



# Billions wasted on biofuels

Biofuels are a harmful and expensive distraction to road transport decarbonisation

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June 2022

## Summary

In recent years, biofuels have consistently been more expensive compared to fossil fuels in Europe. With the current price hikes in many of the feedstocks used for biofuels, like vegetable oils, cereals, used cooking oil and animal fats, the price difference to fossil fuels, despite those skyrocketing as well, is becoming ever larger.

Depending on the feedstock, the energy delivered by **biodiesel currently costs 70%-130% more than fossil diesel.**

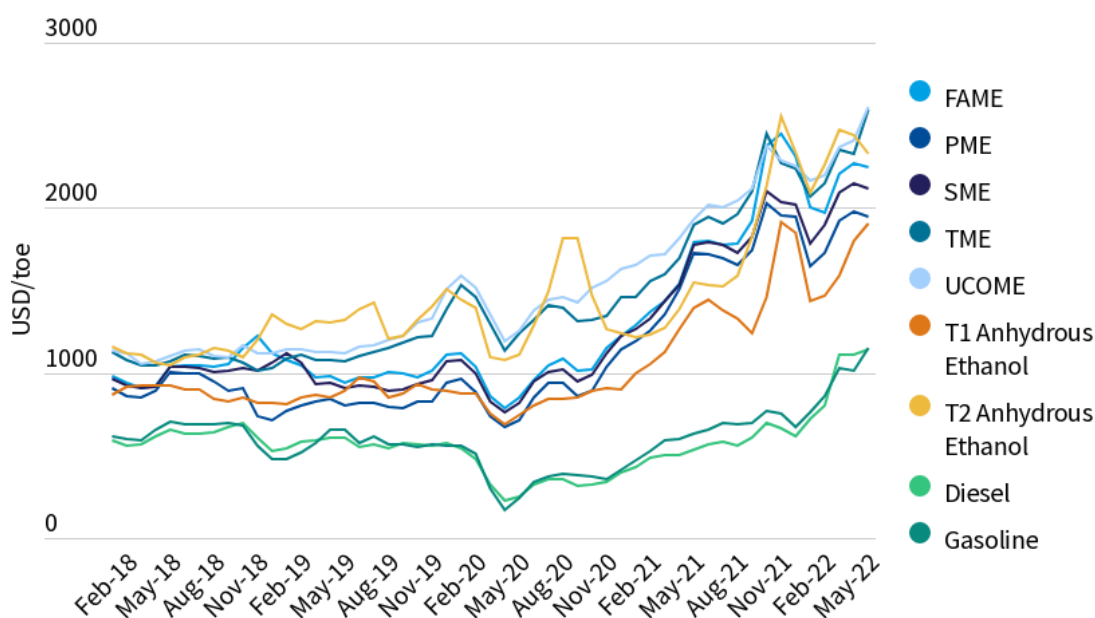
Based on May 2022 prices, the **mandatory blending of biofuels costs European citizens €17 billion more per year.**

Most biofuels are worse for the climate, worse for biodiversity and contribute to higher food prices. As we show here with our analysis of wholesale prices, they also put an unnecessary financial burden on European citizens. The billions now wasted on biofuels should rather be used to boost a transition to real sustainability in transport.

**Crop based biofuels need to be phased out as soon as possible and others severely limited.**

## 1. Biofuels add to high fuel costs in transport

In recent years, biofuels have consistently been more expensive compared to fossil fuels in Europe. Figure 1 presents biofuels and fossil fuels wholesale prices on an energy basis (in USD per tonne of oil equivalent, toe).<sup>1</sup>



Source: T&E analysis based on data provided by Stratas Advisors

**Figure 1: Recent wholesale price developments (USD/toe) across the main fossil fuels and biofuels**

(FAME: Fatty Acid Methyl-Esters, PME: Palm Methyl Ester, SME: Soybean Methyl Ester, TME: Tallow Methyl Ester, UCOME: UCOME: Used Cooking Oil Methyl Ester, T1: EU bioethanol imports, T2: EU domestic bioethanol production).

In the rather stable years 2018/19, compared to diesel, biodiesel (FAME) had been 72% more expensive on a wholesale level (on an energy basis, see Table 1). Imported bioethanol sold at a premium of 45%, for EU produced bioethanol there was a premium of over 100%. This dramatically changed with the pandemic rolling around the globe, letting fuel prices plummet for a short while across the board with ethanol prices skyrocketing at times due to strong demand for disinfectants (see Figure 1). 2021 however, saw massive price increases across fossil fuels and biofuels. The Ukraine war starting in late February 2022 sent new shock waves through this market, seeing fossil fuel prices soar, but food crop prices and related products such as biofuels soaring even more. In May 2022, vegetable oil based biodiesel (FAME) consequently had been nearly 100% more expensive than fossil diesel, those based on animal fat ('tallow'/TME) or used cooking oil (UCO) even came with premiums of nearly 130% (see Table 1). The

<sup>1</sup> Stratas Advisors (2022) Feedstock, biofuel and fossil fuel wholesale prices, 20 May 2022. Data used for this analysis had been provided in CIF, FOB or ex-works for the ARA region (Antwerp, Rotterdam, Amsterdam), meaning without taxes or distribution costs

comparison between the pre-Covid-19 average price (from January 2018 to December 2019) and May 2022, shows that fuels have doubled in price with most biofuels above the doubling threshold and fossil diesel, gasoline and domestically produced bio-ethanol just below.

