the use of food-based biofuels with negative environmental, climate and social impacts. In 2015, the EU adopted a 7% limit on the amount of food-based biofuels to be counted in the 10% transport renewables target, as a measure to address ILUC.

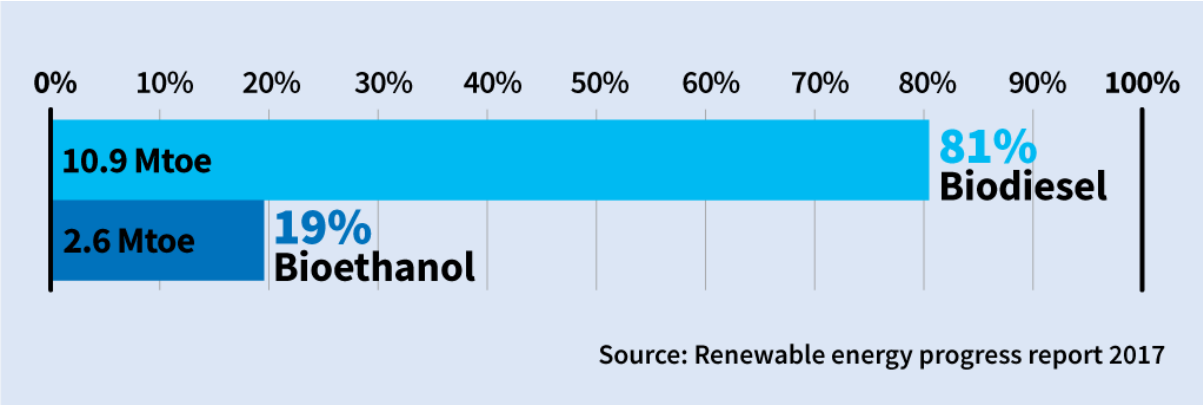
The proposed policy framework for the use of biofuels in the 2020-2030 period - the Renewable Energy Directive recast, or REDII - is currently being negotiated in the European Parliament and the Council. The debate around renewable energy in transport is focusing again on food-based biofuels. The Commission's

proposal decreases the maximum contribution of food and feed based biofuels to 3.8% in 2030 and does not include them under a specific target.

The aim of this briefing is to shed light on some important facts that decision makers and citizens do not know about impacts of the EU biofuels policy. Data on the types of biofuels used in Europe and their origin is quite challenging to access, but through available statistical data, national reports and studies, we here add a reality check on what EU biofuels are.

1. Four in every five litres of biofuel in the EU is biodiesel

According to the latest EU Energy Statistical Pocketbook, the actual share of transport energy coming from biofuels was 4.2% in 2015[1]. Under the Renewable Energy Directive, thanks to multiple accounting, renewable energy accounted for 6% of transport energy in 2015, of which 88% was biofuels[2]. Of all the biofuels used in Europe in 2015, 81% was biodiesel (10.9 Mtoe) and 19% was bioethanol (2.6 Mtoe).



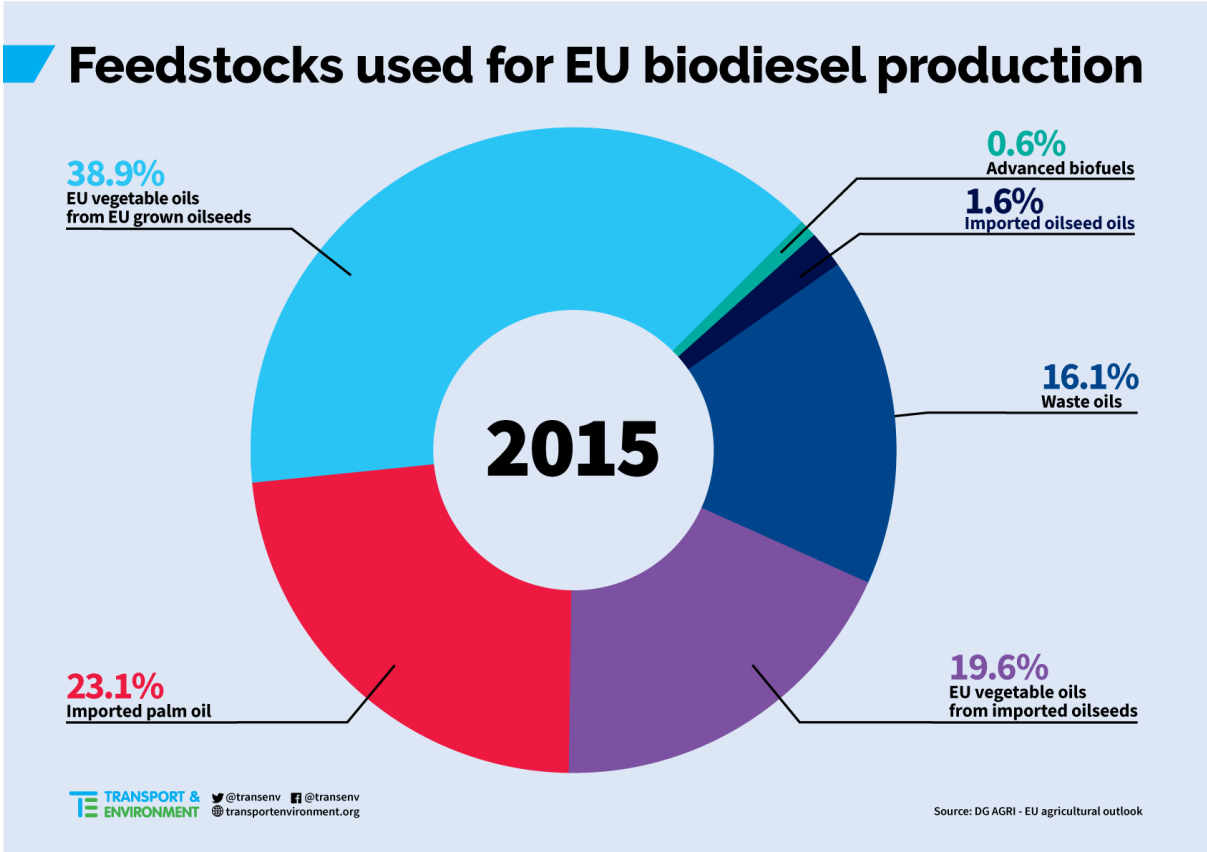
2. Around half of EU production of crop biodiesel is based on imported feedstocks, not crops grown by EU farmers

