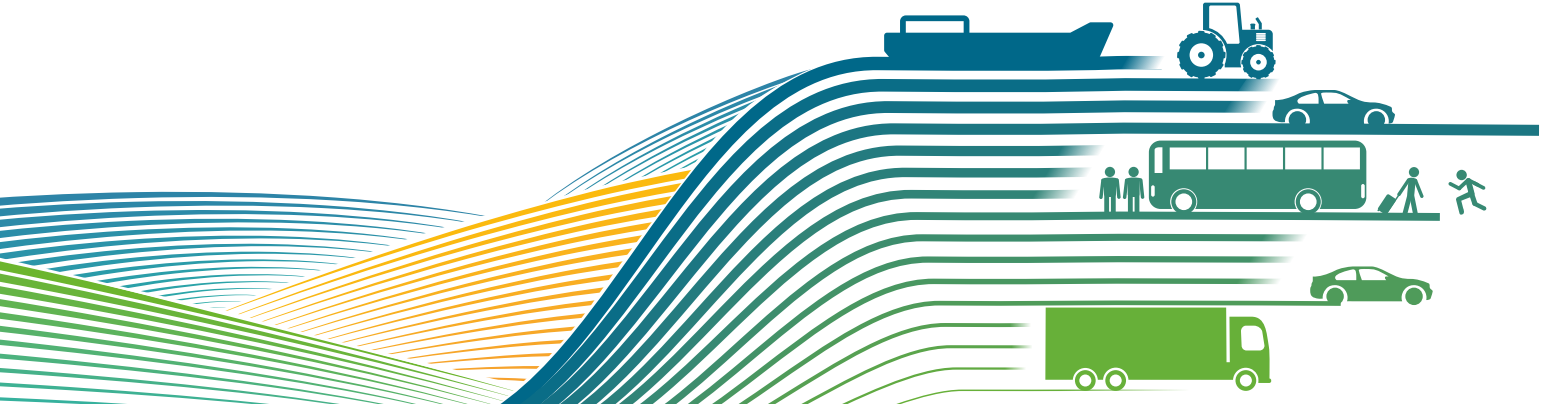
POLICY INFORMATION
BIOFUELS

Consumer confidence
Facts and Background



BDBe Bundesverband der deutschen Bioethanolwirtschaft e.V.

DBV Deutscher Bauernverband

Grain Club

MVaK Mittelstandsverband abfallbasierter Kraftstoffe

OVID ASSOCIATION OF THE OILSEED CRUSHING AND OIL REFINING INDUSTRY IN GERMANY

ufop

VDB Zukunft tanken.

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What does Germany think about biofuels? In order to reply to that question, we commissioned the KANTAR market research institute to gather opinions on biodiesel, bioethanol and biomethane. The survey revealed that a vast majority is in favour of biofuels and of incorporating higher levels into blends. In addition, Germans oppose banning biofuels as a response to greater demand for agricultural feedstocks due to the crisis in Ukraine.

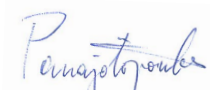
The transport sector must increase the scope and pace of its future contribution to climate change mitigation. Over a period of just eight years, annual greenhouse gas emissions must fall from 148 million to 85 million tonnes. As a matter of fact, biofuels are already protecting the climate. They help cut emissions into the atmosphere by around eleven million tonnes every year and decrease dependence on fossil fuels. That is especially true against the backdrop of the Ukraine war and imports from autocratic states like Russia.

Biofuels can, however, do even more. The raw materials cultivated play a role in producing of a broad spectrum of everyday goods, ranging from eggs, butter or meat to animal feed, toothpaste, detergents or hand disinfectants.

This brochure presents further details, along with relevant facts and figures about biofuels.

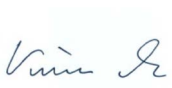
Norbert Schindler, BDB[e] Chairman

Björn Meyer, Chairman Grofor / Grain Club



Michael Fiedler-Panajotopoulos, MVaK Chairman

Jaana Kleinschmit von Lengefeld, OVID President



Detlef Kurreck, UFOP Chairman

Stefan Schreiber, VDB President

"Sustainably produced biofuels can make a significant contribution to reducing the burden on the national budget over the next ten years by significantly cutting greenhouse gas emissions in the transport sector."

Prof. Dr. Claudia Kemfert, *Head of Energy, Transport, Environment Department, German Institute for Economic Research (DIW Berlin) and Professor of Energy Economics and Energy Policy at Leuphana University*

"Support measures should be adopted in the transport sector to boost production of 1st and 2nd-generation biofuels."

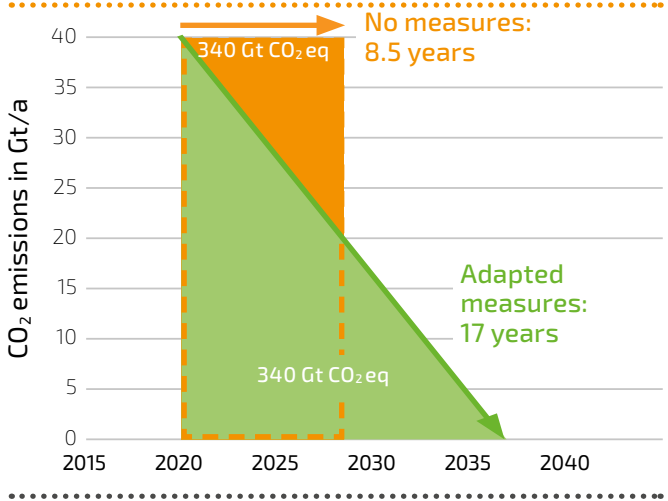
Global energy transformation: A roadmap to 2050 *(2019 edition), report from the International Renewable Energy Agency IRENA*

Time Pressure is Driving Action

Drought, forest fires, record-breaking heat: climate change has long been a reality. That is why the global community has committed to keeping the rise in average global temperature well below 2 °C and, if possible, curbing any increase to 1.5 °C above the pre-industrial level. This means only a limited volume of greenhouse gases can still be emitted: only 340 gigatonnes of CO_2 eq. worldwide (2020). That CO_2 budget will be exhausted by 2029 unless significantly more rigorous measures to mitigate climate change are introduced all over the world. The figures show the need to cut global annual CO_2 emissions more rapidly. **One thing is clear: all available measures that have a rapid impact must be implemented immediately!**

Against this backdrop, in December 2020 the European Union (EU 27) adopted a climate target that aims to cut greenhouse gas emissions by 55 per cent (compared to 1990 figures) by 2030. Climate neutrality is to be achieved in Germany by 2045, i. e. by that date at the latest, it will only be permitted to emit greenhouse gas if the equivalent volume of GHG has previously been removed from the atmosphere. In this context, sticking to the CO_2 budget over the next decade is inextricably linked to attaining climate neutrality.

WHEN WILL THE CO_2 BUDGET FOR THE 1.5 °C TARGET BE EXHAUSTED?



Source: Prof. Dr. Willner, HAW Hamburg, Climate Protection in the Transport Sector – The Key Role of Alternative Fuels, p. 280 ff.

"Consumers love rapeseed honey and livestock love protein-rich rapeseed meal. Human diets also benefit from meat, milk or eggs. That is why we urge politicians to finally recognise the beneficial contribution that biofuels make in climate change mitigation and for the entire agricultural value chain."

Jaana Kleinschmit von Lengefeld, President, OVID Association of the Oilseed Crushing and Vegetable Oil Refining Industry in Germany

"One advantage of German biodiesel production has largely been disregarded so far: glycerine, produced as a co-product, is used in many applications in everyday life and has completely sidelined glycerine made from fossil sources. It is found in tablets, toothpaste, disinfectants, and many other products."

Stefan Schreiber, President, Association of the German Biofuel Industry (VDB)

"Biofuels are emblematic of the close interlinkages along the entire commodity chain from cultivation and harvesting to processing. I would describe that as the transparent bioeconomy in action. Statutory requirements for sustainability, greenhouse gas reduction and certification constitute the shared framework."

Detlef Kurreck, Chairman, Union for the Promotion of Oil and Protein Crops (UFOP)

"If over two thirds of Germans are in favour of biofuels, policy-makers should take this into account and envisage using more certified sustainable bioethanol in road transport to achieve the climate targets. Most Germans think a mix drive solutions is the best way to move forward."

Norbert Schindler, Chairman, German Bioethanol Industry Association (BDBe)

"Politicians must finally take off their ideological blinkers! If we want to protect the climate, we'd be well advised to keep on adding cultivated biofuels to blends."

Joachim Rukwied, President, German Farmers' Association (DBV)

"Waste-based biodiesel makes a quantifiable contribution to protecting the climate and environment. It is produced mainly from used cooking oils. Collecting the oils ensures they do not enter the sewage system."

Michael Fiedler-Panajotopoulos, Chairman of the Board, Association of Medium-Sized Waste-Based Fuels Producers (MVaK)

"Biofuels reduce dependence on fossil fuels and make a real contribution to environmental protection in the mobility sector. Over 10 million tonnes of CO_2 per year are saved. As co-products, glycerine and protein-rich animal feed cut import requirements."

Björn Meyer, Chairman of the German Association of Wholesalers in Oils, Fats and Oil Raw Materials (Grofor), Chairman of the Grain Club

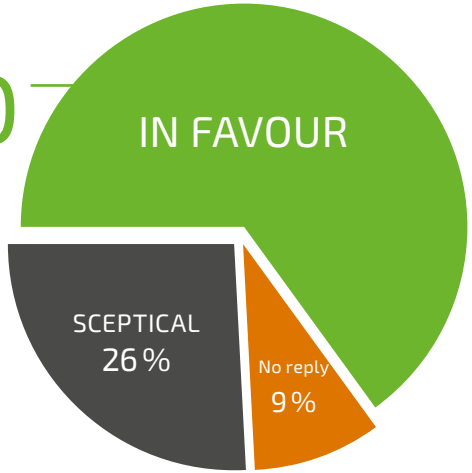
2022 Survey

In June 2022, the market research institute KANTAR polled 1,009 respondents aged at least 14 and resident in Germany about their attitudes towards biofuels. This representative survey was commissioned by the German Bioethanol Industry Association of the Oilseed Processing Industry in Germany (OVID), the Union for the Promotion of Oil and Protein Plants (UFOP) and the German Biofuels Industry Association (VDB). KANTAR put questions by telephone to participants selected in a random sample to ascertain public views on biodiesel, bioethanol and biomethane.

WHAT DO GERMANS THINK ABOUT BIOFUELS?

65 %

OF THE POPULATION HAVE A GENERALLY FAVOURABLE VIEW OF BIOFUELS



Most people in Germany (65 %) have an essentially positive view of biofuels, while only a quarter of respondents are sceptical. Protecting the environment and resources is the main reason given for a generally favourable view, while more critical respondents often raise concerns about wasting land that could be used to grow food.

WOULD YOU PUT BIOFUELS IN YOUR TANK?

... if biofuels are guaranteed to cut greenhouse gas emissions by at least 60 percent compared with fossil fuels and if their production is certified as "sustainable".

