UNION ZUR FÖRDERUNG VON OEL- UND PROTEINPFLANZEN E.V.

BIODIESEL & CO. 2020/2021

REPORT ON PROGRESS AND
FUTURE PROSPECTS – EXCERPT
FROM THE UFOP ANNUAL REPORT

ufop

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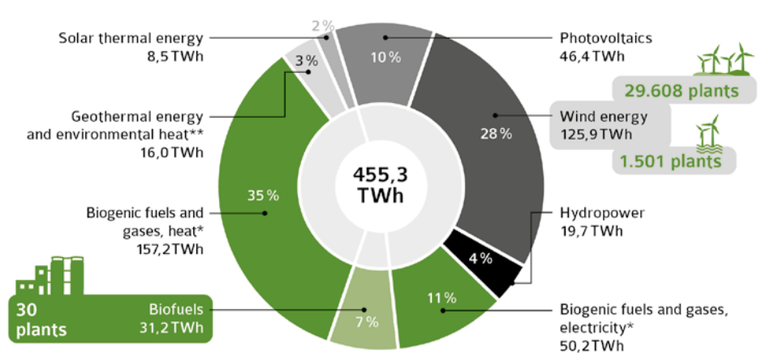
On 12 December, 2018, the European Commission published the revised version of its Renewable Energy Directive (2018/2001/EC) – RED II. It stipulated a deadline of 30 June, 2021 for the EU member states to incorporate the new directive into national law.

Article 36 of the directive expressly requires the member states to have implemented all necessary legal and administrative provisions by this date and to communicate to the EU Commission the wording of such provisions without undue delay – at least that's the "theory". Not one member state fulfilled the requirements during the period under review. Not least because the EU Commission itself had failed to publish on time all the requisite delegated legal acts as a prerequisite for adapting the certification systems and for the re-authorisation thereof, or rather for the amendment of the locally required sustainability ordinances. The first-time inclusion of solid biomass for generating energy and biogas, with the addition of heat and electricity production, has effectively increased in parallel the complexity of the certification backdrop, as well as the number of companies subject to mandatory certification and documentation requirements. This is a synopsis of the background to the regulation, which shaped the UFOP activities in biofuel policy during the period under review.

GHG quota to increase to 25% by 2030

But it did all work out in the end. The law on the further development of the 2030 GHG quota announced by the German Federal Government in the coalition agreement was adopted by the Bundestag in late May 2021. This decision was preceded by a discussion that had been dominated by severe criticism over the bill presented by the Federal Environment Ministry in 2020. The bill had not been agreed with the responsible federal ministries in the Federal Government. It can have been nothing more than an experimental move, since this is the only way to have interpreted the proposed "raising" of the GHG quota (6% by 2025 and 7.25% from 2026 to 2030), as well as the reduction scenario for the cap on biofuels from cultivated biomass (as of 2030: 3.2% to ultimately 2.7% as of 2027). The reaction of the biofuel industry associations (BDBe, VDB and UFOP), which attracted a great deal of media attention, was just as strong. The bill was considered to lack fortitude, the observation being that the Federal Ministry for the Environment is clearly bowing out of climate protection in terms of its transport strategy. In addition, the proportion of fuels from renewable sources would supposedly even fall in the next few years, the result being that the current population of almost 58 million petrol and diesel vehicles would be contributing practically zero to the climate protection offensive. The UFOP repeatedly made reference to the time factor relevant to meeting the climate protection targets for 2030. The climate protection measures, particularly in the transport sector, would therefore have to be measured by their contribution to the fight against climate change actually effective during this period and not solely by actions that might come to fruition. In terms of the transition process and maintaining employment, the UFOP recognises the importance of e-mobility for Germany as a centre for technological innovation. Nonetheless, the criticism was firmly aimed at the bill's proposed four-fold apportionment of e-mobility to the GHG quota commitment – and hence the balance of the support compared to the promotion of biofuels from cultivated biomass. It was against this backdrop that the UFOP challenged the necessary scale-up of the production of renewable power. This has to keep pace with the growth in demand as a whole. That is to say, consideration must also be given to the steadily rising number of electric heat pumps for decarbonising the building sector as well as the additional demand for renewable power to support the hydrogen strategy of the Federal Government (steel production and fuel cell drive systems) and of the chemical industry. The strong initiatives promoting the use of renewable power is increasing the competition for what is becoming an increasingly scarce resource as a result. The move away from coal is just as enshrined in law as the closure of the last remaining CO_2-neutral nuclear power plants by the end of 2022. It was against this backdrop that Federal Minister for Economic Affairs, Peter Altmaier, was asked to estimate the country's future power needs. Prognos, the institute tasked with the research, concluded that the power requirement will increase from the previously estimated 580 terawatt hours (TWh) to 655 TWh by 2030. This was one of the fundamental criticisms made by the associations that played a key role during the course of the political debate over the bill with the responsible federal ministries and the policymakers. The UFOP underlined the importance of German biofuel production, as measured by its contribution of 31.2 TWh to the final energy supply. This is equivalent to the output from as many as 7,700 average size wind turbines, which do not have to be additionally constructed (Fig. 6). A fundamental problem is addressed here, leading to a debate about the areas required to expand wind turbines and photovoltaic systems – along the

Fig. 1: Energy supply from renewable energy sources (2019)



Sources: Federal Environment Agency (UBA) based on AGEE stat, status: 12/2020 March 2021
* with biogenic proportion of waste
** Power generation from geothermal energy approx. 0.2 TWh (not shown separately)

same lines as the discussion over the production of raw materials for biofuels. Opposition in the rural areas and among environmental groups (against offshore farms as well) is testimony to the fact that the willingness of many to accommodate such structures has almost reached its limit. Estimates of potential, such as those of the German Institute for Economic Research (DIW), for a self-supporting strategy to produce renewable power covering demand are inconsistent with the reality of a climate protection policy which is under mounting pressure to act in time. There is also the equally difficult challenge of expanding the electricity lines. This concerns not only the nationwide lines, but also expansion that could be required at regional level to reinforce the grids if the number of battery charging stations, heat pumps and so on to be installed continue to rise. In light of the challenge presented by the climate change policy of limiting global warming to 1.5 degrees by 2030, biofuel associations have always argued for an openness to new technologies and for an overall strategy (including the position of the Bundesverbandes Bioenergie e. V. (German BioEnergy Association) on the Federal Government's bill on the further development of the greenhouse gas reduction quota: *www.ufop.de/pp0321* in German).

The UFOP regards this understanding as essential, particularly in the transport sector, to meeting the ambitious climate protection targets by 2030 by utilising all the sustainable, renewable energy sources and energy carriers available. Taking this energy policy global does and will continue to play a crucial role in achieving this aim. This means importing sustainable-status-certified biomass raw materials, biofuels, e-fuels, hydrogen and renewable power, as well as sustainability certification in battery production. These aspects were discussed in connection with the Government bill presented at the end of December 2020 that has been substantially amended. In further parliamentary procedures, the Committee on the Environment of the Bundestag consulted the trade associations and then decided on additional improvements. These were later to become the basis of the final discussions.