According to the European Commission DG AGRI Medium-Term Agricultural Outlook, 56% of raw materials (feedstocks) used for the production of biodiesel in Europe originates from within the Union in 2015[3]. But this figure assumes that waste oil is all domestic, which is incorrect. Imported used oils mean it is likely that less than half of the biodiesel originates from EU production. For crop biodiesel specifically, only 47% of the feedstocks were grown in the EU for EU production in 2015, with 53% of feedstocks used to produce crop biodiesel in EU installations imported.

[1] European Commission, DG Energy, EU Energy Statistical Pocketbook 2017

[2] This figure takes into account the double counting of advanced biofuels and the multipliers for electricity in transport. European Commission, Renewable Energy Progress Report, 2017

[3] For more information, see Annex I. Based on calculations from data provided in European Commission, DG AGRI Medium-Term Agricultural Outlook 2016-2026, Graph 2.8, page 15



There is, however, some uncertainty regarding the origin of the biofuel feedstocks in the EU and inconsistency in the data. The 2017 Renewable Energy Progress Report of the European Commission states that "In accordance with industry data, more than 60% of biodiesel and more than 90% of bioethanol consumed in the EU was produced from the EU feedstock". But the statement is not substantiated.

The figures highlighted above do not take into account the imports of biodiesel produced outside of Europe. Building on industry data sources, the Renewable Energy Progress report states that 26% of biodiesel is imported, but we do not have sufficient information about the type of feedstocks used to produce this biodiesel outside Europe.

If we look at the origin of biodiesel feedstocks at a national level, the EU crop biofuel market is dominated by France and Germany which alone account for 49% of the EU crop biofuel market[4]. Many countries are heavily reliant on imports for their biofuels. Building on available national data, in Italy around 50% of the feedstocks used for biofuels is imported from non-EU countries[5]. In Spain, only 1% of certified raw materials used for biodiesel in 2016 originates from Spain[6]. In France, whose first commodity for biodiesel production is rapeseed, almost 30% of biodiesel vegetable oils is imported (among them: palm oil, soy and rapeseed)[7]. The main biofuel feedstock in Portugal is used cooking oil: almost 90% of it was imported in July 2017[8].

[4] EUROSTAT, SHARES http://ec.europa.eu/eurostat/web/energy/data/shares

[5] Gestore Servizi Energetici, Rapporto Statistico sulle Energie da Fonti Rinnovabili in Italia, 2015 [Accessed 10 September 2017].

[6] Comisión Nacional de los Mercados y la Competencia, Estadistica de biocarburantes [Accessed 13 September 2017]

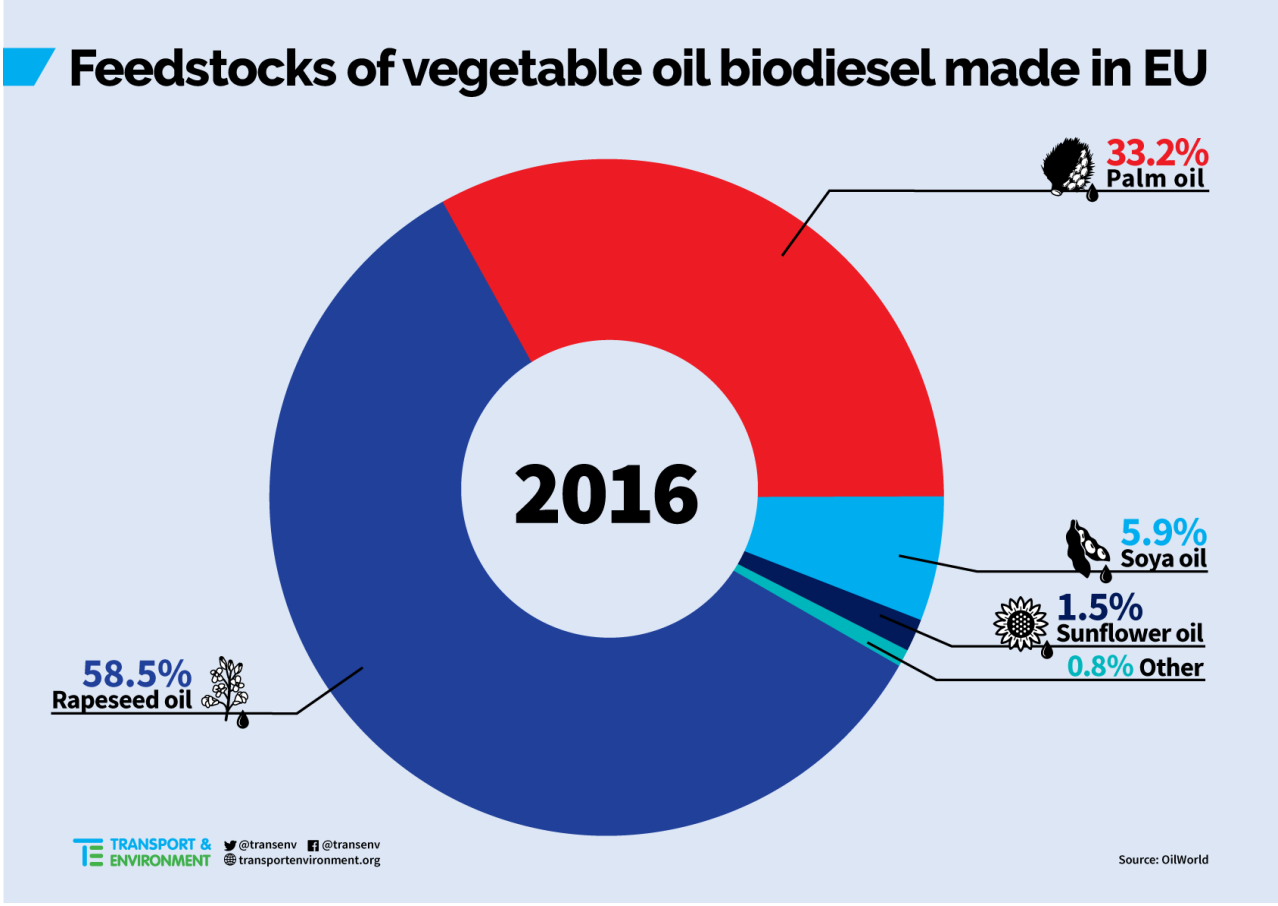
[7] Ministère de la Transition écologique et solidaire https://www.ecologique-solidaire.gouv.fr/biocarburants [Accessed 13 September 2017]