YES, DEFINITELY
39 %

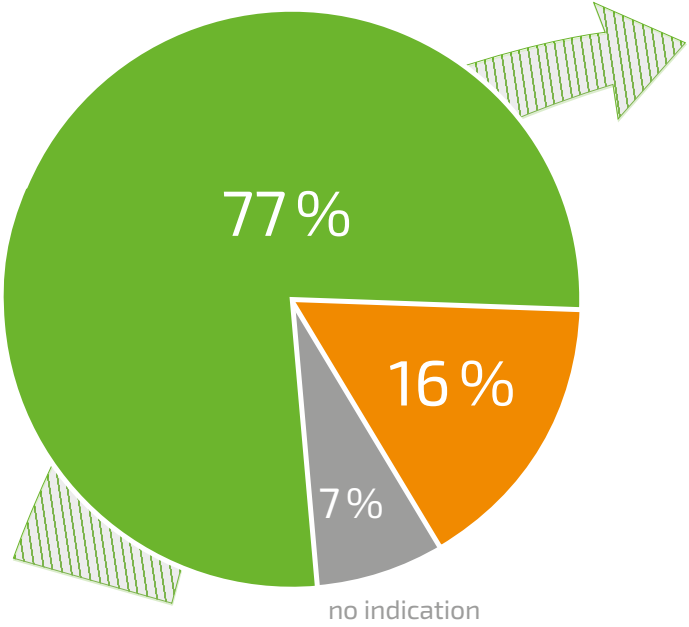
PROBABLY
28 %

I. e. more than 2/3 would fill their tank with biofuels

67 percent of those surveyed would refuel with sustainably produced biofuels if there is a guarantee that these fuels cut greenhouse gas emissions by at least 60 percent compared to mineral oil. If such guarantees are factored in, even over 50 percent of sceptics would be inclined to accept biofuels. Many people simply don't realise that sustainability certification and greenhouse gas reduction are already legal requirements – and some biofuels cut greenhouse gas emissions by over 90 percent.

THREE IN FOUR WANT TO MAINTAIN BIOFUELS

Biofuels reduce CO_2 emissions but there is high demand for agricultural feedstocks against the backdrop of the war in Ukraine. How should policy-makers react?

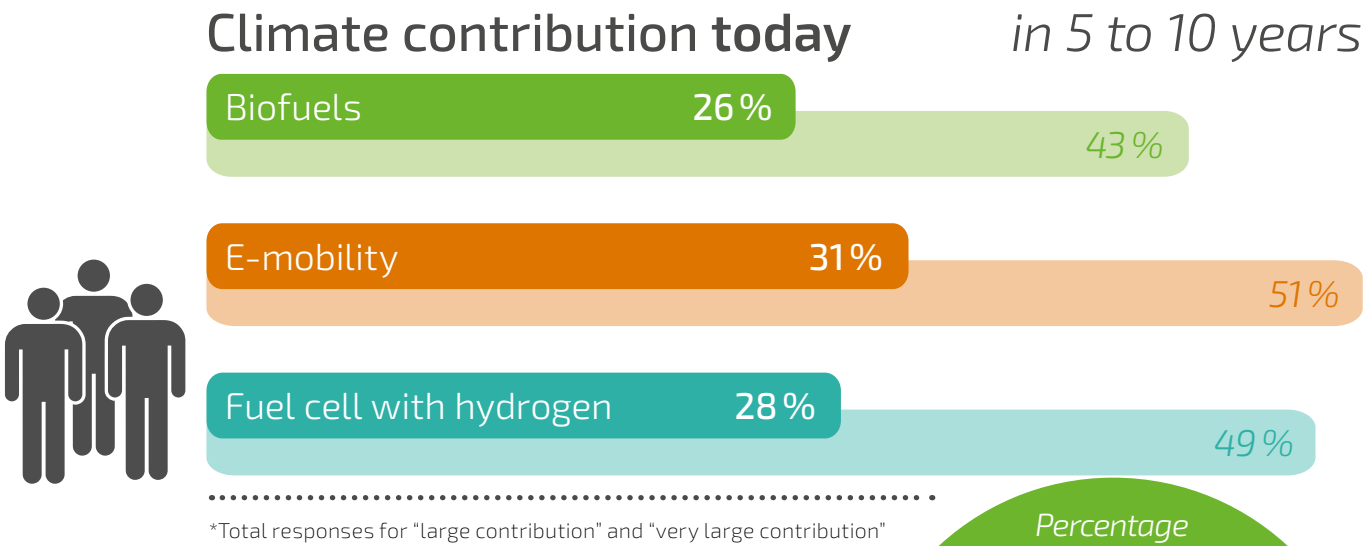


77 % of respondents stated that no permanent cuts or bans should be introduced for biofuels from agricultural feed-stocks.

Over three quarters of the German public want to see continuing use of biofuels in the transport sector. That figure remains steady despite the war in Ukraine and the ensuing greater demand for agricultural feedstocks like vegetable oils and feed grains that are also used for biofuel production.

CONSUMERS EXPECT CLIMATE-FRIENDLY DIVERSITY IN THE TRANSPORT SECTOR

In your opinion, how much do the following drive concepts contribute to reducing greenhouse gases today* and how much will they contribute **in 5 to 10 years***?



*Total responses for "large contribution" and "very large contribution"

Many consumers have long recognised that climate-friendly motorisation calls for diverse and sustainable fuel mixes. Estimates show that in five or ten years biofuels will make almost as great a contribution to mitigating climate change as e-mobility and hydrogen technologies.

*Percentage share of renewable energies in street transport (2022): 97 % biofuels, 3 % e-mobility**.*

** Sources: KBA (Federal Motor Transport Authority), UBA, AGEE-Stat

Climate protection in Transport – What Are the Issues?

Cutting fossil fuel consumption in order to reduce greenhouse gas emissions is the key challenge facing the transport sector. That is the only way to achieve the transport-sector climate target of slashing annual emissions from 134 million t CO_2 eq. in 2023 to 85 million t CO_2 eq. in 2030. Various options are available to attain this goal, such as sustainably certified biofuels (already available), electromobility (under development) and synthetic fuels from renewable electricity, also known as e-fuels (in the future).

Around one million electric cars will be registered in Germany in January 2023, with a government goal of hitting the 15-million mark by 2030. For that to happen, just under 5,500 electric vehicles would need to be registered every day.[1] These vehicles need to be powered exclusively by renewable electricity to exploit their full potential for greenhouse gas reduction. As a general principle, this change-over makes sense for passenger cars, especially as electric drives are 2.5 times more efficient in terms of energy consumption than internal combustion engines. That per se cuts fossil fuel consumption. It's worth noting, though, that the energy content in the tank when a vehicle refuels is unaltered.

Security of supply

Promoting biofuels or conversion to battery operation is not just about climate action. It also has a supply policy dimension, as domestically produced renewables can be used instead of fossil imports. Germany cannot supply its total demand for energy in the transport sector self-sufficiently with biofuels or renewable electricity from wind turbines and photovoltaics. The German government aims to increase the share of renewable electricity in total electricity consumption to 80 % by 2030, in the light of steadily rising demand from e-mobility, heat pumps, and industry. It is vital to speed up efforts to scale up wind power and photovoltaics, as well as continuing to extend the electricity grid.

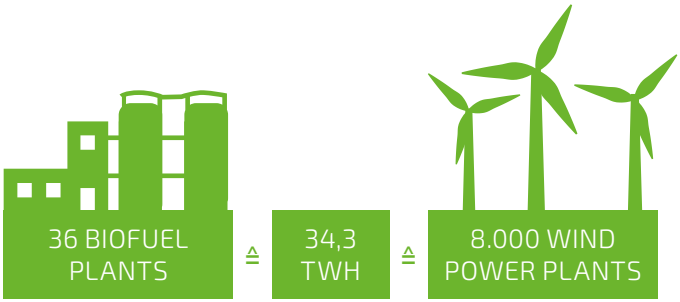
The scale of this challenge is illustrated by the table that reveals that fossil fuel consumption from 2020 to 2022 was approx. 47 – 48 million tonnes per year!

Fuel consumption 2020 – 2022 in million t*

	2020	2021	2022
Biodiesel and HVO**	**3.026**	**2.560**	**2.516**
Diesel fuel	32.045	32.420	32.245
Diesel + blend	35.071	34.980	34.761
Share of biodiesel and HVO	8.6 %	7.3 %	7.2 %
Bioethanol blend***	**1.098**	**1.153**	**1.186**
Petrol	15.161	15.276	15.810
Petrol + Bioethanol	16.259	16.428	16.996
Share of bioethanol	6.8 %	7.0 %	7.0 %

* Source: BAFA (Federal Office for Economic Affairs and Export Control) ** FAME and HVO *** incl. ETBE

Currently, renewable fuels account for about 7 % of fuel consumption. This corresponds to an energy supply of 34.3 terawatt hours (TWh).[2] The approximately 29,000 wind turbines currently in operation in Germany generated about 123 TWh in 2022. Energy produced by biofuels thus corresponds to the energy supply from roughly 8,000 of the wind turbines currently installed.



Given the considerable time pressure to achieve the climate goals described above, this example demonstrates clearly that today all available options are essential to achieve the greenhouse gas reduction targets, especially in the transport sector.

1) Agora Energiewende
2) Federal Environmental Agency

Biofuels' Economic Significance

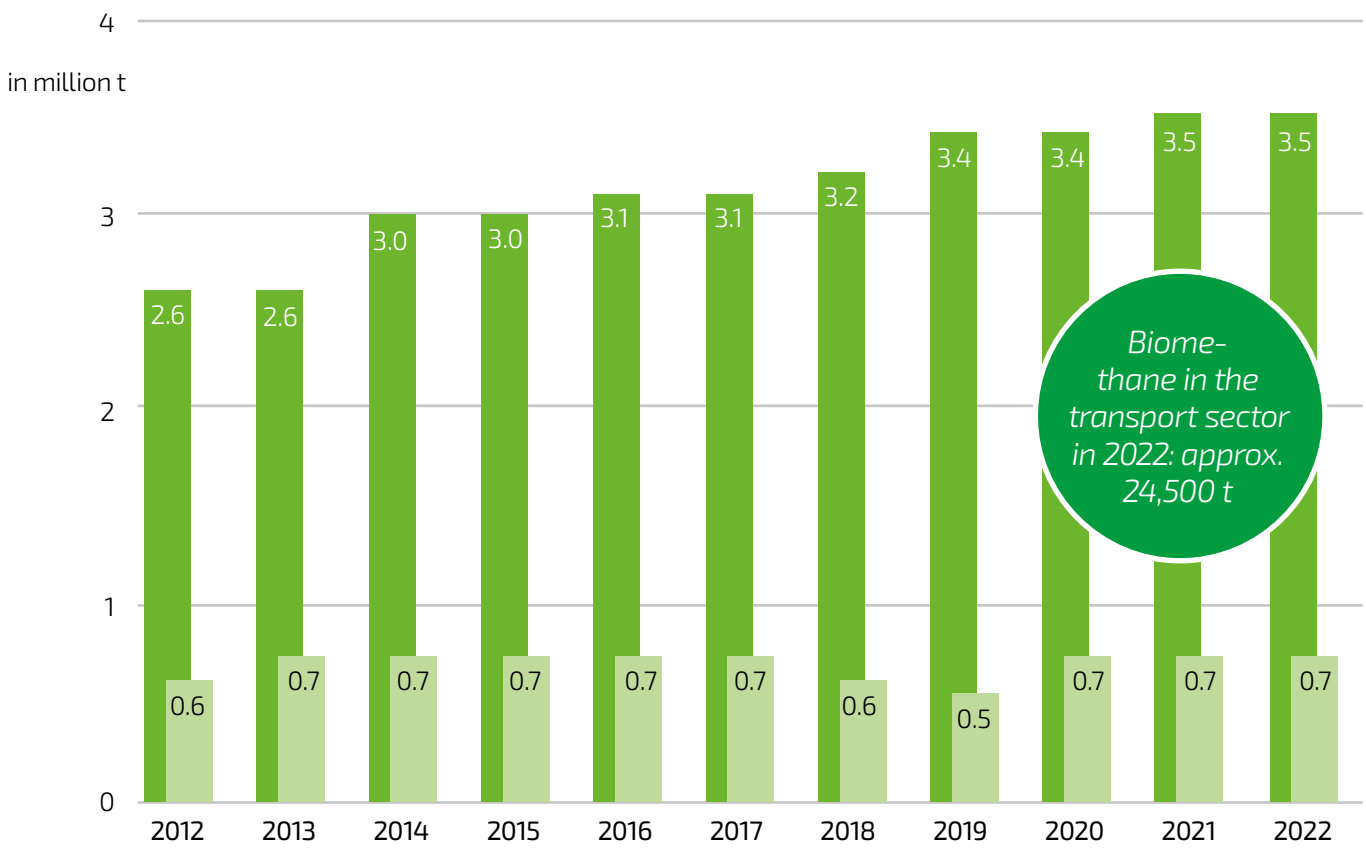
The biofuel industry generates an economic stimulus to the tune of 6.6 billion Euro per year in Germany (Renewable Energies in Germany, data on development in 2022). **Around 22,000 people work in the biofuel sector in Germany, directly or indirectly – many of them in rural, structurally weak regions.** They are often employed in one of the country's 36 biofuel plants, which produced about 3.4 million t of biodiesel, 715,000 t of bioethanol and 24,552 t of biomethane (equivalent to about 34 million m^3) in 2022. When agricultural feedstocks are used for biodiesel and bioethanol, **valuable protein feed is produced as a by-product** and plays an indispensable role in dairy farming as well as in cattle, pig, and poultry rearing. That means fewer soy imports are needed. An important by-product of biodiesel production is glycerine, which is used inter alia in tablets, creams, and foodstuffs.