Key aspects of the GHG quota legislation

Fig. 7 summarises the policy position of the GHG quota legislation:

- The GHG reduction quota will gradually increase from 7% in 2022 to 25% by 2030.
- As of 2023, biofuels from palm oil (biodiesel/hydrotreated vegetable oil) will no longer be apportioned to the quota commitment. The creditable quota will be limited to 0.9% as early as 2022. The basis used for calculation is the energy quantity placed in circulation by the company concerned.
- The proportion of biofuels from cultivated biomass is being limited to 4.4%, this amount being relative to the final energy consumption in road and rail traffic. The exclusion of palm oil as a cultivated biomass is not included in this reckoning.
- The sub-quota (energy production) for "advanced" biofuels (e.g. biomethane from liquid manure/corn stalks or bioethanol from straw) will gradually be raised from 0.2% in 2022 to 2.6% in 2030. Amounts that exceed the annual quota commitment may be apportioned two-fold. This quota is a mandatory requirement, meaning companies in the oil business are obliged to pay a penalty if they fail to meet the target.
- As an investment incentive, certain fulfilment options, e.g. green hydrogen and e-fuels (two-fold) or the charging current for electric vehicles (three-fold) are apportioned several times over. The calculation – or the apportionment of the GHG emission from the charging current – is based on the value of the average greenhouse gas emissions per energy unit of power as published in the Federal Gazette by the Federal Environment Agency at the start of October each year. This applies to each of the subsequent commitment years and amounts to 147 kg CO_2 equivalent per Gigajoule for 2021.
- Biofuels from waste edible oils and, for the time being, from animal waste as well (CAT 1 and 2), can be accounted to the GHG quota commitment to the tune of 1.9% (energetic).

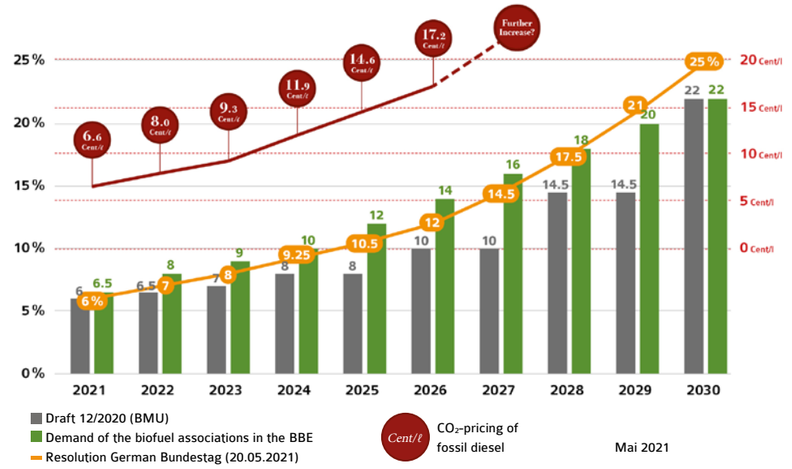
Fig. 2: Details of the national greenhouse gas quotas in the transport sector

	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total GHG quota (Minimum GHG reduction)	7.0%	8.0%	9.25%	10.5%	12.0%	14.5%	17.5%	21.0%	25.0%
Biofuels from feedstocks (that also serve the food and feed sector) (Upper limit, energetic)					4.4%				
Biofuels from UCO and animal fats (Upper limit, energetic)					1.9%				
Advanced biofuels (Minimum for energy purposes)	0.2%	0.3%	0.4%	0.7%	1.0%	1.0%	1.7%	1.7%	2.6%
	Double credit for amounts over the minimum								
Air traffic (minimum share)					0.5%	0.5%	1.0%	1.0%	2.0%
Green hydrogen and downstream products (PTx fuels/e-fuels)	Double credit for quantities used in refineries and road transport								
Electricity for e-vehicles	Triple credit (electricity from public charging stations, private electric vehicles, fleets)								

Source: Bundesregierung May 2021

- Other fulfilment options from fossil fuels or from residues and waste are limited or, just like the crediting of the greenhouse gas emissions saved from crude oil production (UER), will be phased out as of 2026.

Fig. 3: Regulation on the GHG quota in the BImSchG: Draft, request, resolution



The UFOP had welcomed the policy position in principle, especially since it would pave the way not only for raising the GHG quota from the original 22% to as high as 25%, but also for levelling off the quota increase (Fig. 8). These regulations acknowledge the concern that the multiple crediting of e-mobility (the draft initially envisaging a factor of 4) and a fast ramp-up of the number of electric vehicles on the market will force biofuels from cultivated biomass in particular out of the market. Moreover, the law stipulates certain threshold values for electrical energy consumption from e-mobility which, if exceeded, will trigger an immediate adjustment to the GHG quota. This regulation also makes sense from an environmental perspective, not least because its ultimate aim is to exploit the full GHG reduction potential of all fulfilment options in favour of having to export biofuels. The unease over a possible displacement effect is justified, since the Federal Government is envisaging that around one million electrical vehicles will be registered in 2022. The demand for diesel fuel will have passed a historic high at or before this point in time and will then decrease steadily. The most marked displacement effect in the vehicle population will concern the passenger cars powered by diesel fuel. Accordingly, the physical demand for fossil-based diesel and hence the demand for biodiesel for blending purposes (B 7) will drop by around 50,000 to 60,000 t. The Federal Government has announced it will continue its very attractive support initiative (environmental bonus) of e-mobility amounting to 6,000 EUR per vehicle until the end of 2025. This initiative is being boosted by, among other incentives, a purchase bonus from the vehicle manufacturers (3,000 EUR), which has income tax and vehicle tax benefits, alongside funding for expanding the charging infrastructure. Other member states are also promoting e-mobility with environmental bonuses and multiple apportionments to the quota commitment. France, for instance, is offering a factor of 4. Another good reason for the adjustment to the level of the GHG quota commitment is the envisaged regulation that will allow operators of charging stations or national grid operators to start trading with greenhouse gas quotas. The Federal Government agreed this regulation with the deliberate aim of being able to generate revenue to expand the charging infrastructure by way of trading off GHG quotas. This regulation, designed to encourage the development of business models, will be additionally pushed by the increase in the penalty for failing to reach the GHG quota commitment from 460 EUR to 600 EUR per tonne of CO_2. This increase, as well as the desired spike in the number of GHG quota subscribers, will stimulate quota trading and consequently co-determine the price development. It is not only companies in the oil business that are set to participate in this business model on the basis of their investments in charging stations at filling stations they have already made or announced. Public utility companies will also enter this business as electricity providers (tariffs and charging conditions) and, as a result, embark on GHG quota trading too. The clean energy provider LichtBlick has already warned of an emerging monopoly situation.

In the legislative procedure, the UFOP advocated in particular, contrary to the bill by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), the necessary raising of the cap on biofuels from cultivated biomass. The exclusion of palm oil (with France, Austria, Belgium and Italian having already made the move) raises the question as to how the raw material requirement will be covered. The UFOP believes that rapeseed oil will have to become a replacement energy source. The raw material composition in the EU will gradually change at the expense of palm oil; the use of waste oils and fats is capped. In addition, aviation, with the volume it requires determined by quotas, will push its way into the biofuel market. Biokerosene (HVO) from waste oils is in huge demand. The French oil giant Total announced its intention to commission a bio jet fuel station with a capacity of 400,000 tonnes of "Sustainable Aviation Fuels" (SAV) by 2024. Raw materials such as oils and fats as well as waste animal fats from all over Europe are to be used as fuel. Biodiesel manufacturers that process these raw materials feared losing out in the competition for raw materials and therefore cited the results of studies that confirm a better greenhouse gas efficiency of biodiesel made from these raw materials in road traffic than in aviation. The UFOP takes the view that this will be decided by the competition and anticipates that these biodiesel manufacturers will have to resort to rapeseed oil. Faced with several cases of fraud, the sector is having to build confidence and scale up its surveillance and monitoring procedures to the levels required. This tightening of procedures was demanded by five member states (including Germany) of the European Commission and was coupled with the request to intensify the

supervisory obligations of the member states and also to establish an EU database and a supervisory body for monitoring the reporting processes. This initiative came about as a result of imports to which palm oil had been added.