[8] Entidade Nacional para o Mercado de Combustíveis, Matérias-primas utilizadas na produção de biocombustíveis [Accessed 13 September 2017]

When it comes to ethanol, the trade association ePURE publishes data on the raw materials used by its members for ethanol production in Europe. In 2016, 32% of ethanol was produced from wheat, 31% from corn and 24% from sugar (with the rest of the production coming from starch-rich crops, lignocellulosic feedstocks and other feedstocks listed in Annex IX-A)[9].

3. A third of EU crop biodiesel is palm oil, making drivers the top consumers of palm oil in Europe

Biodiesel based on vegetable oils accounts for 85% of all EU biodiesel production in 2015, while the rest is based on waste oils and second generation feedstocks[10]. In 2016, according to OilWorld (an independent market analysis publication working on vegetable oils), 33% of EU vegetable-oil biodiesel came from imported palm oil. Rapeseed still remains the most used raw material (around 60%). There are differences in the GHG impacts of vegetable oils but on average, all crop-based biodiesel are worse for the climate than fossil diesel. Palm has the highest overall GHG emissions - over three times the fossil emissions.

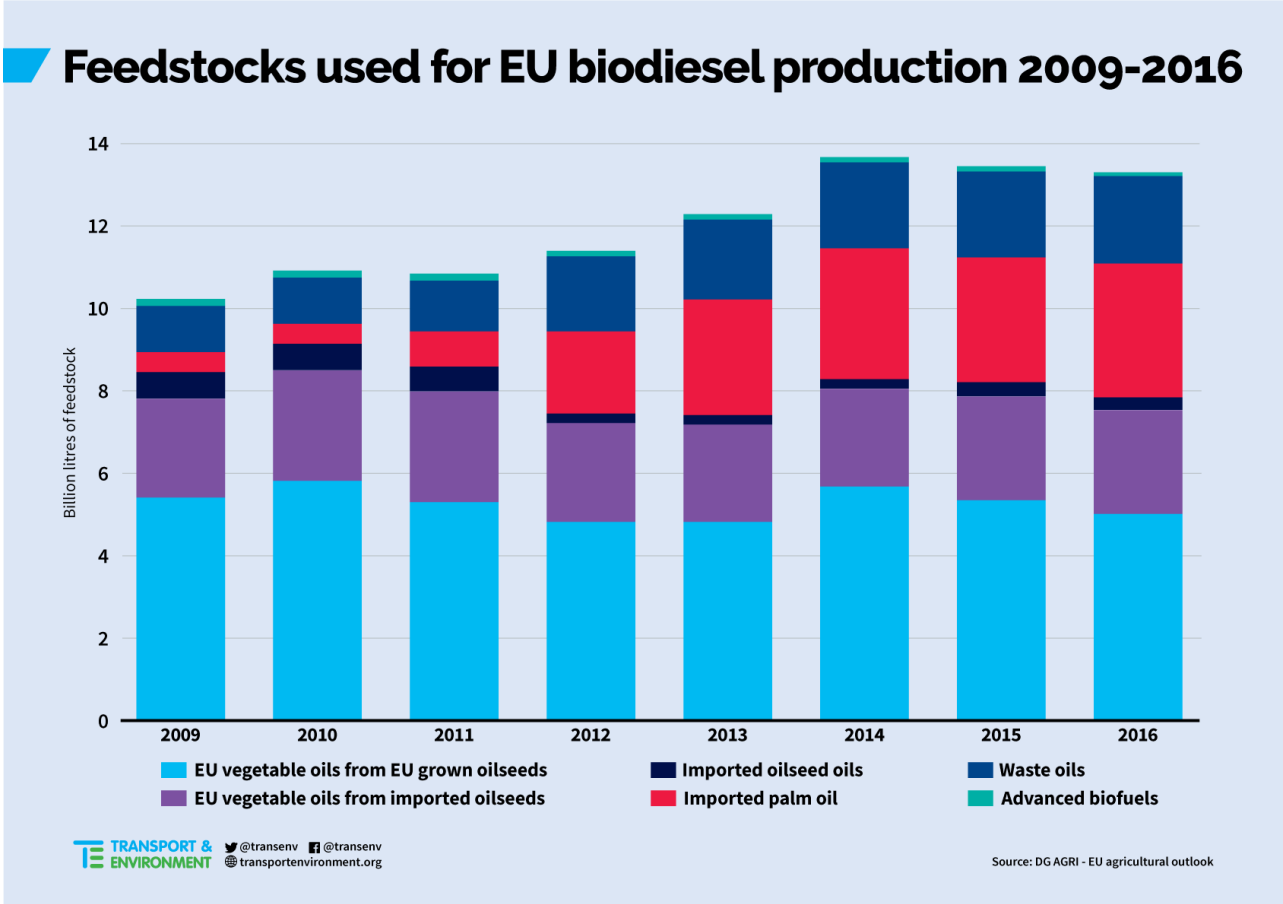


[9] ePure, Share of European renewable ethanol produced from each feedstock type in 2016