The biofuel industry demonstrated its flexibility at the start of the COVID-19 pandemic: within a few weeks, several bioethanol producers switched operations on the bulk of their production lines to supply the disinfectants that were suddenly in great demand.

Tried-and-tested infrastructure and logistics already exist for nationwide use of biofuels. This offers immediate advantages over electromobility, as the charging station network is still under construction.

In the context of the EU Effort Sharing Regulation, biofuels already reduce Germany's need for CO_2 emission rights. The German government would otherwise need to purchase more rights from other EU Member States. As a result, using biofuels will mean savings for the public purse of up to 10 billion Euro by 2030 *(source: DIW/German Institute for Economic Research).*

DOMESTIC PRODUCTION OF **BIODIESEL** AND **BIOETHANOL** SINCE 2012



Sources: VDB, BDB[e], (biomethane: BLE), figures rounded, biodiesel 2021 + 2022 VDB estimate

Sustainably Produced Feedstocks for Biodiesel

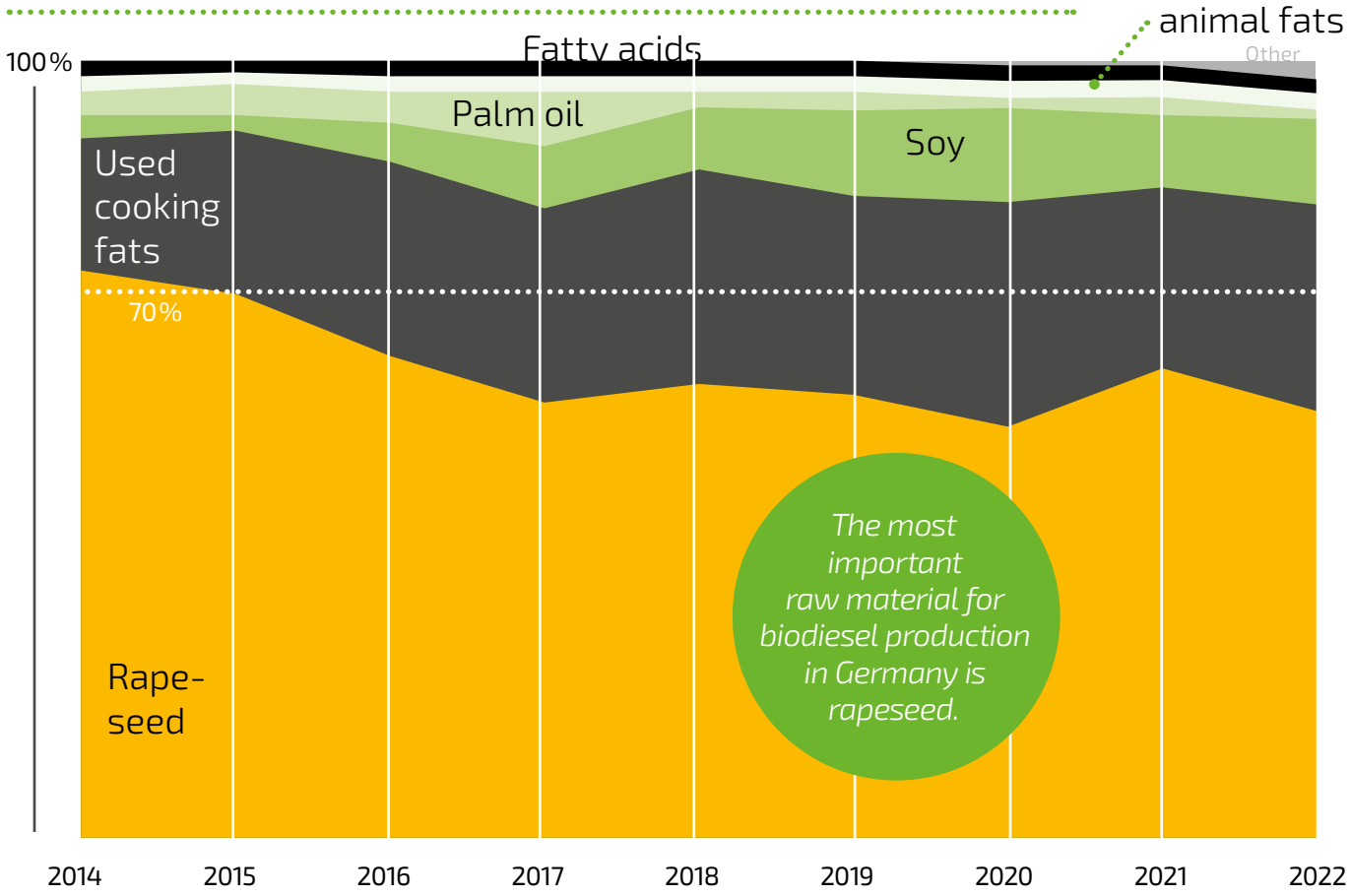
Rapeseed has always been the most important feedstock for biodiesel production in Germany. It accounts for over half of the total; in 2022, rapeseed made up 55 % of all inputs. Used cooking oils make up a further 27 %, a figure that has risen significantly in recent years. In contrast, palm oil (1.2 %) and soybean oil (11 %) played a less significant role; use of palm oil is de facto banned in Germany from 2023. Biodiesel was also produced from waste fats in Germany, admittedly only in very small quantities (2.1 %).

Not all of the feedstocks used to produce biodiesel come from Germany. Nevertheless, Germany is diversifying its energy supply through biofuels, making it less dependent on fossil fuel exporters like Russia.

There's no arguing with the facts: agricultural feedstocks for biofuel production must be cultivated sustainably worldwide. The Biofuel Sustainability Ordinance (2009) stipulates that feedstocks may not come from former rainforest areas, grassland or peat bogs, in order to preserve these ecosystems, which merit particular protection. There is also a statutory requirement to demonstrate that greenhouse gas emissions are cut by at least 50 % compared to fossil fuels.

In 2021, biodiesel, bioethanol and biomethane achieved average emissions savings of 84 %, according to figures from the Federal Office for Agriculture and Food (BLE).

FEEDSTOCK MIX IN GERMAN BIODIESEL (IN %)

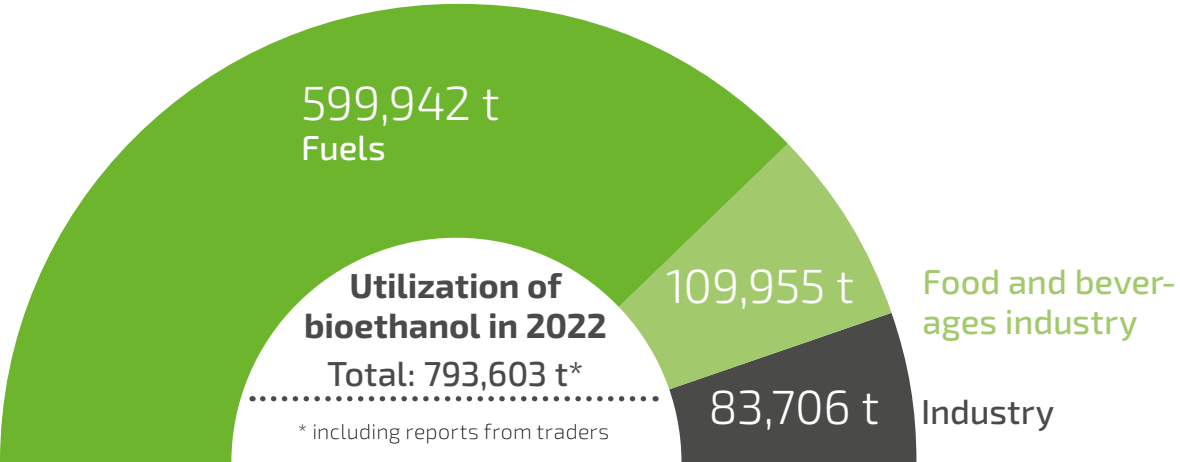


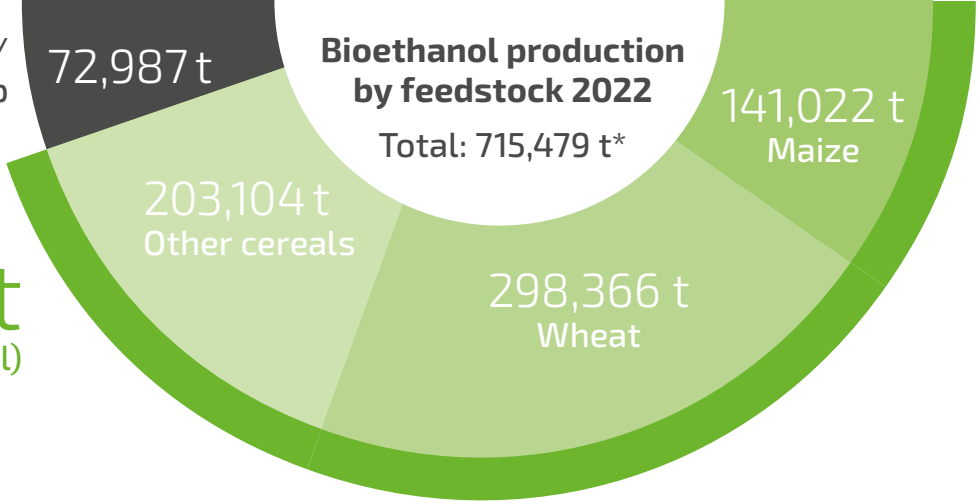
Source: VDB

FEEDSTOCKS FOR BIOETHANOL

In Germany bioethanol is made primarily from sugar beet and grain. In 2022, 715,000 t of bioethanol were produced in Germany from these feedstocks. That figure is 2.0 % higher than in 2021. In addition, a small proportion of bioethanol is produced from residues and waste, although a precise percentage is not given in the figures from the Federal Office for Food and Agriculture (BLE). **Bioethanol is used in the fuel, animal feed, food and beverage sector, as well as in the chemical and pharmaceutical industries.**

In 2022, petrol consumption hit approx. 17 million t, 3.5 % higher than in the previous year (16.5 million t). At the same time, the share of bioethanol in total consumption rose to 1.19 million tonnes. That represents a 6.6 % increase. In contrast, the volume of bioethanol sold to the food and beverage sector (-3.7 %) and to the chemical and pharmaceutical industries (-20.3 %) fell significantly compared to 2021.





642,500 t
from cereals (total)

642,500 t of bioethanol were produced from feed grain in 2022 (+10.8 %). That required around 2.7 million t of feed grain as feedstock. That is equivalent to 6.2 % of the German grain harvest, with a total harvest of 43.5 million t in 2022.