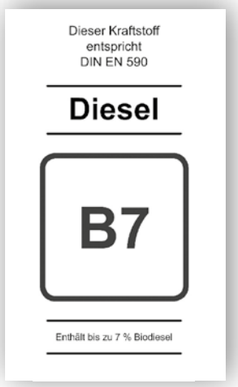
In Germany, the database "Nabisy" is "responsible" for controlling the sustainability of biomass. The evaluation of the sustainability certificates by the Federal Office for Agriculture and Food (BLE) revealed for the year 2019 a proportion of some 0.64 tonnes of biodiesel/HVO from palm oil with a total consumption of around 2.44 million tonnes (Fig. 9). The increase in the proportion of rapeseed oils is a welcome sign. The UFOP expects this trend to continue throughout the 2020 calendar year. The BLE publishes their field and evaluation report in October each year (see BLE reports: *www.ufop.de/ble-en*). In 2020, the total consumption grew to over 3 million tonnes of biodiesel/HVO due to the increase in the GHG quota of 4% to 6% and the fact that GHG quota trading was not possible in the 2020 quota year. This is down to the fuel quality directive, which obliges all member states to reduce the greenhouse gas emissions from the fuels used in the 2020 calendar year by 6%. GHG quota trading will be possible again from 2021 onwards. This was also the reason behind the UFOP demanding the ambitious increase in the GHG quota in the years from 2022 to 2025. The call for a quota increase essentially applies to all member states (see tables 11 and 12).

Sweden is by far the leading EU country in terms of the quota policy (Fig. 10). With ambitious and rising GHG quotas, the country is pressing ahead with the defossilisation of the transport sector. Inevitably, e-mobility and the proportion of biofuel in the tanks of the existing vehicle fleet need to be increased. This raises the question of "how", since DIN EN 590 limits the biodiesel content of diesel fuel to 7% by volume. Since 2020, this information has been readily legible on every pump at public filling stations. In Germany, the solution to achieving higher GHG quota requirements lies in increasing hydrotreated vegetable oil (HVO) in 2020 to an estimated 0.6 million tonnes. Accordingly, an openness to new technologies in the EU is the prerequisite to achieving higher GHG quotas. Indeed, Fig. 11 confirms that, had B10 been approved, as repeatedly called for by the UFOP and the biodiesel industry, the higher GHG quota of 6% could have been achieved

Fig. 5: GHG mandates in Sweden (% GHG)

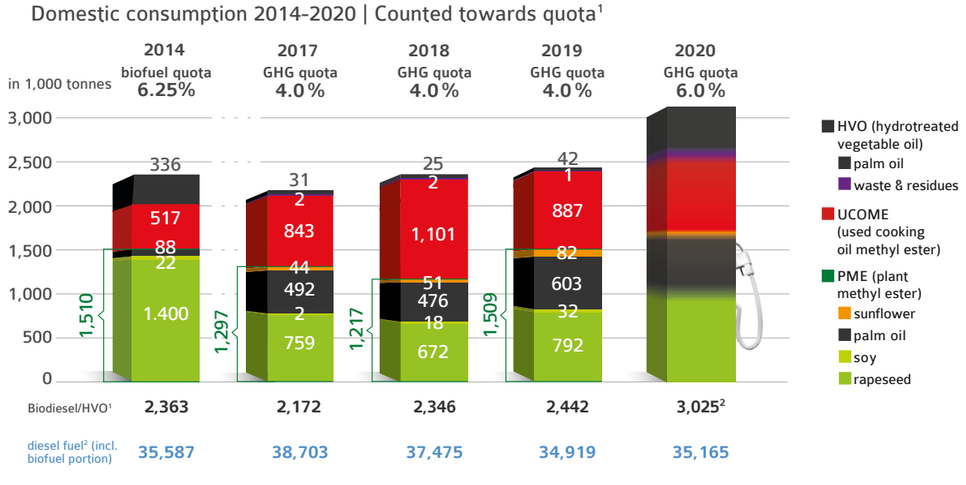
	Diesel	Petrol	Kerosene
By June 2021	21 %	4,2 %	0 %
Since August 2021	26 %	6 %	0,8 %
2022	30,5 %	7,8 %	1,7 %
2023	35 %	10,1 %	2,6 %
2024	40 %	12,5 %	3,5 %
2025	45 %	15,5 %	4,5 %
2026	50 %	19 %	7,2 %
2027	54 %	22 %	10,8 %
2028	58 %	24 %	15,3 %
2029	62 %	26 %	20,7 %
2030	66 %	28 %	27 %

Source: Square Commodities



Fuel label "Diesel B7"

Fig. 4: Market development and raw material composition of biodiesel/HVO



Sources: 1Federal Office for Agriculture and Food: Evaluation und Progress Report 2019, October 2020; 2BAFA: Mineral Oil Statistics.

solely with biodiesel. This option is proposed by the revision of the Renewable Energy Directive – RED III. The member states can approve B10 at public filling stations instead of B7 as a standard grade. The offer, however, is based on the assumption that approvals will be forthcoming from vehicle manufacturers. The use of biodiesel as a pure fuel (B100) or B30 in closed commercial vehicle fleets could also be a financially attractive solution in the future. The impetus comes from the increasing CO_2 pricing of fossil diesel (Fig. 8, P. 25) in conjunction with the option of participating in GHG quota trading with the biodiesel quantities used in fleet operation and the emission reductions achieved. The biodiesel industry too is being called upon to enter into GHG quota trading with their own business models. If this does not happen, there will be concern over a spike in HVO production at the expense of biodiesel production. An increasing overcapacity is conceivable if diesel consumption drops.

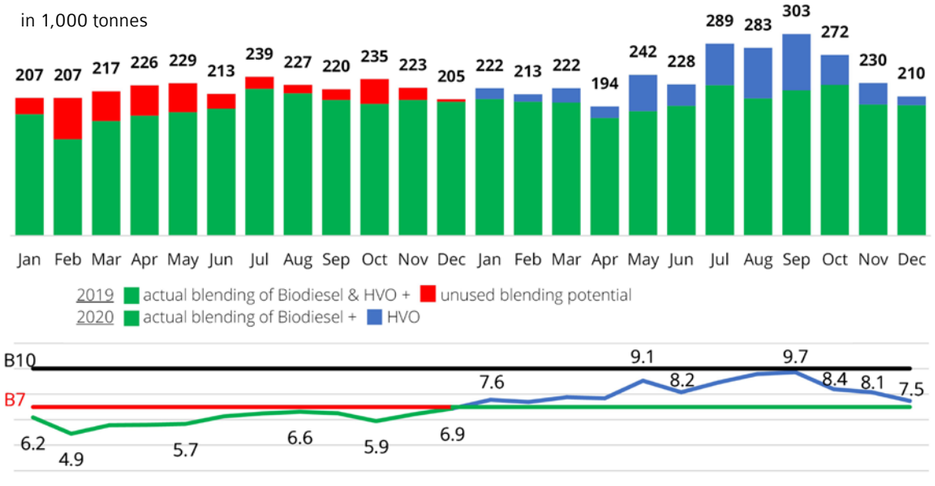
Ruling by the Federal Constitutional Court and EU climate legislation call for ambitious measures