[10] European Commission, DG AGRI Medium-Term Agricultural Outlook 2016-2026.

4. EU biodiesel production growth since 2009 has been based on imports and waste oils

In absolute values, the share of EU-produced biodiesel from EU feedstock has remained stable since the RED came into force - as shown in the graph below[11]. However, imports of palm oil have been constantly increasing. This is also the case for waste oils, for which double counting under the RED has contributed to their development.



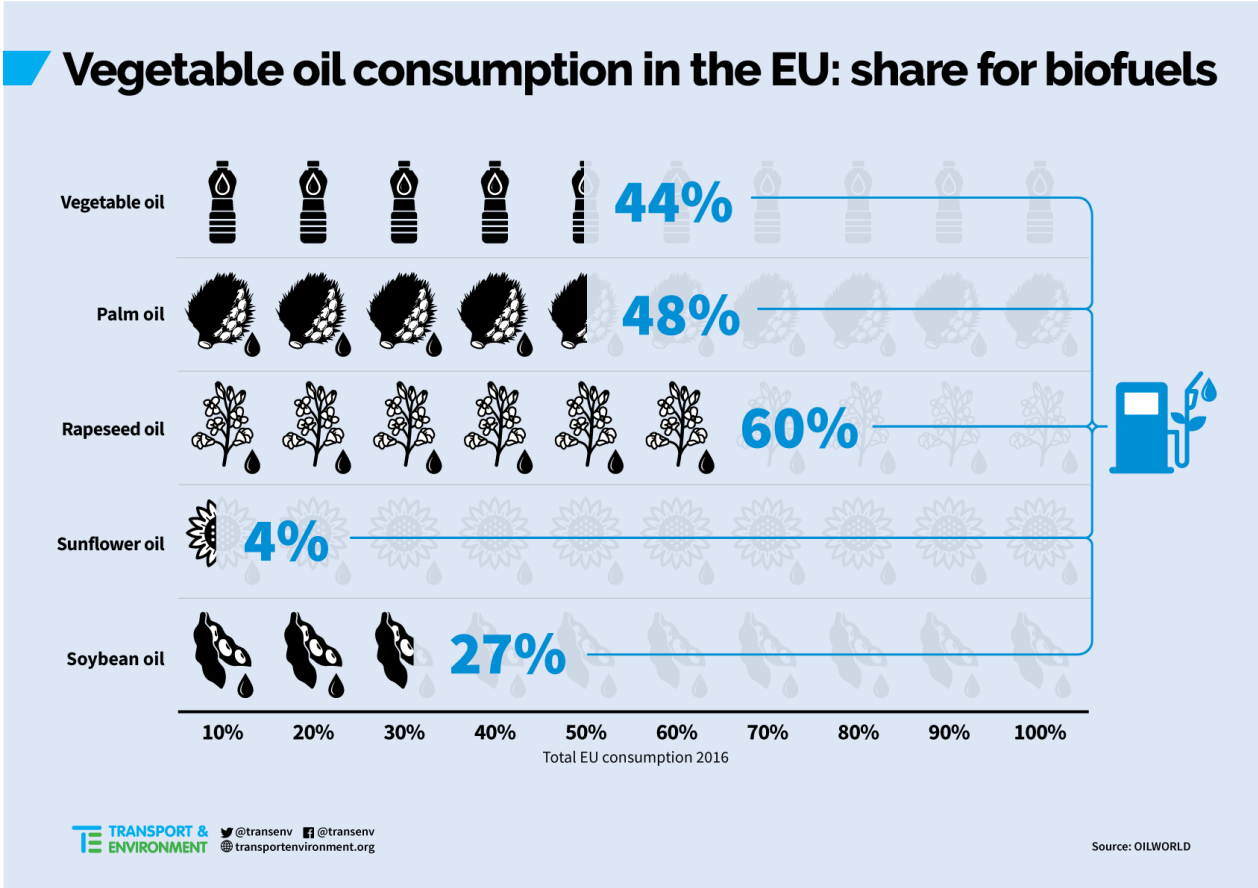
5. Of all EU rapeseed oil, 60% is consumed in the biodiesel sector

The EU push for crop-based biodiesel led to the creation of an additional market for agricultural commodities. Between 2005 and 2015, vegetable oil consumption decreased in the food sector (from 15.1 to 13.7 million tonnes), whereas it almost quadrupled in the bioenergy sector (going from 2.9 to 10.5 million tonnes)[12].

According to data from OilWorld, currently 60% of rapeseed consumed in the EU is used for biodiesel, the absolute volume staying stable since 2009. Only the cheapest vegetable oil commodity, palm oil, has grown in this period. Overall, 44% of all vegetable oils (from palm, soy, rapeseed and sunflower) in Europe is consumed as biodiesel.

[11] Percentages of the graph can be found in Annex I of this briefing.