The raw materials to supply all domestic bioethanol production were cultivated on approx. 360,000 ha. This corresponds to about 3 % of total arable land in Germany.

Alongside bioethanol, other plant-based components from the processed feedstocks provided proteins, dietary fibres, minerals and vitamins, which were turned into high-quality co-products: protein feed from feed grain, concentrated feed from sugar beet, and other products for the food and feed industry, such as gluten and biogenic carbon dioxide for beverages.

* Total without residues and waste materials, information not indicated due to antitrust law.

Waste-based Biofuels

Liquid, waste-based biofuels have become more significant in German road transport. These biofuels, largely produced from used cooking oils, can reduce greenhouse gas emissions particularly dramatically. Used cooking oil is already collected nationwide from the food-processing industry and restaurants. It also accumulates in households and could be collected, but systems to make that possible are still in their infancy in Germany. It would however be a particular good idea in that context, since households often dispose of used cooking oil by tipping it down the drain and into the sewage system. Used cooking oil can contribute to the formation of problematic deposits in sewage systems that are especially tricky to remove. **That means collecting used cooking oil from households would be good news in terms of environmental protection too.**

There is also another reason to collect used cooking oil. The main concern in countries like India, Bangladesh or China is to prevent misuse in the form of repeated reutilisation of used cooking oil, as that poses risks to health. Processing used cooking oil into biofuel ensures it is removed safely from the food and feed cycle.

There is not an unlimited supply of residues and waste materials. That is why they need to be handled efficiently, just like all other inputs, when producing renewable fuels for consumers and as part of climate action. **The highest yield and most significant reduction in greenhouse gas emissions from oils based on waste and cultivated biomass can be achieved by turning them into biodiesel for use in road transport and shipping.**

Moving Towards Climate Neutrality: Biofuels are Crucial for the Transport Sector

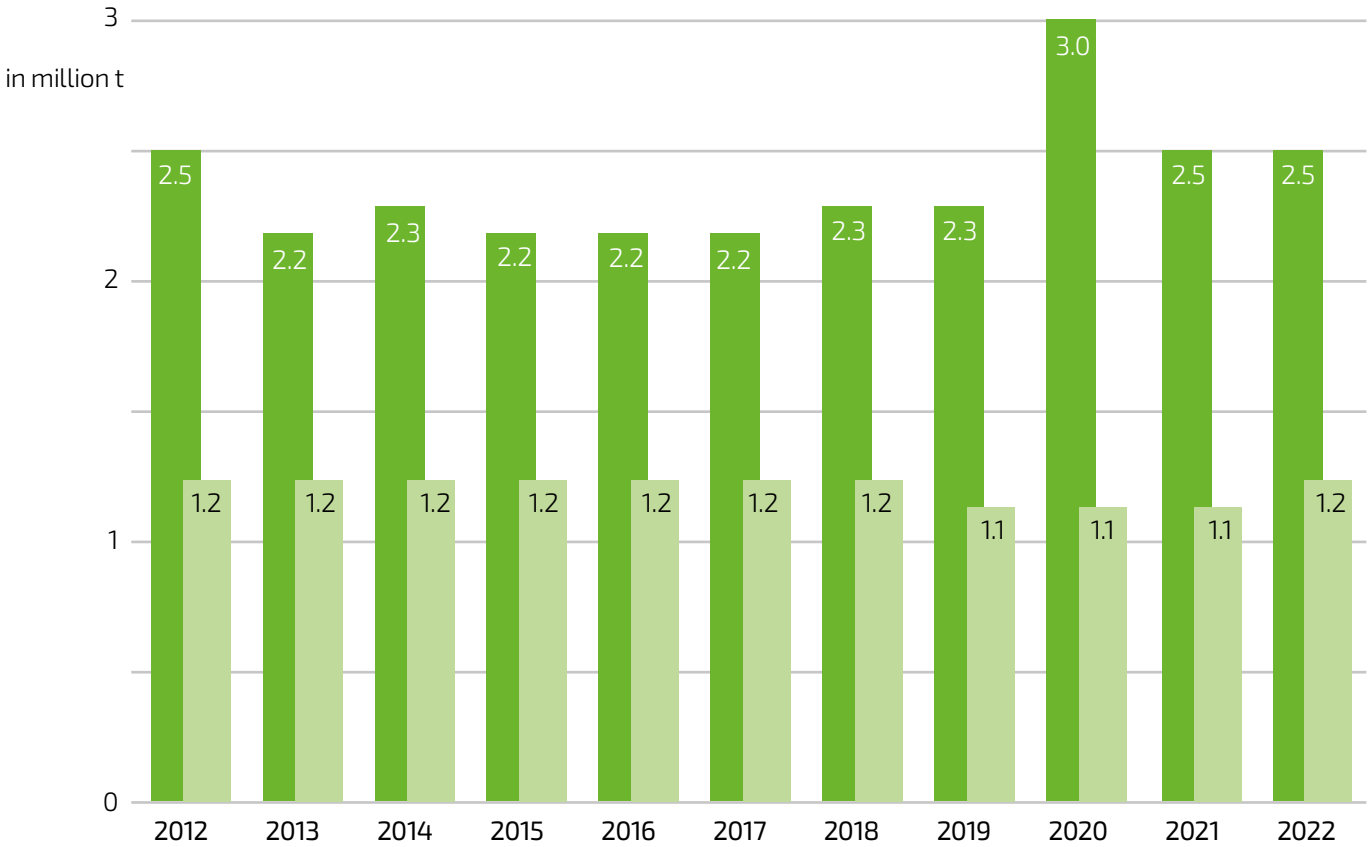
According to § 3 of the Federal Climate Protection Law, greenhouse gas emissions in Germany must be reduced to a level that ensures climate neutrality by 2045. **In order to achieve this ambitious target in only 22 years, enormous efforts are required** in all sectors: industry, housing, energy generation and transport.

Achieving the necessary emission reductions, especially in transport, is challenging. After all, greenhouse gas emissions in this sector have scarcely decreased since 1990. In just eight years, these emissions must be cut from the current annual level of 148 million tonnes of CO_2 to 85 million tonnes in 2030. **Biofuels reduce greenhouse gas emissions by about 11 million tonnes per annum, with about 7.5 million tonnes saved thanks to biodiesel and bioethanol from cultivated biomass.** That clearly shows that sustainably produced biofuels are vital for defossilisation the transport sector.

Biofuels are of course not entirely climate-neutral. Nevertheless, they have gradually improved their performance in terms of greenhouse gas reductions and have for years been the most significant and reliable factor in reducing emissions in the transport sector. Depending on the feedstock used, biodiesel and bioethanol cut greenhouse gas emissions by around 70 % to over 90 % compared to fossil fuels. Although biofuels from cultivated biomass do emit CO_2 when burned, the volume in question is only equivalent to the CO_2 previously absorbed by the plants that are processed. Any further emissions are linked to aspects of agricultural cultivation, transport, processing, etc.

In its most recent 2023 assessment report, the Intergovernmental Panel on Climate Change (IPCC) underlines that every tonne of CO_2 makes a difference as we move towards climate neutrality. In this spirit, biodiesel, bioethanol and biomethane will continue to be absolutely necessary in years to come.

SALES OF **BIODIESEL*** AND **BIOETHANOL**



* Biodiesel and HVO | Sources: VDB, BDB[e] , BAFA, figures rounded

Potential Applications (B7, B10, B100, E5, E10, E20, E85)

Biodiesel, bioethanol and biomethane are placed on the market in the form of fuels that comply with specific standards. This guarantees that they can be used safely and without technical problems. **The higher the admixture, the greater the positive effect for the climate.**

Biodiesel:

- B7: Permissible admixture of biodiesel to fossil diesel with a maximum share of 7 % (by volume) biodiesel (DIN EN 590)
- B10: Permissible admixture of biodiesel to fossil diesel with a maximum share of 10 % (by volume) biodiesel (DIN EN 16734)
- B20/B30: Permissible admixture of biodiesel to fossil diesel with a maximum share of 20 % (by volume) or 30 % (by volume) biodiesel (DIN EN 16709).
- B100: pure biodiesel (DIN EN 14214)

Biomethane:

- Biomethane as pure fuel or blended with fossil natural gas (DIN EN 16723-2)

Bioethanol:

Fuels that comply with DIN EN 51625 and DIN EN 15376.

- E5: Permissible admixture of bioethanol to fossil petrol with a maximum share of 5 % (by volume) ethanol (DIN EN 228)
- E10: Permissible admixture of bioethanol to fossil petrol with a maximum share of 10 % (by volume) ethanol (DIN EN 228)
- E85: Permissible admixture of bioethanol to fossil petrol with a maximum share of 85 % (by volume) ethanol (DIN EN 15293).

In the medium term, blends with higher biodiesel levels should also be approved for sale at public filling stations, as is the case for the already standardised grades B10, B20 or B30. The standardisation process for a petrol blend with a higher biofuel content (E20) is currently underway.

GHG Quota

By 2022, biofuels had achieved emission savings of around 80 million tonnes of CO_2 thanks to the greenhouse gas reduction quota (GHG quota) introduced in 2015. This quota does not stipulate a requirement to use a specific amount of biofuel. Instead, the quota obliges the mineral oil industry to reduce the greenhouse gas emissions of fuels placed on the market. To that end, firms may opt to use biodiesel, bioethanol or biomethane as well as electromobility or hydrogen.

The lower the greenhouse gas emissions of the alternative used, the faster oil companies can achieve the stipulated reduction, while also needing a smaller volume of biofuels. Companies can make purchasing decisions based on price and the degree of greenhouse gas reduction. This creates competition to produce biofuels that emit the lowest possible GHG levels. As a result of significantly enhanced performance in cutting emissions, smaller volumes of biofuels are needed to meet GHG reduction targets. That also means the same amount of biofuel has an even greater impact on climate change mitigation.

One point that needs to be viewed critically is the option available until 2026 for mineral oil companies to meet up to 1.2 per cent of their annual obligation through upstream emission reductions (UER). These are measures to reduce greenhouse gases during oil production, e.g. immediate burning off (flaring) of associated gas (methane) that escapes during drilling. It opens the possibility for UER measures in oil production in Siberia or Nigeria to be counted towards the GHG quota without any drop in emissions from road transport in Germany.

Fuel distributors obliged to meet the GHG quota can also trade GHG reductions with other firms that place fuels on the market, e.g. if they use a higher level of biofuels than required. This offers greater flexibility to meet the quota.

Prices for a tonne of CO_2 savings traded between companies fluctuate between about 150 and 400 Euro. **Market-driven emissions trading is**

already taking place in this context. These figures reveal that the cost of avoiding greenhouse gas emissions is much higher in the transport sector than in sectors covered by the European Union's Emissions Trading Scheme (industry, power generation). In those sectors, prices are around 90 to 100 Euro per tonne of CO_2 (2023), although the figures are rising there too.

Boosting this potential by raising the GHG quota makes obvious sense, as a measure that has a direct impact and secures a greater contribution to climate change mitigation. In contrast to e-mobility and hydrogen technology, no additional infrastructure is required to take this step.

Calculation of the GHG quota:

Mineral oil companies multiply the energy of the fuels they put on the market (diesel, petrol, biofuels, etc.) by a "fossil fuel reference value". This corresponds to the European fuel mix in 2010 and is 94.1 g CO_2/MJ. The resulting notional value is used as a basis for calculating the mandatory emission reductions that the companies must achieve, which is set at minus 8 % in 2023 and steadily increases to 25 % by 2030. They comply with the mandate by employing biofuels, green hydrogen, electromobility or UER. (see following pages).

Climate-friendly Transport without Multiple Offsetting

In spring 2021, the Bundestag passed the "Act on Further Development of the Greenhouse Gas Reduction Commitment – GHG Quota".