At the end of April, the German Federal Constitutional Court ruled, in short, that climate protection is a basic right. To uphold that right, the intergenerational contract calls for immediate action. The ruling is based on scientific principles, including the report by the German Advisory Council on the Environment (SRU) (link: *https://bit.ly/3opXZA6*). The Federal Government did not hesitate for long and soon introduced legislation for an amendment to the climate protection law for passage through parliament. The law was expanded by dated targets for reducing greenhouse gas emissions for the period from 2031 to 2040, with the aim of having achieved climate neutrality by 2045 (instead of 2050 as previously). There was pressure to act in any case, since in June 2021 the European Parliament and the European Council had agreed to raise the greenhouse gas reduction target for 2030 from 40% to 55%. On top of that, the EU Commissioned had announced its intention to release its "Fit for 55" legislation package in mid July 2021. According to these proposals, all member states are obliged to adapt their national energy and climate plans. The resolution on the amended climate protection law stipulates an increase in the minimum target for 2030 from 55% to 65%. The sector-specific climate protection regulations in particular are being tightened up. This means a further reduction in the annual emission ceilings for the energy and transport sectors and also for industry and agriculture (Fig. 7. P. 12). The idea is to meet the higher target with 8 billion euros of additional funding provided by the Federal Government for additional climate protection measures. Even if e-mobility gets off to the best start, there will still be approx. 35 million vehicles with combustion engines dominating German roads in 2030. The only way to meet the intensified annual targets under climate protection legislation is to decarbonise the fuels powering these vehicles. The key here is the availability of alternative fuels that improve greenhouse gas emissions. In this sense, the UFOP believes that the importance of biofuels, those from cultivated biomass in particular, has to be appropriately ranked in its "bridging and role model function", as emphasised by the UFOP on numerous occasions. This concerns in particular the pioneering role in the sustainability certification process through the creation of a global level playing field. Before the "Fit for 55" package was published, the UFOP explained this role model function in detail in its position paper on the amendment to the Renewable Energy Directive – RED III. The UFOP also delivered this position paper to the members of the committees responsible in the European Parliament (see Chapter 3, page 18).

RED II – Palm oil industry pins its hopes on WTO lawsuit

In the EU, palm oil – accounting for approx. 30% – is the second most important raw material for the production of biodiesel and HVO after rapeseed oil (38%). , According to the Oil World market information service, palm oil accounted for around 4.5

Fig. 6: GHG quota increase from 4 to 6% and greater openness towards new technologies possible



Source: D. Bockey, UFOP / according to AMI, Bafa

Fig. 7: Sector targets of the Federal Climate Protection Act (incl. additional reduction goals)

Annual emission budgets in million oft CO_{2aq}	basis 1990	estimation 2020	target 2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy add. reduction goal	466	221	280		257								108 -67
Industry add. reduction goal	284	178	186	182	177	172	165 -3	157 -6	149 -9	140 -14	132 -17	125 -20	118 -22
Transport add. reduction goal	164	146	150	145	139	134	128	123	117	112	105 -1	96 -5	85 -10
Buildings add. reduction goal	210	120	118	113	108	102 -1	97 -2	92 -2	87 -2	82 -2	77 -3	72 -3	67 -3
Agriculture add. reduction goal	87	66	70	68	67	66	65	63 -1	62 -1	61	59 -1	57 -2	56 -2
Waste and others add. reduction goal	38	9	9	9	8	8	7	7	6 -1	6 -1	6	5	4 -1

LULUCF sector: minus 25 million t by 2030 / minus 35m t by 2040 / minus 40m by 2045

million tonnes of total biofuel production of approx. 15 million tonnes in 2019 (EU 28). The criticism of the indirect land use changes brought about by the EU biofuel policy continues unabated today. Environmental groups have been exerting pressure, ultimately with success, on the policymakers for years: The iLUC regulation and its implementation in national law confirm this progress. The most important palm oil producers, Malaysia and Indonesia, or rather the palm oil companies and the processing chain down the line, have yet to initiate any adequately effective measures to challenge these arguments. Instead of questioning studies, a transparency offensive to show the positive effects of the sustainability certification stipulated under EU law would surely have made more sense. Transparency or rather traceability, however, are clearly not the intention. Yet this problem concerns the use of palm oil in general, not only its use for the purpose of producing energy. The debate over soya imports and proof of deforestation-free procurement also have to be viewed in this context. The problematic discourse about cultivated biomass has been, and is still being, left to the national and European farmers' unions and biofuel organisations. RED II, however, put an end to this "waiting it out" approach – or did it? In late 2020, the governments of Malaysia and Indonesia initiated proceedings at the WTO to stop palm oil from being phased out. The conclusion the WTO will reach remains an open question. The phasing out of raw materials involves a number of legal requirements, and the principle of non-discrimination has to be followed. At the same time, the EU Commission is seeking a free trade agreement with the ASEAN countries. In this respect, it remains to be seen whether a complete phase-out of palm oil is viable, especially since Indonesia and Malaysia will recall their announcements or rather their "bargaining chip" for directing the procurement of aircraft for the national airlines towards Airbus competitors for instance.

Biofuels in agriculture and forestry

The industry platform "Biofuels in agriculture and forestry" set up by associations linked to agriculture (DBV, UFOP), the biofuel industry (VDB, BDOel, FvB), and agricultural machinery (John Deere, New Holland) and other initiators and supporters (*www.biokraftstoffe-tanken.de/* in German) focused, their information campaigns and PR activities during the year under review to digital format and content due to the coronavirus pandemic. The number of institutions involved and the participant numbers are testimony to the steady development of the network. The Technology and Support Centre (TFZ) of the Bavarian Ministry of Food, Agriculture and Forestry in Straubing and the "LandSchafftEnergie" network offered two online seminars entitled "Was tanken Traktoren morgen?" (Which fuel for the tractors of tomorrow?) This was followed in mid July 2021 by the online future forum of the industry platform: "Sofort wirksamer Klimaschutz durch nachhaltige Biokraftstoffe in der Land- und Forstwirtschaft" (Sustainable biofuels in forestry and agriculture for immediately effective climate protection) Agricultural experts and professionals from the agricultural machinery industry presented their experiences with vegetable oil and biodiesel and shared their expectations. They called in particular for a simplified and hence less costly process for approving new machines under emission legislation. As part of the future forum, the UFOP set out the action required to change the framework conditions for funding policy at a European and national level. The associations and organisations involved in the industry platform explained in a position paper the three most important measures for scaling up the use of biofuel in agriculture and forestry:

1. Incorporating biofuel usage into the planned emergency programme of the Federal Government for climate protection measures
2. Securing a tax concession on biofuels in agriculture and forestry by adapting the European environmental and energy subsidy guidelines
3. Content revision and financial reinforcement of the BMEL Directive for promoting energy efficiency and reduction of CO_2 emissions in agriculture and horticulture