[12] European Commission, Agricultural Medium-Term Agricultural Outlook 2016-2026 (tables)



The significant share of EU biodiesel for the vegetable oil market has also increased the price of vegetable oils[13]. This explains the interest of the agricultural sector to keep mandates for food-based biofuels in place[14].

6. Palm biodiesel is three times worse for the climate than fossil diesel

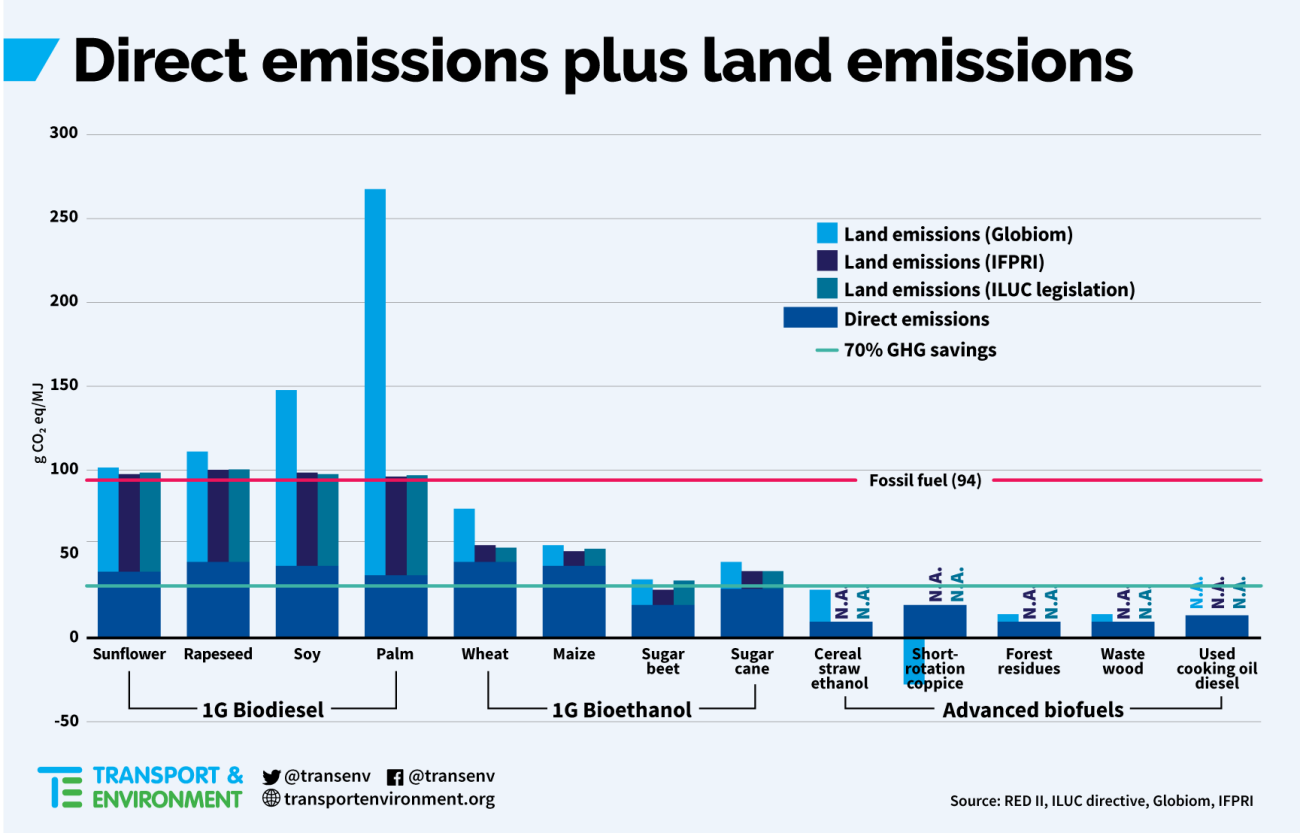
The use of food-based biofuels has been debated for a long time, due to their negative environmental and social impacts, but also the climate impacts linked to land use change emissions. When existing agricultural land is used to make biofuels, agricultural production has to expand elsewhere to meet the world's growing demand for food and animal feed. This land pressure causes a substantial increase in CO2 emissions.

Biodiesel made from vegetable oils (rapeseed, palm oil, soy and sunflower) leads to higher emissions than the fossil diesel they replace[15]. Palm oil in particular is three times worse for the climate than fossil diesel when indirect land use change is taken into account.

In 2015, the EU adopted a 7% limit on the amount of food-based biofuels that can be counted in the 10% transport renewables target, as a measure to address ILUC. But even after the 7% limit, EU biofuel policy will still likely increase emissions by 1.4%[16].

[13] Thought for Food, A review of the interaction between biofuel consumption and food markets, Cerulogy, 2017.
[14] Copa-Cogeca, Phasing out first generation biofuels: What is at stake?, November 2016
[15] T&E analysis of Globiom results, 2016.
[16] T&E analysis of Globiom results, 2016.