1. The law stipulates the following provisions:
   - A continuing increase in the GHG quota (in %).

2023	2024	2025	2026	2027	2028	2029	2030
8	9.25	10.5	12	14.5	17.5	21	25

   However, the higher quota levels do not reflect the actual physical contribution to GHG savings as provisions for multiple counting are envisaged to fulfil the GHG quota:

   - Electromobility: 3-fold credit
   - Green hydrogen used in mineral oil refineries: 2-fold credit
   - Green hydrogen as a fuel as well as PtX (power to gas or power to liquid): 2-fold credit
   - Biofuels from straw, manure, nutshells or similar (Annex XI, Section A, RED II) must make up a defined minimum share:

2023	2024	2025	2026	2027	2028	2029	2030
0,3 %	0,4 %	0,7 %	1,0 %	1,0 %	1,7 %	1,7 %	2,6 %

     Greenhouse gas reductions that exceed this sub-quota are counted twice towards the GHG quota; this applies indefinitely.

2. Until 2030, a maximum contribution to climate change mitigation of 4.4 % of final energy consumption is stipulated for biofuels from cultivated biomass. Biofuels from palm oil could only be credited towards the GHG quota until 2022.

3. Crediting of biofuels from animal fats and used cooking oils is restricted to at most 1.9 % of final energy consumption.

4. The GHG quota is to be increased to compensate for a more rapid ramp-up of electromobility (§ 37h Federal Immission Control Act /BImSchG).

Appraisal:

1. The update of the successful biofuels legislation by the German Bundestag ensures that biodiesel and bioethanol will make a major contribution to climate change mitigation in the period up to 2030. In addition, investment security is safeguarded for the industry moving forward. Arrangements to intermesh electromobility, biofuels and other climate-friendly fuels are also secured. German policymakers have been more ambitious in this context than their European counterparts in addressing the challenge of GHG reduction in road transport; the existing provisions should therefore be retained.

2. It is becoming apparent that reducing greenhouse gas emissions in the transport sector is particularly challenging. To date, biofuels are almost the only option to reduce CO_2 emissions reliably. Against this backdrop, it is imperative that any attempts to amend the recently introduced legislation be firmly rebuffed.

3. The growing number of electric cars means energy consumption in the transport sector will fall, as electric motors are much more efficient than conventional combustion engines. **When that phenomenon begins to have an impact, the cap for biofuels from cultivated biomass (currently 4.4 % in terms of energy output) should therefore be raised to ensure electric vehicles also contribute to climate change mitigation in the medium term. The same applies to the sub-quota for advanced biofuels (Annex IX, Part A, RED II) and the cap for waste-based biofuels (Annex IX, Part B, RED II)**. Advanced biofuels may only be credited towards national and EU targets if the countries where such fuels are produced can demonstrate strict enforcement of administrative measures and verification of proof of sustainability, as well as effective oversight. Creating incentives for domestic investment in advanced biofuels should be a key objective, along with safeguarding existing investments in the biofuel sector.

Environmentally and Climate-friendly Production Chain

Calculating the greenhouse gas footprint of biodiesel, bioethanol and biomethane includes each stage of the biofuel production process (cultivation, transport, processing), irrespective of whether the feedstock materials are grown in Germany or overseas.

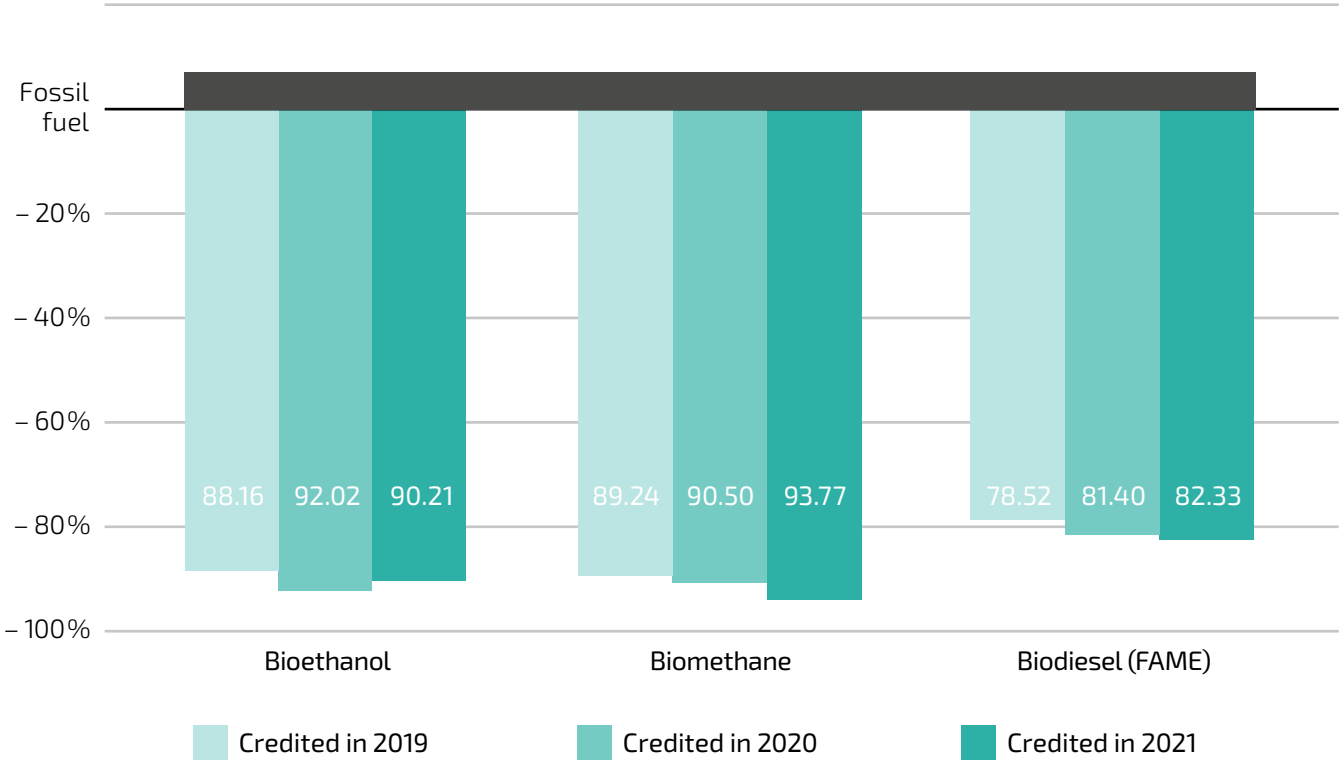
Firms that produce biodiesel, bioethanol and biomethane are in fierce competition to achieve the lowest possible GHG emissions. Multiple options exist to optimise GHG reduction in biofuel production:

- Using combined heat and power (CHP)
- Improved insulation of heating pipes
- Using more efficient machinery
- In-house power supply based on renewables
- Shorter transport routes
- Reduced fertiliser use
- Use of biofuels in agriculture
- Reducing emissions through
  - Carbon capture and storage (CCS)
  - Use of CO_2 in other applications (CCU, e.g. fertilisation in greenhouses, beverage industry applications)

According to non-governmental organisations, higher feedstock demand from the biofuel industry has led to "indirect land use change" (iLUC), causing additional CO_2 emissions.. However, the Intergovernmental Panel on Climate Change (IPCC) notes in its Special Report on Climate Change and Land that "There is low confidence in attribution of emissions from iLUC to bioenergy". Despite the clear statement from the IPCC, the EU has reacted to the iLUC theory by capping the permitted contribution to climate change mitigation that may be made by biofuels from cultivated biomass at 7 % of energy consumption. Palm oil will be banned as a feedstock in the EU by 2030, as it has a high iLUC risk. **Palm oil is already prohibited as a feedstock for biofuels in Germany.** Biofuels from cultivated biomass may only constitute 4.4 % of total energy in the transport sector in Germany.

BIOFUELS' CONTRIBUTION TO CLIMATE CHANGE MITIGATION

Average emission savings (in %) compared to reference fossil fuel



Source: BLE Evaluations- und Erfahrungsbericht 2021, pp. 60 and 61

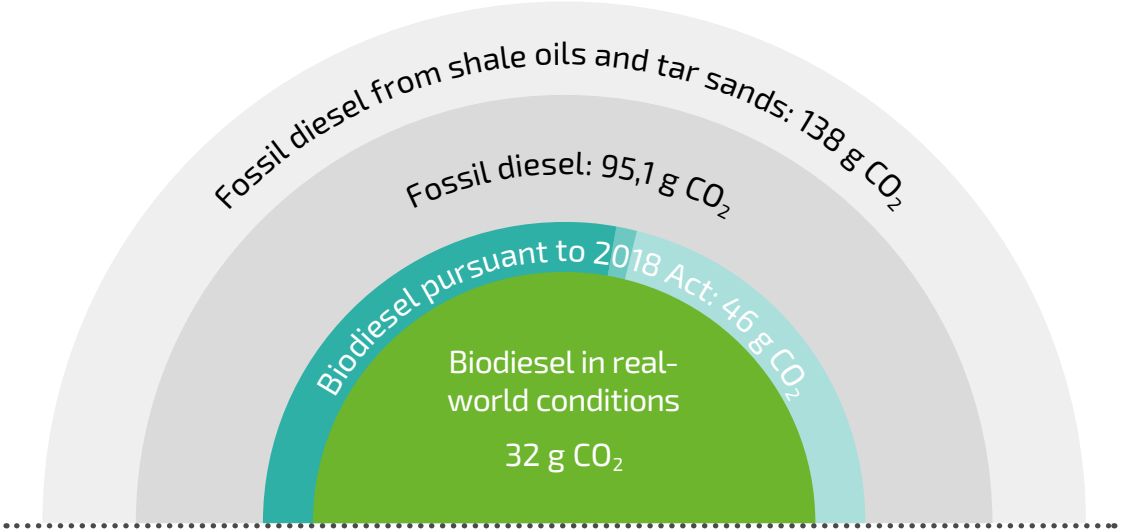
GHG EMISSIONS FROM BIOFUELS (WITH BIODIESEL AS AN EXAMPLE)

Greenhouse gases are emitted during biodiesel production. The figure shows GHG emissions from (rapeseed-based) biodiesel compared with fossil fuel.