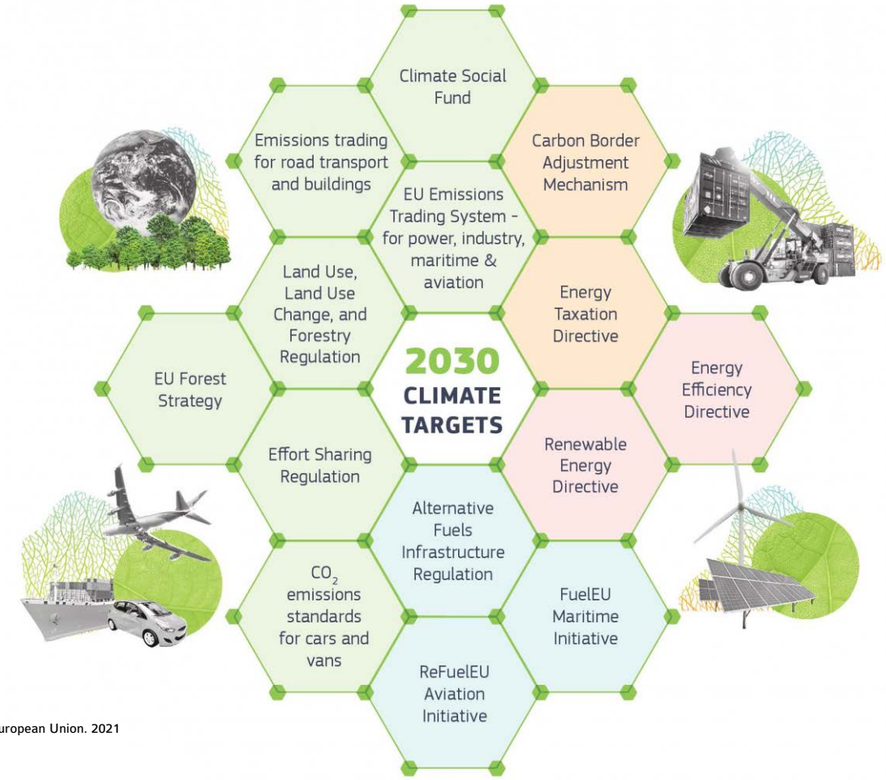
In a letter to federal ministers Julia Klöckner and Svenja Schulze, the industry platform demanded that biofuel usage in agricultural and forestry operations be included in the emergency

programme for climate protection. The Federal Cabinet had earmarked a total of 8 billion euros in additional funding for all sectors. The demand is justified by the rapid contribution that a vehicle pool of nearly 1.5 million agricultural and forestry vehicles could make to climate protection by switching to biodiesel, vegetable oil or biomethane. One of the main obstacles to the use of biofuel is cited as being the licensing requirements of the environmental and energy subsidy guidelines of the EU. These requirements are inconsistent with the climate goals that have been raised at EU level, and even thwart climate protection. It may now be possible to resolve this issue by considering the proposal to amend the Energy Tax Directive (see below). Here too, however, approvals from vehicle manufacturers for used and new vehicles are required in order to trigger the climate protection effect in technical terms.

"Fit for 55" proposals are shaping the future of lobbying

In July 2021, the European Commission presented a forward-looking package containing a total of twelve proposals for amending existing and new directives with a scope that would affect all economic sectors and the wider society (Fig. 13). A look at the climate protection targets for 2030 shows that the political agenda will be determined by severe time constraints, which will ultimately create pressure on decision-making processes. It is, after all, the annual statistics and reports that reveal the potential success of climate protection measures. These proposals are the vehicle through which the EU Commission is essentially announcing its plan to push on with its ambitious climate protection policy, even if leading industrial nations fail to pursue this level of ambition. With its measures and the 10% or so contribution it makes to global greenhouse gas emissions, however, the EU will not be able to win the fight against climate change single-handedly. Climate diplomacy (G7/G20) is gaining traction and is set to become one of the key challenges at the 26th UN Climate Conference being held from 31 October to 12 November 2021 in Glasgow. There is no doubt that although the conference will attract global economic interest, it will also be shaped by a lack of understanding among the political leaders. This was clear at the G20 Environment Ministers' Meeting at the end of July 2021. The ministers were unable to agree on the 1.5 degree target by 2030, despite the climate-driven disasters that were happening at the time: forest fires/heat waves in the USA and Canada, as well as flooding in north-western Europe and China. Alongside the BRIC countries (Brazil, Russia, India and China), the USA has also taken a critical stance toward the planned introduction of a CO_2 border tax. The introduction of a climate tax by the EU looks to rule out the possibility of mode-shift effects in third countries and competitive disadvantages for the EU economy in the single market. This new kind of "external protection policy" will present a central challenge for the EU

Fig. 8: The "Fit for 55" package of proposals of the European Commission of 14 July 2021



Source: European Union. 2021

if it wants to achieve the goals of job security and prosperity, alongside the required level of public acceptance for climate protection measures in Europe.

One key element of the package is the proposal to further develop the emissions trading system. The price development in the first half of 2021 and the rapid increase to approx. 57 EUR/t CO_2 are testimony to the price-elastic nature of this system. Accordingly, the price rise also reveals the corresponding effects since the EU commission's proposal involves expanding emissions trading to shipping, road traffic and heating fuels (buildings). Due to the different levels of abatement costs for reducing greenhouse gas emissions, a differentiation by sector ought to be established or such systems, which are already in place, continued. The German emissions trading system is expected to be integrated into the EU emissions trading system in 2026. Otherwise, there would be a double pricing of fossil energy sources. The consequences for the federal government budget (loss of revenues) will then, without a doubt, be the subject of intense debate. Logically, the European Effort Sharing Regulation has to be amended. The sector-specific climate protection targets laid down in climate protection legislation in Germany need to be readjusted to equally ambitious levels in all member states. Under the proposal, the climate protection requirement for Germany, Luxembourg, Sweden, Finland and Denmark will be raised from 38% to 50%. For France, the target is to be increased to 47.5%. In addition, the Eastern European member states will be increasingly called upon to fulfil their responsibilities: Hungary and Poland will be required to meet higher targets of 18.7% and 17.7% respectively. The proposal to revise the Energy Tax Directive makes provisions for a harmonising of the tax base across Europe. The energy tax will be implemented for all energy sources based on their energy content (EUR/ Gigajoule). The draft directive proposes minimum taxation rates (see Chapter 4, page 20). Due to the high level of taxation in Germany, there is unlikely to be any need for adjustment. The UFOP welcomes the fact that, under the proposal, a compensation effect will come in the form of reduced rates of taxation for biofuels in agriculture, including for biofuels from cultivated biomass. Accordingly, the EU is evidently no longer against continuing the authorisation of member states for the tax concession from biofuels in agriculture and forestry. It should be borne in mind, however, that the usable quantities fall below the cap of 4.4% on biofuels from cultivated biomass. Therefore, it falls to the market to decide which biofuel quantities will be used in which sectors. The proposal will also harmonise the tax concessions on fossil diesel. This will certainly become the subject of intense negotiations and present a major obstacle to achieving a compromise, as it has done in the past. This is because in terms of taxation, regulations affecting member states directly can be decided only unanimously by the Council of Finance Ministers. Under the Green Deal, the EU Commission had announced that this very situation would change, yet failed to put forward any proposal to accelerate the agreement process in the Council of Finance Ministers.

Amendment to RED (RED III)

The Renewable Energy Directive performs two primary functions: It defines which energy sources are considered "renewable" when sustainability is taken into account and, in the case of biofuels – differentiated by types of raw materials – sets out the so-called caps on biofuels from cultivated biomass and waste material, as well as binding targets for the proportion of renewable power in the European power mix. The EU's goal of achieving climate neutrality by 2050 requires all member states to dramatically ramp up their production capacities for renewable energies. The rules concerning the most important bio and alternative fuels:

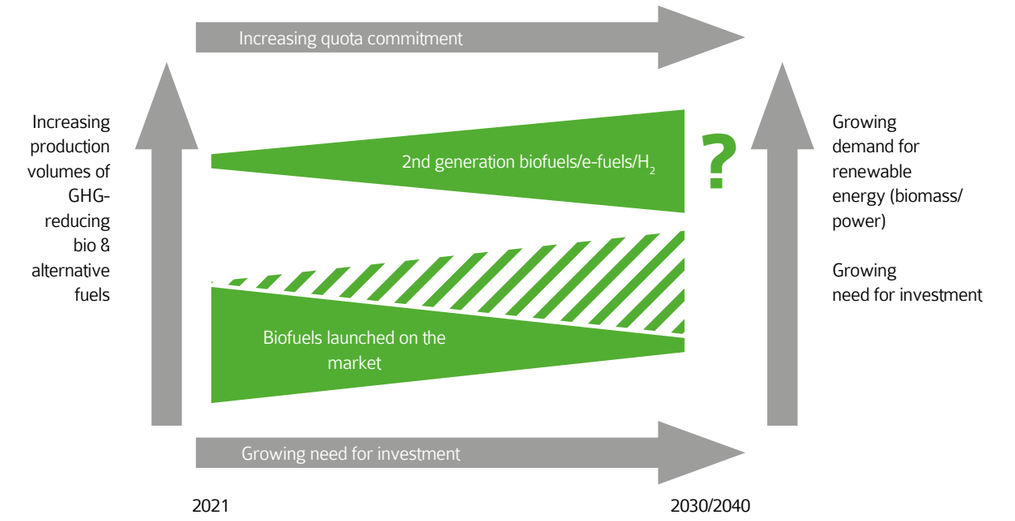
- Further raising of the target for the share of renewable energies in the gross final energy consumption from 32% to 40% by 2030.
- The transport sector is under an obligation to reduce greenhouse gas emissions by at least 13% by the year 2030.
- The sub-quota for energy production from progressive biofuels (Appendix IX, Part A: Straw, etc.) is at least 0.2% in 2022, 0.5% in 2025 and 2.2% in 2030.
- The introduction of a target of 2.6% for Renewable Fuels of Non-Biological Origin – RFNBO (synthetic fuels, e-Fuels) in 2030 is new.
- Biofuels from waste products (Appendix IX, Part B: Waste oils and fats) are limited to 1.7% max. (energy production) without the national increase option.
- With the cap on biofuels from cultivated biomass, the limit remains at 7% (implementation at national level: consumption rate of biofuels in 2020 + max. 1%).
- Offsetting the power from renewable energy sources against the quota (as in Germany).
- There are no multiple creditings in road traffic.
- Biofuels whose cultivation pose a high risk of change to land use (high iLUC – palm oil) are being frozen at the consumption level in the year 2019 for the respective member state – to be excluded by 2030 at the latest.
- The option of the introduction of the GHG quota regulation and the offsetting of renewable energy for quota trading being open to all member states is a new development. The regulation on the GHG quota introduced in Germany will be adopted as a result. Referring to the experiences available in Germany, the UFOP had repeatedly criticised the policymakers and the EU Commission for this amendment.

Is policy on climate change "fast" enough? – The innovation and investment dilemma

The climate protection movement "Fridays for Future" personifies the concern that climate protection has arrived too late. The climate initiatives are currently shaping political discourse, with the criticism of policy failures taking centre stage. Environment statistics only strengthened their case. The recent ruling by the Federal Constitutional Court was therefore merely a logical step – the right to a future in a world fit to live in. It is against this backdrop that the UFOP, in reaction to the amendment of the climate protection law, said that meeting ambitious climate protection targets in the same period would naturally be difficult and that the climate protection path is getting steeper with every step. The policymakers seemingly look to outbid each other with the demand for higher targets. However, this commitment is not reflected in the necessary, immediately effective measures. Measuring progress in these

terms fails to consider not only the problems but also the fulfilment options that are yet to be exercised. During the course of discussions on the resolution of the law for the further development of the GHG quota, the UFOP therefore appealed to the policymakers to make use of this option and revise their reservations against sustainably certified biofuels from cultivated biomass. The common challenge is that of mobilising the generally available GHG reduction potential for the remaining eight years of the commitment period through to 2030. As a result of the iLUC and the recurring 'food or fuel' debate, the policymakers come up against the dilemma that the options available now will gradually reduce. At the same time, the urgently needed investments in equipment to produce biofuels from waste products or for generating e-fuels are not apparent (Fig. 14). This challenge is set to become one of the key aspects of EU and national funding policy for decarbonising the transport sector. For this reason, the UFOP believes that the level of the cap must be brought back to the negotiating table. The Federal Government had already decided on a 5.3% cap with the national climate and energy plan and communicated its plan to the EU Commission. The threat of penalty payments will not help if the climate has already started to markedly "topple". The effects of the extreme jet stream pattern should be a stark warning.

Fig. 9: Matrix of the emission reduction targets in the innovation and investment dilemma



Source: D. Bockey/UFOP

UFOP EXPERT COMMISSION FOR BIOFUELS AND RENEWABLE RESOURCES

The joint meeting of the UFOP expert commission with the Fuels Joint Research Group (FJRG) in Radebeul planned last year had to be postponed again due to the pandemic and was finally held virtually.

The web conference started with a presentation by Dieter Bockey, UFOP, on the background to and the status of the legislative procedure for amending the Renewable Energy Directive (2018/2001/EU) – RED II. In September 2020, the Federal Ministry for the Environment submitted a first draft, which had not been agreed with the other federal departments responsible. The strong criticism made by the UFOP together with other organisations in the biofuel industry then led to significant improvements, especially in the quota level and the so-called cap on biofuels from cultivated biomass. The raising of the GHG quota to 25% by the year 2030 (see *Chapter 3.1*) led to the discussion about how this obligation can be fulfilled, and not only by scaling up e-mobility but also specifically through the use of biofuels. The question of the so-called "blend wall" was also discussed once again. The background to this is the limit on the admixture of biodiesel to max. 7 volume percent in accordance with the European standard for diesel fuel (DIN EN 590, B7). At the same time, a standard for the admixture of 10% biodiesel (B 10) was agreed at European level, as well as the option for using B 20 or B 30 in closed vehicle fleets, likewise based on existing European standards. Therefore, research topics on possible negative interactions between biodiesel and fossil fuel components, as well as additives, are the subject of projects funded by the UFOP as part of joint initiatives. The aim is to approve new vehicles and stock vehicles as a prerequisite for marketing.

Final report on the project: Development of on-board sensor

The development of an on-board sensor was the subject matter of a research project spanning several years by the Coburg University of Applied Sciences. In presenting the final report, co-author Martin Unglert emphasised how an understanding of fuel ageing is an important aspect for adding more rapeseed oil methyl ester (RME) to blends with other new regenerative fuels (HVO/OME) in the future in order to ensure stable fuel formulations. Ageing products were explained using liquid chromatograph coupled with high-resolution mass spectrometry. This process also permits a structural analysis of the compounds through MS/MS experiments. During the investigations into RME, for example, a limiting of the oxidation process was observed. In the study, the structure of short-chained ageing products was also identified. These products and other results of the investigations provide the basis for being able to identify the ageing process in a vehicle's fuel tank using a sensor system. For a future emission reduction and sediment-free operation, an on-board sensor can make an important contribution to identifying the fuel composition and the degree of ageing, especially with new renewable fuels.

The on-board sensor presented is based on near-infrared spectroscopy and the measurement of relative permittivity. It is able to detect the FAME quota, the proportion of aromates and the hydrocarbons. It also uses three parameters (acid number, density and oxidation index) to detect chemical changes after the induction time. The sensor developed in this project permits the detection of ageing. In the future, it will be able to support emission-reduced operation by determining the composition of the fuel. As far as the UFOP is concerned, these sensors now have to be tested in vehicle operation.

The report is avlailable:
www.ufop.de/files/4116/0188/0784/UFOP_1724_Abschlussbericht_OWI-TAC_en_021020.pdf.