All across Europe, countries have or are considering reducing mandates for biofuel blending, some out of concern for global food security, others out of concerns for national fuel prices. Those include including Finland<sup>2</sup>, Latvia<sup>3</sup>, the Czech Republic, Norway, Sweden and Croatia.<sup>4</sup>

**Table 1: Comparison of average wholesale fuel prices for 2018/2019<sup>5</sup> with May 2022**

(on an energy basis; in US dollars per tonne of oil equivalent (USD/toe))

	2018/2019 price (USD/toe)	2018/2019 biofuel premium (%)	May 2022 price (USD/toe)	May 2022 biofuel premium (%)	May 2022 to 2018/2019 price ratio
<b>FAME</b>	1023	72	2244	97	2.19
<b>PME</b>	857	44	1944	71	2.27
<b>TME</b>	1112	87	2595	128	2.33
<b>UCOME</b>	1163	96	2607	129	2.24
<b>T1 Anhydrous Ethanol</b>	881	45	1903	65	2.16
<b>T2 Anhydrous Ethanol</b>	1234	103	2328	102	1.89
<b>Diesel</b>	594		1140		1.92
<b>Gasoline</b>	607		1153		1.90

FAME: Fatty Acid Methyl-Esters = vegetable oils, TME: Tallow Methyl Ester = animal fat, UCOME: Used Cooking Oil Methyl Ester, T1: imported bioethanol, T2: domestic (EU) bioethanol.

<sup>2</sup> McGarrity, J. (2022) New relaxations on blending mandates could reduce biofuels demand, FastMarkets, 13 April 2022. [www.fastmarkets.com/insights/new-relaxations-on-blending-mandates-could-reduce-biofuels-demand](http://www.fastmarkets.com/insights/new-relaxations-on-blending-mandates-could-reduce-biofuels-demand)

<sup>3</sup> Aprinķis (2022) Koalīcija atbalsta priekšlikumu biodegvielas piejaukuma prasības terminētai atcelšanai, 3 May 2022.

<http://www.aprinkis.lv/index.php/ekonomika/32680-koalicija-atbalsta-priekslikum-biodegvielas-piejaukuma-prasibas-terminetai-atcelsanai>

<sup>4</sup> Claeys, C. (2022) Russia-Ukraine stalls EU Biofuels, but accelerates its medium/long-term targets, StratasAdvisors, 23 May 2022.

<https://energypost.eu/russia-ukraine-stalls-eu-biofuels-but-accelerates-its-medium-long-term-targets/> IEA (2022) Renewable Energy Market Update - May 2022.

<https://www.iea.org/reports/renewable-energy-market-update-2022/transport-biofuels>

<sup>5</sup> from January 2018 to December 2019

## 1.1. Biofuels contribution to total wholesale fuel prices

The evolution of prices presented in the previous section obviously has an impact on the total price of the fuel consumers pay at the pump. The contribution of biofuels blended into the fuel mix to this final price is difficult to calculate in all its complexity, but important to estimate in the current context of fuel prices putting an ever higher burden on consumers.

The prices of the final blends for consumers depend on markups, varying taxation and duties regimes. These vary both geographically and over time. For our estimate we consider a simplified approach: we calculate the price of the final fuel mix based on wholesale prices and compare it to the fossil equivalent that would deliver the same energy. We ignore the cost of blending and assume that total volumes of fuel sold and corresponding biofuel shares are constant at 2019 levels. That is, the results presented here reflect only the evolution of prices and not that of volumes and blending shares after 2019. Results do not represent directly the cost to consumers but the cost of the fuel mix used for road transport at wholesale price - i.e. the costs European societies have to shoulder in total, be it via higher retail prices or lost tax revenue, where biofuels receive a preferential tax treatment to make them competitive on the retail market.

### Biofuels come with a lower energy density

Biofuels have a lower energy density compared to their fossil fuel equivalents. Hence it is important to compare biofuel and fossil fuel prices on an energy, not mass or volume basis. The lower heating values (LHV) of bio- and fossil fuels<sup>6</sup> on a mass and volume basis are summarized in Table 2.

**Table 2: Lower heating values (LHV) of bio- and fossil fuels on a mass and volume basis**

	MJ/kg	MJ/l
<b>Biodiesel</b>	37.2	33.1
<b>Diesel</b>	43.1	35.9
<b>Ethanol</b>	26.8	21.3
<b>Gasoline</b>	43.2	32.1

As a consequence, filling a tank with E5, E10, E15 or E85 (where the number represents the ethanol blend by volume) means that we have less and less energy for the same volume: about 2%, 3%, 5% and 29% less respectively. For example, where a tank filled with pure fossil gasoline gets a car over 600 km, the same tank filled with E85, available e.g. in France, would have the car run out of fuel 175 km earlier.