56 %
Planting and crop cultivation*

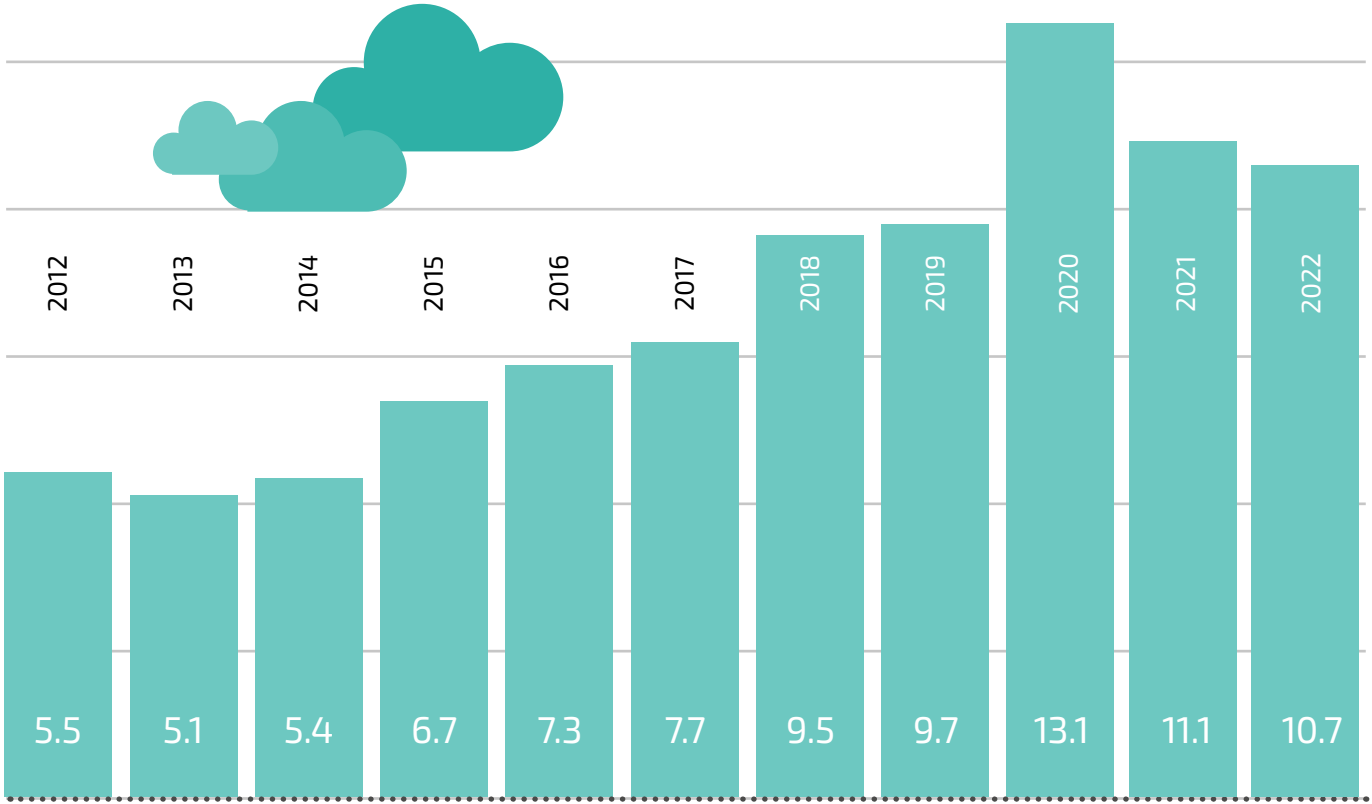
2 %
Transport*

42 %
Processing*



* Standard values

CO_2 SAVINGS THROUGH BIOFUELS IN MILLION TONNES



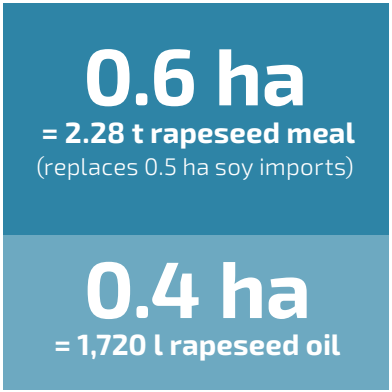
Sources: BMWK / Federal Ministry for Economic Affairs and Climate Action, UBA/German Environment Agency, AGEE-Stat, BLE/Federal Office for Agriculture and Food (for 2022: UFOP estimate) | Evolution of greenhouse gas reduction ratio (GHG ratio): 2015: 3.5 %; 2017: 4 %; 2020/2021: 6 %; 2022: 7 %; 2023: 8 %. Fossil fuel reference value until 2018: 83.8 g CO_2 eq./MJ, thereafter 94.1 g CO_2 eq./MJ

A Key Role in Food Security and Biodiversity

Critical questions are raised by the general public concerning ethical justifications for using rapeseed and grain as feedstocks for biofuels, particularly as this is sometimes held to undermine efforts to foster biodiversity. There is even talk of "land consumption" by biofuels, with critics calling for more extensive agriculture (30 % organic farming).

Rapeseed Cultivation for Table, Tank and Trough

1 ha rape = 4 t rapeseed



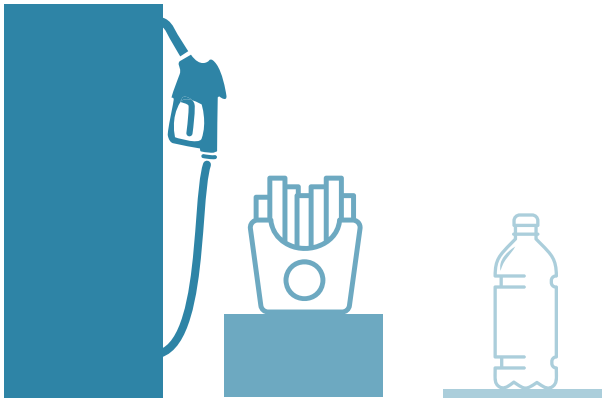
From the agricultural perspective, the term "land consumption" is disconcerting, distorts the situation and devalues what is known as good agricultural practice in arable farming. It inappropriate to talk about land consumption because biofuel only emerges as an intended use in the commodity chain after harvesting, i. e. when the rapeseed oil is sold to a biodiesel producer, for example. When a decision is taken to grow a particular crop, its subsequent use is not determined. Rapeseed is cultivated in accordance with increasingly stringent legal requirements concerning use of fertilisers and pesticides.

Producing biofuels from cereals and rapeseed always generates large quantities of protein feed, i. e. part of the harvest is always deployed to feed livestock and thus ultimately contributes to human nutrition. As a further option, the entire harvest may be channelled into food production. In contrast to extensification (organic farming), where the harvest volumes are reduced by 30 – 40 %, the full genetic yield potential is exploited in the light of the conditions on each

specific site – for biofuel production or to produce food if there is a crisis. Growing feedstocks for biofuel production thus also plays an important part in ensuring security of supply, if harvest volumes are lower or if imports dry up. In 2022, it was possible to compensate for the shortfall in sunflower oil imports due to the war in Ukraine by drawing on rapeseed oil from the EU. There was no supply problem, only a temporary shortage in shops due to hoarding. Sufficient volumes were also available on global grain markets and were diverted to Africa to replace supplies from Ukraine.

Securing food supply has priority over biofuels. Rapeseed oil intended for biodiesel production was utilised to make up for the sunflower oil shortfall. This example demonstrates that biofuels ensure that intended biofuel inputs are available as a buffer. These reserves would not have existed if there had been a switch to more extensive agriculture or if biofuels had been abolished. What's more, the food market always wins in price-driven demand-side competition!

Private households account for 2 % of total consumption of German rapeseed oil (2021)



Sources: BLE, AMI with GfK Consumer Panel

Opportunity Costs of Biofuels

Non-governmental organisations have raised a new argument against biofuels, claiming that renaturation of arable land would be a preferable option, as it would bind more greenhouse gases, or that solar plants should be installed to generate more energy.

Renaturation vs. biofuels

Greenhouse gas savings from biofuels are verified, certified and resilient. In contrast, storage of carbon in the soil or in vegetation – e.g. in trees or shrubs – is not stable. That has been demonstrated worldwide in recent years, especially due to forest fires.

Photovoltaics vs. biofuels

Comparing these technologies is like comparing chalk and cheese: photovoltaics is a technology for generating electrical energy. Biofuels, on the other hand, are storing energy, in other words, energy is bound within molecules, can be readily transported, providing reserves in case of energy shortages. It is fair to say that photovoltaic systems generate significantly more energy in the long term per unit area than cultivating feedstocks for biodiesel or bioethanol. However, the energy yield from photovoltaics is virtually zero in winter, at night or in cloudy conditions. In contrast, biofuels can supply the energy stored in them constantly. Biofuels can reduce greenhouse gas emissions in the existing fleet, while electricity from photovoltaic systems can be used in new e-cars. Both technologies are important and complementary.

Land used to generate solar energy is not available for food production or, in the case of agrivoltaics, limits agricultural output. That is however not the case when growing biomass that can be used to produce biofuels.

Land Use for Biofuels

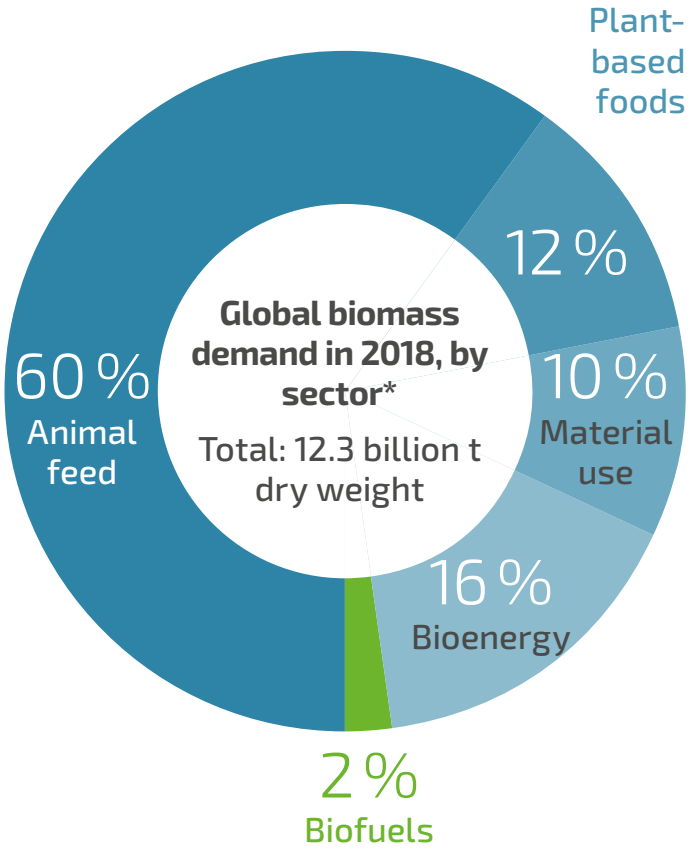
Feedstocks for biofuel make up only 2 % of global biomass demand for various use. Consequently, the area required to grow these feedstocks is relatively small, in Germany as elsewhere. Rapeseed, grain and sugar beet for biodiesel and bioethanol are grown on about 850,000 ha. That corresponds to only 7 % of the 11.7 million hectares used for arable farming in Germany.

It is important to bear in mind that within the biofuel production chain, during the processing of rapeseed and cereals also large quantities of protein feed are produced, hereby cutting soy imports from overseas.

Area under cultivation for biofuels in Germany

in ha	2020	2021	2022
Rapeseed oil for biodiesel/ vegetable oil	471,000	612,000	665,000
Crops for bioethanol	188,000	216,000	216,000
	659,000	**828,000**	**881,000**

Source: Fachagentur Nachwachsende Rohstoffe (FNR/Agency for Renewable Resources); 2021: preliminary figures; 2022: estimated values



* Hauptbericht, Wissenschaftliche Beirat der Bundesregierung Globale Umweltveränderungen/ German Advisory Council on Global Change (WBGU), November 2020, p. 212

Biofuels' Role in Production of Glycerine and Disinfectants

» Glycerine is a valuable by-product of biodiesel production.

» This transparent and odourless liquid is a vital ingredient in medicines, cosmetics, antifreeze and lubricants, as well as in food.

» Annual production of 3.4 million tonnes of biodiesel in Germany gives rise to around **340,000 tonnes of glycerine**. The vegetable oil-based, domestic feedstock has by now almost completely displaced crude-oil-based glycerine.

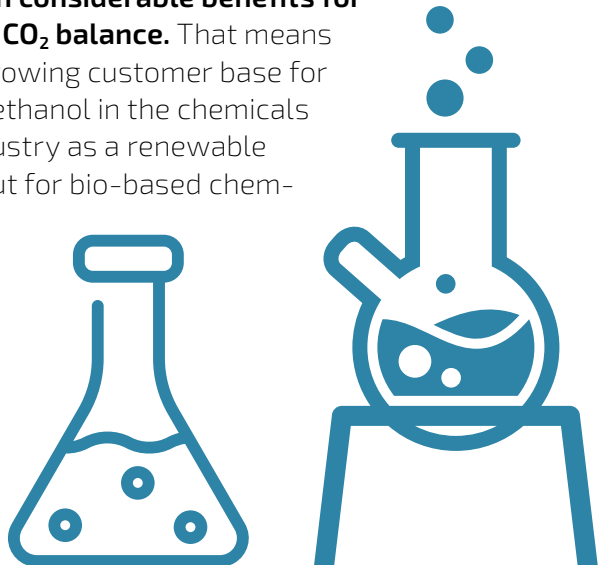
» In producing disinfectants, bioethanol with added glycerine is mainly deployed.