Final report on the project: Fuels for PHEV vehicles

Presenting the report, Sebastian Feldhoff from Öl-Wärme-Institut GmbH (OWI) emphasised the various practices involved in using plug-in hybrid vehicles (PHEV). If these vehicles are used only for short distances and charged on a regular basis, it is possible for the fuel to remain in the tank for a prolonged period. During this time, fuel undergoes ageing processes that impact the fuel's properties and hence lead to unwanted interactions with fuel-carrying components. The joint research project funded by the UFOP and Forschungsvereinigung Verbrennungskraftmaschinen e.V. (Research Association for Combustion Engines((FVV) involved examining fuel ageing phenomena and hardware interaction processes. The fuel mix used for the project comprised 21 diesel fuels and 14 petrol fuels that were stored under PHEV-relevant framework conditions for up to nine months. In addition, hardware components such as injectors, hoses and filters, which were filled with selected fuel specimens, were stored under similar conditions in order to examine the possible impacts on the function caused by fuel ageing within the components.

The project results show two key long-term effects. First, diesel fuels undergo oxidative and non-oxidative ageing processes. The critical parameters here are acid number, peroxide number and oxidation stability; these lead to turbidity and sedimentation. Regarding blends with biodiesel, the quality of both the fossil diesel fuel and the biodiesel can be the reason for the instability of the fuel mixture. The use of stabilising additives can slow the fuel ageing process. Second, the results of the petrol fuels revealed that the boiling characteristics of all tested fuels change during the period of storage. In addition, spectometric data point to a change in the molecular composition of the tested benzine fuels over time, which can be linked to the ageing processes.

The second part of the project focussed on the hardware effects. Mr. Feldhoff emphasised that the examined fuel lines, filters and pumps are only slightly impacted by the long-term storage of fuels in these components. In contrast, tests carried out on the injectors showed that their opening response and flow rate can be affected by sedimentation processes. Other tests with potential fuel components for the future on cold starting ability and emission behaviour with aged fuels, as well as with possibly pre-aged injection components were recommended.

The report is avlailable:
www.ufop.de/english/bio-fuels/project-reports-biodiesel-and-engine/.

Prof. Dr. Ing. Peter Pickel, John Deere, reported on the status of the MuSt5-Trak project (see also to the right). The aim of the project is to adapt the Tier V engine for use with diesel, biodiesel and vegetable oil fuel. He explained the necessary modifications to the exhaust gas aftertreatment process (including urea injection for reducing nitrous oxides) and to the engine management system. Prof. Pickel described the particular challenges of complying with the legally prescribed exhaust gas emission levels, engine lubrication, cold start behaviour, engine power/efficiency and the combination of the various fuels in the on-board management system. This requires the intelligent linking of the sensors used in series engines, among other things, for the fuel or injection quantities and pump fault detection, for instance. Measurements using various fuel mixtures are currently ongoing in the field and on test benches with a view to validating fuel detection in the real world.

The tests also examine emissions in vehicle operation (PEMS – Portable Emission Measurement System). The results of the BMEL/FNR-funded project were presented on 12 August 2021. The UFOF supported this project as part of the public relations exercise by giving a presentation on the status of the industry platform "Biofuels in agriculture and forestry" during International Green Week 2020.

Social perception of technological developments

The UFOP has promoted and continues to promote numerous projects with a practical emphasis that are aligned close to the market This does of course require that the scientific results are communicated in the most effective way possible. Prof. Josef Löffl, Technical University of Ostwestfalen-Lippe, therefore centred his presentation around the social perception of technological developments. He gave both an insight into and an overview of the challenges involved in science communication and illustrated how the situation has been further compounded by digital media. One factor is the influence on public opinion through the formation of groups, i.e. the systematic and coordinated multiplication of information and the reinforcement effects that result. Prof. Löffl explained the role played by the media using the spread of rumours as an example. If, for instance, news about price trends is made to look "interesting" or this is linked to information already in the public domain.

UFOP project proposal
Multi-fuel tractor level V ("MuSt5-Trak")

Project support: John Deere GmbH & Co. KG, Mannheim

Duration: March 2018 to February 2021

The project involves developing an engine model that is able to reliably detect fuel and automatically optimise the engine setting for use of various vegetable oil fuels and diesel fuels, or rather the mixtures thereof. The fuel detection system and automated engine setting are to be realised using existing sensors in the engine, exhaust gas treatment systems or other vehicle sensors (exhaust gas temperature, injection quantity, etc.)and implemented on a real tractor and their functionality validated under real operating conditions. The aim is to establish whether an adequately reliable fuel detection system can be realised without additional sensors.

RED III POLICY PAPER

UFOP policy paper for the amendment of the Renewable Energy Sources Directive (2018/2001/EG) – RED III - sustainable biofuels from cultivated biomass are part of it!

1. Sustainable biofuels from cultivated biomass in a globally networked bioeconomy

In globally networked flows of agricultural raw materials and products, biofuels have a special role model function. This was and is the subject of intense political debates about the sustainability requirements and their documentation as a prerequisite for crediting them against quota obligations and thus for market access. The "drivers" are the EU targets for climate protection by 2030 and the achievement of climate neutrality by 2050 at the latest. Sustainable and greenhouse gas-optimised biofuels are currently and in the medium term the option introduced on the market as a contribution to climate protection in North and South America as well as Asia. In these regions they are also expressly a control instrument for the income-supporting supply and price development for agriculture.

The legal requirements anchored in EU law must also be implemented in third countries, including the certification systems approved by the EU Commission. This refers to the steadily tightened and expanded regulations of the European Union (RED II 2018/2001/EC) for the verification of a sustainable value chain from the field or the plantation to the companies in the mineral oil industry. The access authorisation for the market is granted with the sustainability certificate. The declared amount of biofuel can then be offset against the company-specific energy quota obligation, in Germany or Sweden against the greenhouse gas reduction obligation. This legally prescribed certification or verification chain only exists in this form for biofuels.

The introduction of the CO2 footprint for agricultural products is being discussed in a very critical and demanding manner, not least because society is becoming more aware of global climate change and its consequences. Above all, the younger generation urges the public to act: Framework conditions and consumer behaviour must change, because time is running out. It now depends on how this period is used.

The commitment to climate protection policy can be seen in concrete terms in the national legislation of the member states and the sector-specific targets anchored there, which are to be met by 2030. However, politicians must also resolve the issue of avoiding the relocation of negative environmental effects to third countries. So-called „carbon leakage effects" are avoided with biofuels as a result of sustainability certification. The following applies to all biofuel origins: market access is linked to proof of a specific greenhouse gas reduction for the end product. In Germany, the introduction of the greenhouse gas quota instead of an energy quota obligation has led to a market- and demand-driven efficiency competition.

Indirect land use effects cannot be proven with regard to the cause and effect relationship in relation to the specific area. This finding confirms the long and ineffective "iLUC discussion" on biofuels. In contrast, the expansion of cultivated areas at the expense of the biotopes necessary for biodiversity and climate protection as a result of the overall global increase in demand for agricultural raw materials is undisputed. The main triggers are the flow of raw materials towards Asia and, in particular, the demand from China, which has been boosted by an increase in purchasing power.

The heads of government of the EU-27 set the framework and pressure for action with the resolution of December 2020, in which the EU climate protection target for 2030 was raised from 40% to at least 55%. The EU climate law is the first tangible result of the transformation process to be accelerated with the Green Deal, which will include all areas of life and the economy.

The EU Commission has made it clear that the EU is going ahead with climate protection, even if not all industrialised countries follow this level of ambition. Ecological extensification is announced for agriculture, but this will be combined with an opening for the approval of innovative methods in plant breeding. It seems that the important argument of the gain in time that can be achieved in the development of crops adapted to climate change is recognised. New breeding technologies such as CRISPR/Cas9 & Targeted Genome Editing are used in third countries. The raw materials are grown and marketed for food and non-food purposes. A policy that is balanced in terms of practical constraints and arguments is now urgently required.