<sup>6</sup> Prussi, M., Yugo, M., De Prada, L., Padella, M. and Edwards, R., JEC Well-To-Wheels report v5, EUR 30284 EN, Publications Office of the European Union, Luxembourg, 2020, ISBN 978-92-76-20109-0, doi:10.2760/100379, JRC121213.

The shares of biofuels in diesel and gasoline used in road transport are taken from Eurostat<sup>7</sup>, where also the total volumes of fuels consumed in road transport have been obtained from. The share of the different types of biodiesel (e.g. FAME, PME, UCOME etc.) is estimated considering the feedstocks used in biodiesel according to data provided by Oil World<sup>8</sup> and corresponding conversion ratios (from vegetable oil to biodiesel)<sup>9</sup>. Ethanol is split into domestically produced and imported according to data reported in the USDA Biofuel Annual 2021 report for the European Union<sup>10</sup>. All data refers to the EU27, plus UK and the year 2019 apart from the wholesale prices, which refer to a time series provided by Stratas Advisors as described above. Under these assumptions we calculate the wholesale price of the gasoline and diesel fuel blends (*scenario 1 - with biofuels*).

We then compare the wholesale sale price of *scenario 1 - with biofuels* to that of fossil-only diesel and gasoline (*scenario 2 - fossil only*) on an energy basis. Table 3 displays total wholesale prices pre-Covid-19 and for May 2022 for the two different scenarios on the same energy basis. The price difference of *scenario 1 - with biofuels* with *scenario 2 - fossil* can be interpreted as the extra-cost in wholesale price attributable to biofuels. While these extra costs accounted for 4.1% on average across 2018 and 2019, they had risen to 5.3% by May 2022.

**Table 3: Wholesale fuel prices comparison (USD/toe)**

	2018/2019	May 2022
<b>Scenario 1 - with biofuels</b>	623	1206
<b>Scenario 2 - fossil only</b>	598	1145
<b>Extra cost due to biofuels</b>	4.1%	5.3%

Taking the total diesel and gasoline used in road transport in 2019 as an example (amounting to 218.2 Mtoe for diesel, and 81.8 Mtoe for gasoline), we can estimate the total extra expenditure attributable to biofuels with respect to using fossil fuels only, to provide the same amount of energy (see Table 3). The biofuel share in the fuel mix is mandated at member state level and generally provides the greatest contribution to renewable energy in transport. However, this means an extra cost for fuel across Europe amounting to USD 7.3 billion per year based on average fuel and biofuel prices across the years 2018 and 2019, rising to a staggering USD 18.3 billion based on prices in May 2022, or about **€17 billion**. Most of these costs are linked to biofuels that are no solution to reducing GHG emissions from the transport sector, but actually do impede climate mitigation efforts, do harm to nature, biodiversity and to people.

<sup>7</sup> Eurostat (2022), Final energy consumption in road transport by type of fuel (Data extracted on 01/06/2022)

[https://ec.europa.eu/eurostat/databrowser/product/view/NRG\\_BAL\\_C](https://ec.europa.eu/eurostat/databrowser/product/view/NRG_BAL_C)

<sup>8</sup> Mielke (2021) Oil World Annual 2021, ISTA Mielke GmbH, June 11 2021

<sup>9</sup> BioGrace Excel tool - version 4d, <https://www.biograce.net/home>

<sup>10</sup> Flach, B., Lieberz, S., Bolla, S. (2021) Biofuels Annual (Country: European Union). United States Department for Agriculture (USDA) and Global Agriculture Information Network (GAIN).

[https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Biofuels%20Annual\\_The%20Hague\\_European%20Union\\_06-18-2021.pdf](https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Biofuels%20Annual_The%20Hague_European%20Union_06-18-2021.pdf)

## 2. Conclusions

Biofuels from crops never made sense. They are worse for the climate, worse for biodiversity and contribute to higher food prices. Biofuels from animal fats (tallow) rely on industrial livestock farming with its known dramatic impact on climate and nature, and of course the well-being of the animals themselves. Large parts of available animal fats are also a highly sought after raw material for other industries, like pet food production. Used cooking oil as a feedstock sourced in Europe does not come with these negative consequences, but is very limited in supply. Europe is already importing more than half of its UCO consumption for biodiesel.

As we have shown in this briefing, besides not being a real solution for our energy needs in road transport for above reasons, biofuels also drive up costs for European citizens. As we also need to get out fossil fuels as fast as possible, this highlights the urgent need for a rapid acceleration of electrification in transport.

**The billions now wasted on biofuels should rather be used to boost a transition to real sustainability in transport.**

We are calling on the European Commission, the Council and the European Parliament **to immediately halt the use of crops in biofuels** and to strictly limit the mandates for advanced and waste based biofuels. This can already be done by countries at national level but also through changes in the Renewable Energy Directive, currently under review at EU level.