» Bioethanol typically achieves alcohol purity levels of 99.5 – 99.9 %, making it effective against microorganisms and viruses – perfect for use in hospitals or for sale in pharmacies.

Bioethanol: The Key to Sustainable Chemicals and Plastics

The range of applications for ethanol is very diverse: alcohol is used in the beverage and food industry, is the basis for many cosmetic products, plays a vital role in the pharmaceutical industry and also plays a part, inter alia, in producing paints, varnishes and cleaning agents.

Nowadays, ethanol produced in Europe is almost exclusively made from sustainably certified biomass rather than from fossil sources, with considerable benefits for the CO_2 balance. That means a growing customer base for bioethanol in the chemicals industry as a renewable input for bio-based chemicals and plastics. Renewable ethanol can be utilised, for example, to produce ethyl acetate, widely deployed as a solvent when manufacturing paints, adhesives, cosmetics, flexible packaging and much more. Acetaldehyde, acetic acid, butanol, and ethylene are further important products. They may be used directly or converted in further steps, for example, to plastics such as polyethylene, polypropylene, and synthetic rubber.



By-product of oilseed processing:

Lecithin from oilseed processing is used as a plant-based emulsifier in bread, baked goods and margarine, as well as in medical contexts, cosmetics, food supplements, and beverage products.

Biofuel Production and Animal Feed

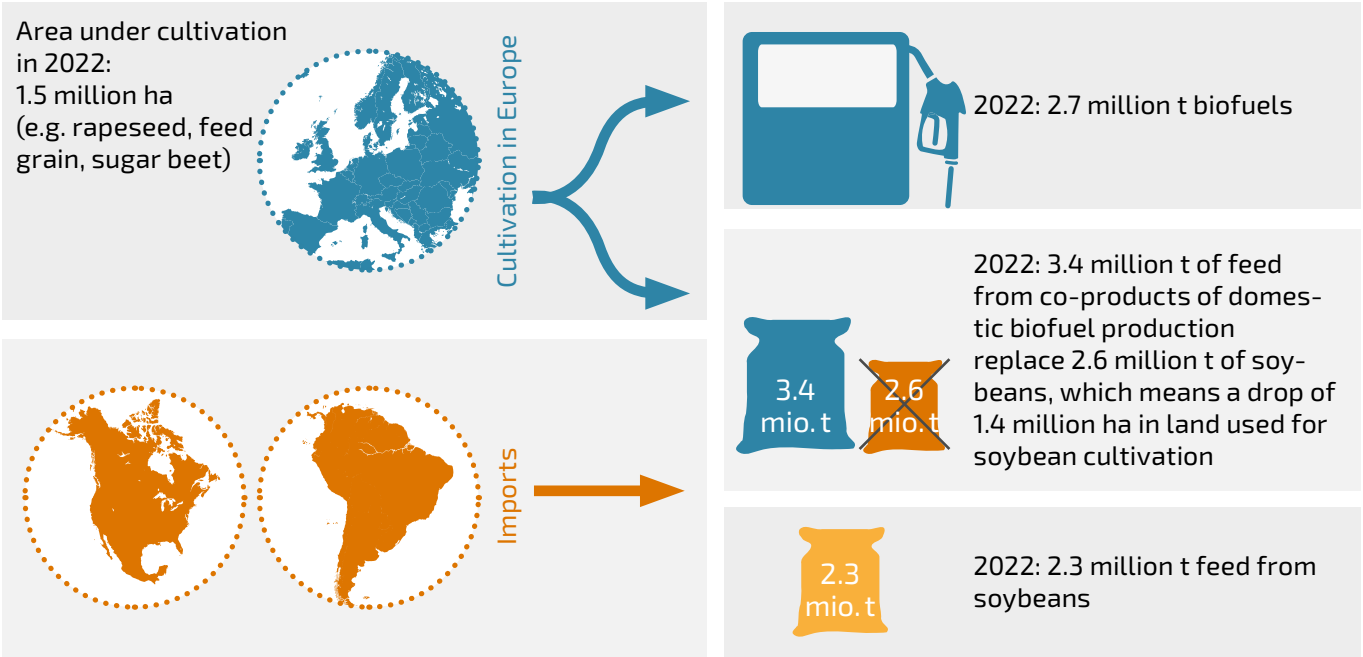
Protein feed is indispensable in rearing cattle, pigs, and poultry. Much of the demand is met by imported soybeans or soybean meal from overseas. The protein feed produced while making biofuels considerably diminishes the need for imports. **The most important protein feed is rapeseed meal produced while making biodiesel from rapeseed oil.** During biodiesel production, around 60 % of the rapeseed input is turned into meal, while 40 % of the rapeseed grain serves to make vegetable oil as an input for biodiesel. Rapeseed grown in the European Union is not genetically modified. Producing bioethanol from grain also generates protein-rich animal feed in the form of dried sillage. These by-products of biofuel production mean high-quality protein sources are available; this biomass, which humans cannot eat, can only be converted efficiently into high-quality food by farm animals, with no competition at all between table and trough.

Total biofuel and animal feed production in Germany means import savings of around 2.6 million tonnes of soybean meal per annum. That helps conserve valuable and sensitive ecosystems in soybean producing countries, preventing "land consumption" there due to clearing of virgin forest. That is why biofuel and production of protein feed are inextricably linked.

A crucial point to remember is that rapeseed and sugar beet are a good supplement to crop rotations with a high proportion in cereals, improving the humus balance as their biomass remains on fields after harvesting, in the process contributing to carbon storage as a further facet of climate change mitigation. As a flowering plant, rapeseed is an attractive addition to the landscape in spring and the most important forage plant for bee colonies and thus for honey production.

DOMESTICALLY PRODUCED BIOFUELS AVOID SOY IMPORTS

Without co-products from domestic biofuel production, Germany would need to more than double its soybean meal imports.



Sources: AEE/Renewable Energy Agency; BDBe ; BMEL; DBFZ/German Biomass Research Centre; DLG /German Agricultural Society; Feedipedia; Oil World; OVID; Proteinmarkt.de; UFOP; VDB

Keeping an Openness to all Technology Options

The transport sector is the problem child of the energy transition. Biofuels offer a ray of hope. For years, they have been the only widely available alternative to fossil petrol and diesel.

Biodiesel, bioethanol and biomethane currently supply around 98 % of the renewable energy used in road transport. In seeking to achieve extensive defossilisation of the transport sector, they thus form a crucial foundation for development of other renewable fuels and alternative drive systems. Overall, renewable energies provided 6.8 % of total energy consumption in road, rail and air transport in Germany in 2022. Biofuels account for 7 % in terms of energy supply from all renewable energy sources (2022). In order to boost climate change mitigation, the share of biodiesel, bioethanol and biomethane can be gradually increased, provided that at the same time e-mobility plays a greater role and sales of fossil fuels decrease.

Significant volumes of green hydrogen and electricity-based synthetic fuels (e-fuels) are unlikely to be available before 2030. The Federal Immission Control Act (Bundesimmissionsschutzgesetz) stipulates a statutory obligation to blend these fuels with kerosene from 2026 and provides that the requisite production capacities must be put in place by that deadline.

Reducing traffic and switching to other modes of transport such as rail, inland waterways, local public transport, cycling, and walking are also crucial steps to help cut greenhouse gas emissions in the mobility sector.

All these measures must be implemented in conjunction to meet the German government's ambitious goals.

Gradually increasing the share of biodiesel, bioethanol and biomethane has an immediate impact on climate change mitigation.

Biofuels in Road Transport – in 2023 and 2030

In the hope of rapidly cutting emissions in the transport sector, electromobility is currently being promoted vigorously, inter alia, through purchase premiums, tax incentives and state-supported development of charging infrastructure. As a result, the proportion of electric vehicles amongst new cars is rising rapidly at present. Forecasts suggest that up to 15 million electric vehicles will be registered in Germany by 2030. **However, biodiesel, bioethanol and biomethane must continue to play an important role in the energy mix in the transport sector, to ensure that in 2030 the forecast roughly 33 million passenger cars with internal combustion engines can operate with the lowest possible greenhouse gas emissions.**

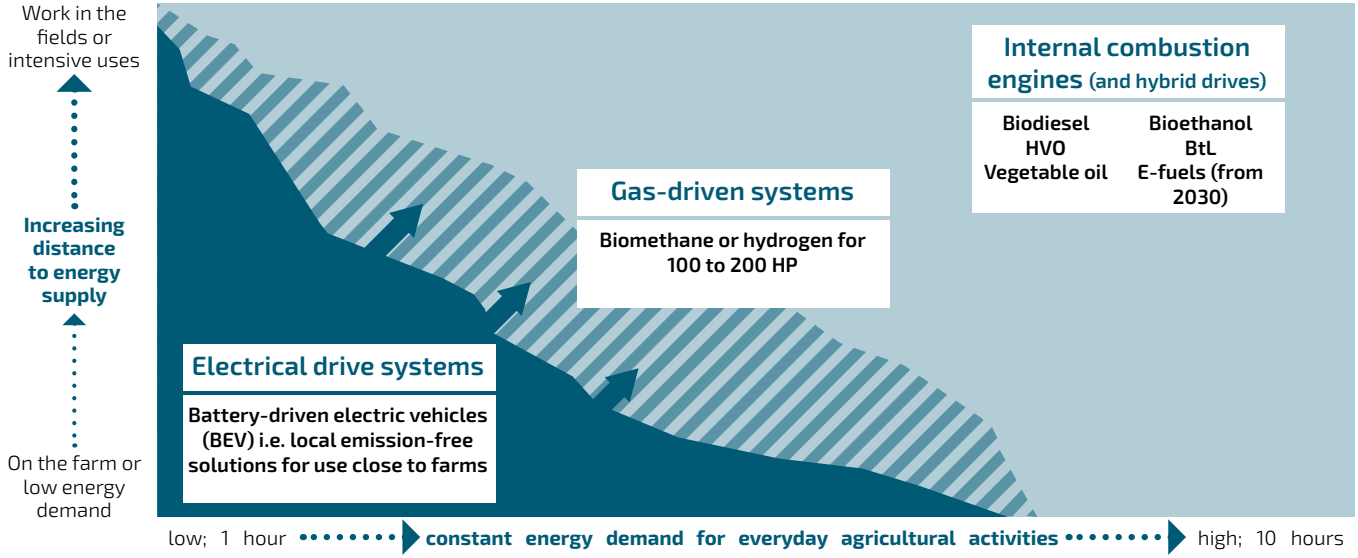
In addition, it will be some time until there has been sufficient progress on further developing the electricity grid and battery technology to enable heavy commercial vehicles like lorries to operate with electric motors.

This is the context in which electrification runs up against constraints. Lorries, buses or even agricultural machinery have high and constant power requirements given the range required for transportation or the tractive force needed for ploughing. **Nowadays biofuels can already offer a technically viable, cost-effective option for greenhouse gas reduction.**

Around 7,300 additional modern wind turbines would be needed if the energy produced by the German biofuel industry had to be replaced by electricity generated by new wind farms. However in 2022 only 551 new wind turbines were added to Germany's existing stock of around 27,000 turbines (onshore).

There's no question: in 2023 and after 2030, biofuels provide a significant, indispensable alternative to fossil fuels when it comes to meeting transport-sector climate targets.

Renewable Propulsive Energy in Agriculture and Forestry



SOURCE: BASED ON CLAAS; EXTENDED

Liquid or gaseous biofuels are the only way to reduce emissions significantly and ensure efficient economic operation.

The fuel needed for tractors run on vegetable oil can be sourced via decentralised oil mills, keeping all the added value in the countryside.