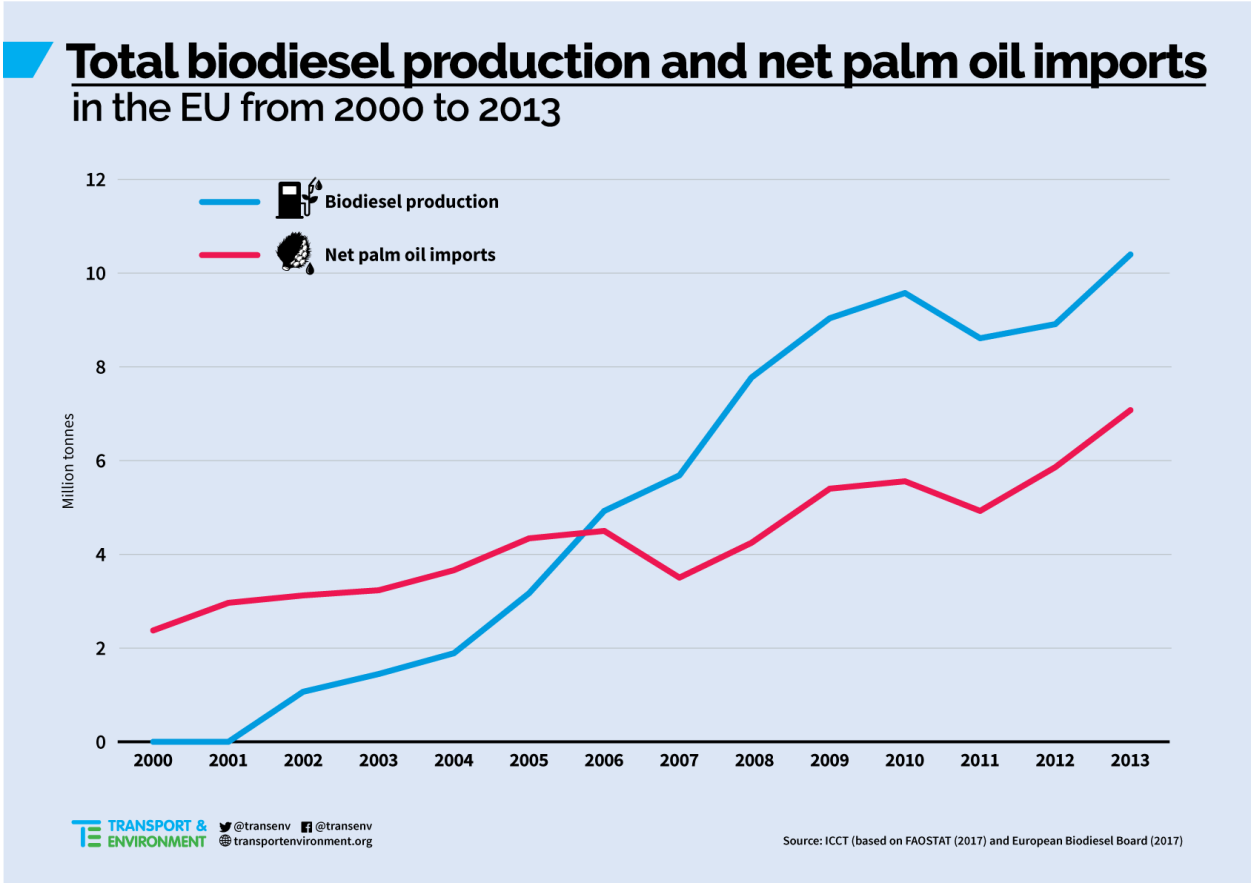
The Commission's proposal for a recast of the RED decreases the maximum contribution of food and feed based biofuels to 3.8% in 2030 and does not include them in a specific transport subtarget. A decrease of the 7% limit to 3.8% would save around 190 Mt CO2e emissions due to avoided land use emissions, according to a Globiom complementary scenario.



7. Phasing out palm oil alone is not going to fix the biofuels policy

In 2017, an own initiative report of the European Parliament on "palm oil and deforestation of rainforests" acknowledges that all vegetable oils (and not palm oil alone) used for biodiesel production cause deforestation because of ILUC, and recommends to phase out their use for biofuels.

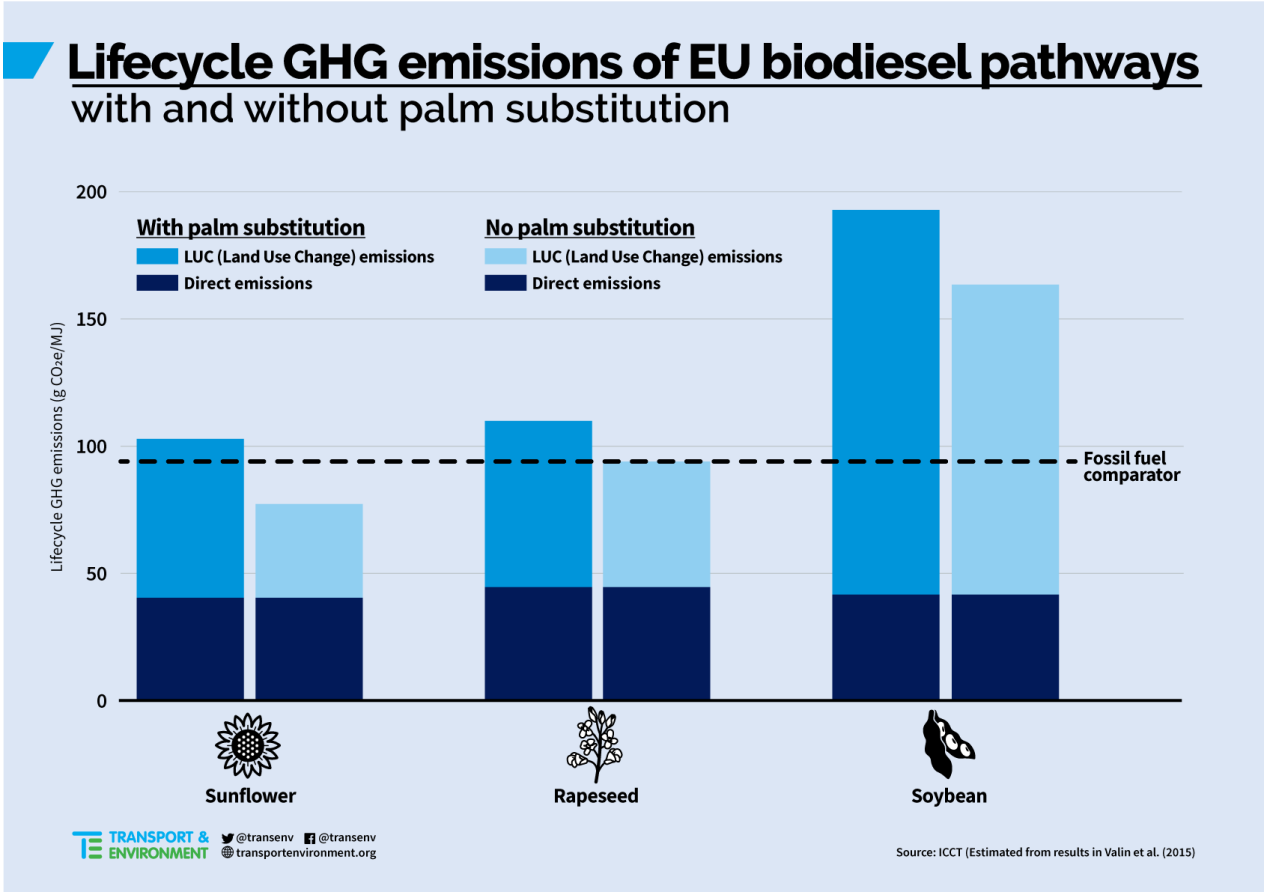
A study contracted by the International Council on Clean Transportation (ICCT) confirms that rapeseed oil drives palm expansion and deforestation. It shows that vegetable oils such as palm oil and rapeseed oil are linked on EU vegetable oil markets and that substitution effects take place. According to the ICCT, the palm oil imports have increased over the past 10 years, which coincides with the ramp-up in the EU biodiesel production.