Alternative Fuels in Shipping

The volume of shipping traffic has risen continuously worldwide over the past decades. Currently, around 90 % of global trade is seaborne; the destination or port of departure of around one third of global shipping journeys is within the EU. Pressure for maritime transport to make an appropriate contribution to reaching climate change mitigation goals has been further exacerbated since the 2015 Paris Agreement.

Over and above efforts to improve energy efficiency and record GHG emissions, there is a specific need for measures to cut particulate emissions from inland navigation. Existing propulsion systems have considerable potential to reduce shipping emissions if technical and operational measures are adopted and, above all, if alternative fuels are utilised. Biodiesel, for example, offers noticeable reductions in particulate emissions in exhaust gas. As it is virtually sulphur-free, biodiesel is readily biodegradable, while its high flash point means it is not a hazardous material.

Inland navigation and maritime transport could make a rapid and significant contribution to climate change mitigation if biodiesel were added to the fossil-fuel-based products used in shipping. That would be quite straightforward technically. Many ship engines are already approved to operate with biodiesel (B7, B20, B30 or pure biodiesel) or have been shown to be well-suited to this fuel in practice.

Legal Framework for Biofuels

Biofuels legislation is embedded in a wide range of standards and legislation on future mobility. At the European level, these include the Green Deal legislation:

» The recast **Renewable Energy Directive (RED III)**, adopted in 2023, stipulates a mandatory target for Member States: at least 29 % renewable energies by 2030 or at least 14.5 % reduction of greenhouse gas emissions. Although all technologies can be used to meet the target, it will only be possible to attain this goal if biofuels are used.

» **Effort Sharing Regulation (ESR)** – sets binding CO_2 reduction targets for EU Member States by 2030 for the building, transport, agriculture, and waste management sectors. Provisions in the current version stipulate that Germany must reduce its emissions by 50 % compared to 2005. If this target is not met, the German government will be obliged to purchase additional pollution rights from other Member States that have cut their omissions by more than the mandatory amount.

» **CO_2 emission performance standards** – the average emissions target set for new passenger cars in 2020 is 95 g CO_2/km. That figure will drop to zero by 2035 and will only be possible to attain under the current system with electric vehicles. It will however be possible to register new vehicles with combustion engines if they run exclusively on e-fuels.

» **Emissions Trading System II (ETS II)** – from 2027, a European emissions trading system will also apply to the road transport and heating sectors; the price per tonne of CO_2 is initially to remain at around 45 Euro. In Germany, ETS II will replace the national emissions trading system (nETS in the form of the German Fuel Emissions Trading Act (BEHG)).

» **Clean Vehicles Directive (CVD) –** binding quotas are stipulated for public-sector procurement of low-emission and zero-emission vehicles, e.g. municipal buses for public transport systems. Using electric vehicles and switching to 100 % biofuels makes it possible to meet the requirements.

A significant body of legislation governs climate action in the transport sector in Germany, in some cases implementing European requirements:

» **Federal Climate Change Act (KSG)** – stipulates that CO_2 emissions in the transport sector must be reduced from the current roughly 150 million tonnes per annum to 85 million tonnes by 2030.

» **German Fuel Emissions Trading Act (BEHG) –** establishes rising CO_2 prices for the period up to 2026. Sustainable biofuels are exempt from the pricing system, while petrol and diesel will become more expensive due to the CO_2 price.

Factoring in the maximum CO_2 price – pricing of fossil diesel and petrol (pursuant to § 10; German Fuel Emissions Trading Act (BEHG))

	2021	2022	2023	2024	2025
Emission certificate price in €	25	30	30	35	45
Diesel in Ct/l	**6.7**	**8.0**	**8.0**	**9.4**	**12.0**
Petrol in Ct/l	**6.0**	**7.2**	**7.2**	**8.4**	**10.8**

» **Federal Immission Control Act (BImSchG) –** regulates the greenhouse gas reduction quota in §§ 37a ff. BImSchG and contains several provisions authorising the authorities to adopt ordinances when required.

» **36th – 38th Federal Immission Control Ordinances (BImSchV)** – implementing provisions on promoting biofuels

» **10th Federal Immission Control Ordinance (BImSchV)** – contains regulations and standards for placing fuels on the market.

» **Biofuel Sustainability Ordinance** – addresses sustainability of biofuels in keeping with the Renewable Energy Directive II.

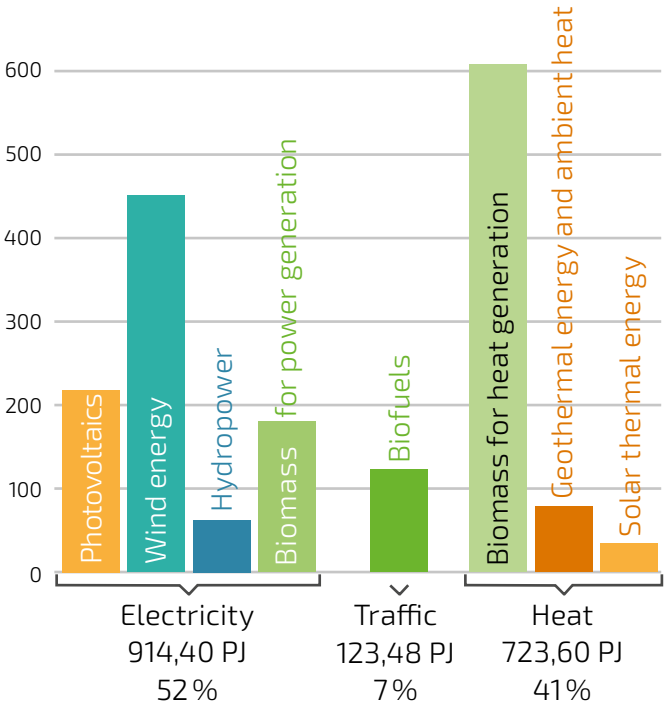
» **Ruling by the Federal Constitutional Court of April 2021** – as a result of the ruling, German government policies are now placing greater emphasis on climate change mitigation and more ambitious targets have been introduced to slash greenhouse gas emissions before 2030.

FINAL ENERGY CONSUMPTION OF RENEWABLE ENERGIES IN THE TRANSPORT SECTOR IN 2022

Final energy consumption in the transport sector in petajoules (PJ) in 2022	
Biodiesel*	88.26
Vegetable oil	0.08
Bioethanol	31.29
Biomethane	3.82
Electricity consumption of renewable energies in the transport sector**	22.13
	145.58
Share of total energy consumption in the transport sector	6.8 %

* incl. HVO | ** Share of rail transport approx. 90 % – share of road transport approx. 10 % | Source: Federal Environment Agency based on data from AGEE-Stat (Working Group on Renewable Energy Statistics)

ENERGY SUPPLY FROM RENEWABLE ENERGY SOURCES IN 2022 (TOTAL: 1,761 PJ)



Source: Federal Environment Agency based on data from AGEE-Stat (Working Group on Renewable Energy Statistics)

E-mobility, Biofuels and E-fuels – Pulling Together for Climate Change Mitigation

In future, biodiesel, bioethanol and e-fuels will contribute to defossilisation of road transport. In the coming years, e-mobility will play an important role for new cars, while climate-friendly fuels will be particularly in demand for the existing fleet. In addition, these fuels help cut GHG emissions from aviation and shipping.

Currently however almost no e-fuels, as energy sources derived from electricity are called for short, are available on fuel markets; the first industrial-scale production facilities are under construction. Although economies of scale may reduce manufacturing costs for e-fuels in coming years, at present, they are still much more expensive than conventional biofuels, for example. That is why a separate sub-quota for electricity-based fuels has been introduced to promote e-fuels within the framework of the greenhouse gas or GHG quota (c.f. page 26). The GHG quota is set to rise sharply in coming years. E-fuels are one way for the petroleum industry to fulfil higher quota obligations. These types of alternative fuel can be produced in Germany, elsewhere in Europe or in other countries where solar and wind energy supply electricity even more efficiently and consistently than they do here.

The climate change mitigation goals for the transport sector can only be attained if many different measures come together. There is no single solution that can solve all problems. **Renewable fuels are vital, and e-fuels, like biofuels, can contribute significantly to reducing emissions.**

Political Demands: Creating Reliable Policy on Biofuels

The new EU Climate Law sets a binding climate change mitigation target of a 55 % reduction in emissions compared to 1990 by 2030. A ruling from the Federal Constitutional Court on the German Climate Change Act has already led to a more ambitious goal of 65 %. Time is the most pressing factor: all the options for GHG reduction in transport that have an immediate impact must be implemented immediately to achieve the 2030 targets. The regulatory framework for renewable fuels should be adapted to attain further rapid emissions reductions for road transport and ensure investment security.

I. Allow higher blending levels

Authorisation for public filling stations to sell blends with a higher share of sustainable biofuels is crucial to tap into their full potential for climate change mitigation. For biodiesel, that means the fuel grade B10 for the general market and B30 for commercial vehicles (trucks and buses), while Super E20 will be the relevant bioethanol grade (once the standardisation process has been completed).

In addition, the petrol grade Super (E5) should be withdrawn from the market – a move successfully implemented in other EU Member States – as practically all vehicles in Germany can run on Super E10, while Super Plus (E5) is sufficient as a protective grade for older vehicles.

II. Introduce CO_2-based energy taxation

Energy tax for fuels must shift from a quantity-based approach to CO_2-based taxation. Low-CO_2 or neutral fuel alternatives would consequently be favoured over fossil fuels, generating incentive effects for consumers and producers of renewable fuels.

III. Short-term adjustments to the GHG quota pursuant to § 37h Federal Immission Control Act (BImSchG)

At the European level, the innovations incorporated into RED III will provide impetus for future design of climate change mitigation in the mobility sector. In addition, the German Climate Change Act also defines targets for reducing CO_2 emissions in the transport sector. To meet these objectives, the German GHG quota offers scope for multiple crediting of electricity used for charging vehicles, as an industrial policy measure to promote e-mobility. Multiple crediting clearly does not achieve genuine additional CO_2 reductions. With a view to ensuring that all options for reducing greenhouse gas emissions in transport are used to the full, the legislator must be consistent in implementing the adjustment options laid out in § 37h Federal Immission Control Act/BImSchG.

IV. Crediting biofuels to offset CO_2 fleet emissions

The automotive industry must be allowed to count renewable fuels, such as biofuels, as well as e-fuels, towards statutory CO_2 fleet limits. This will stimulate and accelerate the shift towards fuels with low greenhouse gas emissions. At the same time, measures are needed to ensure that the emission-reducing alternative fuels to be credited are placed on the market as additional volumes, over and above existing quota provisions.

V. Lower tolls for renewable pure fuels

Legislators can boost the significant potential of renewable pure fuels to cut GHG emissions by introducing reduced toll rates for vehicles using these fuels. That will offer a wider spectrum of options for HGVs to make road freight transport more climate-friendly in the short term, while also making it possible to meet climate targets.

Further information

Study: Greenhouse gas savings from biofuels in Germany
- bit.ly/Study_GHG-savings

Study: Biofuels' contribution to achieving the 2030 climate targets *(in German)*
- bit.ly/2NUY3Ym

Study: Indirect land use changes in life cycle assessments
- bit.ly/3oRqK9a

Status report Biodiesel & Co
- bit.ly/BiofuelProgress_2022

Global Market Supply Report
- bit.ly/Supply_23

Approval list of commercial vehicle manufacturers for operation with biodiesel
- bit.ly/Approvals_List

List of biofuel publications
- bit.ly/UFOP_List2023

- www.ufop.de/english/news
- www.ufop.de/english/bio-fuels
- https://grain-club.de/information-in-english
- https://www.bauernverband.de/english

www.

- www.epure.org
- www.fediol.eu
- www.copa-cogeca.eu
- www.ebb-eu.org

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OVID Association of the Oilseed Crushing and Vegetable Oil Refining Industry in Germany

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