Econometric analysis made by Santeramo[17] determines the correlation between the prices of different vegetable oils and how they affect their supply. The study observes that palm oil imports increase as rapeseed oil prices increase in the EU. The most likely explanation for an increase in the imports of palm oil is that it is not only used in biofuels, but it is also replacing rapeseed oil somewhere else in the EU market (in the food market for instance).

Palm oil substitution effects have a high impact in the overall environmental performance of rapeseed biodiesel. ICCT estimates the GHG impact derived from the substitution effect based on Valin et al.'s assessment of EU biofuels policy (see graph below).

[17] Santeramo F., Cross-Price Elasticities for oil and fats in the US and the EU, 2017



If we consider that no palm oil substitution occurs, rapeseed biodiesel would have 25% less greenhouse gas emissions associated to it. But still, it wouldn't have any net climate benefit compared to fossil diesel. Palm oil substitution effects aside, life-cycle emissions of rapeseed biodiesel do not justify policy support for it under the RED.

Vegetable oils used for biodiesel production are interchangeable, and if the phase-out only concerns palm biodiesel, it is likely that it will be replaced by rapeseed biodiesel, which also has high associated ILUC emissions - making them worse for the climate than fossil diesel. If only palm and soy oil biodiesel is to be phased out, it is therefore essential that the cap on biodiesel is reduced at appropriate level to prevent substitution by rapeseed.

8. The co-production of animal feed cannot justify the support for crop biofuels

While it is true that the production of crop-based biofuels leads to the production of animal feed, the impact of these co-products is often overestimated. Distillers' grains from ethanol production account for about 2% of protein fed to EU livestock and 5% of the total supply of mid- and high-protein animal feeds. The meal byproduct from rapeseed and sunflower biodiesel accounts for about 4% of animal proteins and 7% of the EU supply of mid- to high-protein feed[18]. Although this is not a negligible contribution to the EU's animal protein industry, it is also not a large enough contribution to significantly reduce the EU dependence on protein feed imports. What is clear is that this is not enough to compensate the quantity of vegetable oil

[18] Malins C., Thought for Food - A review of the interaction between biofuel consumption and food markets, Cerulogy, 2017

taken from the food market and diverted to biofuels production. As noted above, around 60% of all EU grown rapeseed is now used for biodiesel production. Also, more than half of EU production of crop biodiesel is based on imports. In comparison to these figures, the gains from additional animal feed production are very small.

The conclusions of modelling exercises conducted to estimate land use change emissions already take into account the potential positive impacts of the feed co-products. And despite this, they still conclude that crop biofuels impact food prices and that they are associated with significant indirect land use change emissions.

Finally, if rapeseed continues to be cultivated to produce oil for exports or for the food market, rapeseed meal will continue to be produced as well. The DG AGRI EU agricultural outlook concludes that a decrease in rapeseed biodiesel consumption would be compensated by an increase in rapeseed oil exports and an increased use in the food market. In addition, if rapeseed production was reduced, alternative rotational protein crops such as beans or lupins could be produced.

9. There is an acute lack of transparency about the biofuels used in the EU with data either unavailable or very hard to access

The EU biofuels policy has been put in place without sufficient transparency on biofuel feedstocks origin and climate impacts. At an EU level, EUROSTAT figures only cover the shares of biofuels consumed in the overall transport fuel consumption (and in the overall gasoline and diesel consumption for bioethanol and biodiesel respectively). EUROSTAT also provides information on how much biofuels are based on crop biofuels and how much is double-counted biofuels. But to date, there is no EU-wide obligation for fuel suppliers to publish more detailed data about the type of biofuels they blend and supply. As pointed out throughout the briefing, some Commission reports show figures about EU biofuels, but the data remain fragmented, inconsistent and difficult to access. In this briefing, we also used some data compiled by independent players, such as OILWORLD (an independent market analysis publication working on vegetable oils). Further explanation of the main data sources used for this briefing can be found in Annex II.

On a national level, some EU Member States oblige fuel suppliers to report information on the type, the GHG profile and the sustainability of the fuels that they put on the market. However, only a few EU Member States publish data obtained through this mandatory reporting. This is the case in the UK, where information can be easily found online on the UK government website, under the Renewable Transport Fuel Obligation (RTFO). Another example is the Netherlands, where the Dutch Emission Authority (NEa) compiles and publishes data. These examples demonstrate that more transparency on a national level encourages suppliers to source sustainable biofuels with significant GHG savings, which is also visible in their feedstock mixes.

10. **Drivers don't know they a**re filling up their car tanks with vegetable oils and other food crops

As for food products, EU consumers should be able to know what type of biofuel they put in their tanks. Food products have extensive labelling on their ingredients, but this is not the case for biofuels at the petrol stations. Sometimes EU drivers are informed about the presence of biocomponents in the fuels they use

(E10 labels for example), but not more than this. The lack of information is especially relevant for palm oil used in EU biodiesel. Some consumers have the impression to contribute to a better environment by buying palm oil free products, but they don't even know that they might be running their car on palm biodiesel. It would also be useful to inform people when they are using rapeseed oil or wheat ethanol in their tanks, when they might prefer to keep these raw materials for food purposes.

Conclusions and policy recommendations

The current EU biofuel policy lacks transparency and accessing information about the types of biofuels, their origins and their climate impacts is very challenging. This is in part due to the lack of reported information on biofuels, which is fragmented and inconsistent, but also the difficulty to access this information where it exists. Around half of EU production of crop biodiesel is based on imports and the recent biodiesel growth has been mainly filled with imports of the cheapest raw material, palm oil. EU drivers are not informed about the type of biofuels they are forced to use at petrol stations and there is a clear lack of harmonised and publicly available data at EU and national level on the feedstocks, the origin and the climate of biofuels.

The current sustainability criteria have been insufficient in tackling issues around biofuels use, as they are not capturing the full climate impacts of the biofuels. In the context of the RED II process, we recommend EU decision-makers to:

- Create a public EU-wide database enabling the traceability of all transport fuels in the Member States. The database shall include information about economic operators, the type of fuels supplied and sustainability characteristics (type and origin of feedstocks and fuel, GHG performance).
- Ensure sufficient information to consumers on the types of renewable fuels they consume.
- Promote a sustainable use of clean forms of energy for transport such as advanced biofuels based on wastes and residues and renewable electricity.
- Phase-out the use of crop-based biodiesel as soon as possible. Policy support to all crop-based biofuels should be phased out by 2030.

Annex 1

Feedstocks used for EU biodiesel production

Absolute values (billion litres) and percentages extracted from Graph 2.8 of the EU Agricultural Medium-Term Outlook 2016-2026:

Year	EU vegetable oils from EU grown oilseeds		EU vegetable oils from imported oilseed		Imported oilseed oils		Imported palm oil		Waste oils		Advanced biofuels		Total	
2005	1.9	59%	0.82	26%	0.20	6%	0.18	6%	0.00	0%	0.11	3%	3.2	100%
2006	2.9	52%	1.50	27%	0.60	11%	0.30	5%	0.17	3%	0.09	2%	5.5	100%
2007	4.0	53%	2.2	28%	0.6	7%	0.4	6%	0.4	5%	0.1	1%	7.6	100%
2008	4.4	49%	2.56	28%	0.66	7%	0.45	5%	0.90	10%	0.11	1%	9.1	100%
2009	5.5	55%	2.39	24%	0.50	5%	0.52	5%	1.10	11%	0.09	1%	10.1	100%
2010	5.9	54%	2.59	24%	0.62	6%	0.57	5%	1.09	10%	0.09	1%	10.9	100%
2011	5.3	49%	2.75	26%	0.56	5%	0.85	8%	1.25	12%	0.11	1%	10.8	100%
2012	4.8	42%	2.48	22%	0.18	2%	1.95	17%	1.81	16%	0.11	1%	11.3	100%
2013	4.8	39%	2.40	20%	0.18	1%	2.83	23%	1.93	16%	0.09	1%	12.2	100%
2014	5.8	42%	2.21	16%	0.18	1%	3.38	25%	2.02	15%	0.11	1%	13.7	100%
2015	5.3	39%	2.65	20%	0.22	2%	3.13	23%	2.18	16%	0.09	1%	13.5	100%
2016	5.0	37%	2.59	19%	0.28	2%	3.21	24%	2.19	16%	0.11	1%	13.4	100%

Annex II

List of data sources used in this briefing:

- Prospects for agricultural markets and income in the EU 2016-2026. This DG AGRI report shows the medium-term outlook for the major EU agricultural commodity markets, based on a set of macroeconomic assumptions assuming a continuation of current agricultural policies. The analysis is based on information available at the end of September 2016 for agricultural production. For this

briefing, we used figures about biodiesel feedstocks used for EU production between 2009 and 2016 that we extracted from the Graph 2.8 ("EU biodiesel Feedstocks"), thus not taking into account net biodiesel imports. We also used figures about the EU biodiesel production coming from vegetable oils. No further information about the origins of "waste oils" was found, nor given after request.

- Renewable Energy Progress Report 2017. This report, published every two years by the European Commission, provides an overview of renewable energy policy developments in EU countries. For this briefing, we used figures about biodiesel and bioethanol shares out of the total EU biofuel mix in 2015. There is a mismatch between the figures about the "imported feedstocks for biofuels produced in the EU" of this report and the ones given by DG AGRI.
- OilWorld 2017. OilWorld is the Independent Global Forecasting Service for Oilseeds, Oils & Fats and Oilmeals. For this briefing, we used figures about vegetable oils used for biodiesel.

Further information

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