Agriculture is directly affected by climate change. A relocation of production facilities, as is the case with other branches of industry, is of course not possible. This is why agriculture is standing up to the challenges of ambitious climate protection in adapting production systems. The sustainability requirements anchored in RED II are guidelines and provide direction – also for third countries, but so far „only" for cultivated biomass with the purpose of using biofuels in the EU.

The short-term amendment of the RED II announced in the package of measures for the Green Deal again offers the option of designing an internationally effective "level playing field" for global competition appropriately and fairly. The German Advisory Council on Global Change (WGBU) has recognised this and made the following recommendation: „Sustainability standards, as they already apply to the promotion of bioenergy and biofuels, should be extended to other uses of biomass"1.

The regulations anchored in EU laws for sustainability certification for liquid and in future also for gaseous and solid biomass sources are immediately effective and open up the possibility of on-site inspections by the responsible bodies. These regulations are therefore more effective than corresponding regulations in trade agreements for compliance with the Sustainable Development Goals (SDGs). The WTO proceedings initiated by the governments of Malaysia and Indonesia against the decision of the EU to restrict the use of palm oil with the implementation of RED II are clear evidence.

2. Thinking and evaluating system services of innovations and value chains holistically

The supply of sustainably produced protein for animal and human nutrition is a central challenge. The EU's large protein deficit in protein feed has repeatedly been confirmed by the EU Commission and can be seen from the quantities imported from third countries. Soy, in particular, has been the subject of criticism and has repeatedly been the plaything of economic interests between the governments (USA/China) and the EU. This also affects the EU's security of supply and, associated with it, the question of improving the EU's own production of protein plants.

Improving the security of supply with feed protein produced sustainably in the EU must therefore be the basis for justifying the further eligibility of biofuels made from cultivated biomass. Flowering plants such as rapeseed or sunflowers have the potential to make a noticeable and valuable contribution in connection with the expansion of crop rotations with grain legumes. The absence of genetic engineering is a unique selling point of these crops, which, as a result of the labelling of products made from milk, eggs, etc., also leads to a „regional link". The sustainability certification for the use of biofuels creates the necessary transparency according to origin and greenhouse gas efficiency, in line with the EU Commission's farm-to-fork strategy.

In recital (116), RED II provides for the greenhouse gas emissions caused by production and use to be split between biofuel and protein components (allocation). However, the greenhouse gas-reducing substitution effect is not taken into account. This arises by avoiding cultivation in third countries and importing soy, for example, if cultivated biomass from European cultivation such as rapeseed or sunflowers are processed for biofuel production. With the production of GMO-free feed protein, the land pressure in the exporting countries is reduced. That would be a positive „iLUC effect".

If this substitution effect were recognised, the domestic or European raw material cultivation – this also includes the production of bioethanol from grain – would properly enter the greenhouse gas competition. With this approach, not only competitiveness, but also added value for agriculture and thus the expansion of crop rotations would be strengthened and promoted, also in line with the farm-to-fork strategy.

The products created in the supply chain are sustainably certified. This is not only the biofuel or feed content of the processed raw materials, but all by-products such as glycerine, for example. This approach would therefore also serve as a model for third countries. Because in order to be able to fulfil the internationally binding goals of the Paris Climate Protection Agreement, the signatory states must develop analogue and globally binding sustainability concepts, the basis of which must be transparent and comprehensible evidence of greenhouse gas reduction. It is now about the „path" to be standardised to the climate protection contribution to be taken into account.

UFOP therefore calls on politicians to develop these options and approaches holistically together with business so that sustainable biofuel production from cultivated biomass can continue to play an important role as a model of a networked and sustainably oriented bioeconomy strategy in the future. This approach also improves acceptance in agriculture and society.

1) Source: Land turn in the Anthropocene: From competition to integration https://www.wbgu.de/de/publikationen/publikation/landwende

“FIT FOR 55” – THE PACKAGE OF PROPOSALS BY THE EU COMMISSION

Overview of the proposals and the planned core provisions

On 14/07/2021, the European Commission presented a forward-looking package of proposals for amending existing and new directives that will affect all economic sectors and the wider society. These measures are essentially a logical consequence of the targets set by the EU climate legislation accepted by the European Parliament and the EU Council which came into force at the end of June 2021, which saw an increase in the EU climate protection target from 40% to 55%.

Over the next one to two years, these proposals will shape the political agenda not only in Brussels, but also and especially in the member states. Every single one of the proposals has to pass through the voting procedure between EU Parliament and EU Council, thus constituting a trilogue process, before then – as a result of the national legislative procedure – going through a notification procedure for implementation.

Time is a very scarce commodity in this process, as these measures need to be transposed into national law at the earliest possible stage as a prerequisite to being able to meet the EU climate protection target within the commitment period through to 2030 and ultimately climate neutrality by 2050 at the latest. In light of the experience garnered with the reform of the CAP, the EU Commission should therefore limit itself to its role as facilitator from the outset.

These proposals are the vehicle through which the EU Commission is essentially announcing its plan to push on with its ambitious climate protection policy, even if leading industrial nations fail to pursue this level of ambition. With these measures and the 10% or so contribution it makes to global greenhouse gas emissions, however, the EU will not be able to win the fight against climate change single-handedly. Climate diplomacy (G7/G20) is gaining traction and is set to become one of the key challenges at the 26th UN Climate Conference being held from 31 October to 12 November 2021 in Glasgow. There is no doubt that the conference will attract global economic interest. Alongside the BRIC countries, the USA for example, has also positioned itself critically for the planned introduction of a CO_2 border tax. The EU wants to rule out the possibility of carbon leakage in third countries and competitive disadvantages for the EU economy. The “external protection policy” will present a key challenge if the aims of job security and prosperity and the associated required level of public acceptance in the EU are to be achieved.

The proposals made by the EU Commission:

1. Revision of existing directives/regulations:

- EU Emissions Trading System
- Regulation on land use and forestry (LULUCF)
- Effort Sharing Regulation
- Renewable Energy Directive – RED III
- Energy Efficiency Directive
- Alternative Fuels Infrastructure Directive
- Directive on emissions performance standards for passenger cars and
- light commercial vehicles
- Energy Taxation Directive

2. New draft directives/regulations:

- EU Forest Strategy
- Carbon Border Adjustment Mechanism
- Social Climate Fund
- ReFuelEU Aviation
- FuelEU Maritime

THE KEY PROPOSALS ARE BRIEFLY EXPLAINED AND COMMENTED:

1. EU Emissions Trading System (ETS)

The advancement of the emission trading system is a central strategic approach to accelerating the implementation of climate protection measures in organisations by increasing the cost of the emission rights that the approximately 12,000 affected companies in the EU (fossil power stations, cement industry, fertiliser industry, refineries, steel works) have to purchase. At less than 10 euro/tonne of CO_2, the certificates have been comparatively inexpensive until now. In addition, free certificates used to be issued to the affected industrial companies. This free issuing is set to be reduced step-by-step. The speed of the market reaction to certificates/emission rights becoming increasingly scarce is shown by the current development (EUA quotation of 01/07/21 – EUA (European Union Allowance = emission right) of the CO_2 price, with a steep rise to approx. 57 EUR/t CO_2. The costs will be passed on to the customer by factoring them into the price of steel or coal (coal-fired electricity from plants for ensuring grid stability), for example.

A high CO_2 price will accelerate the shut-down of the coal-fired power plants for economic reasons, according to those who advocate this measure. However, it should be noted that the increase in demand due to the advancement of e-mobility (approx. 1 million in 2022), heat pumps (approx. 5 million), hydrogen (electrolysis), etc., is not being matched by any adequate increase in wind power and photovoltaic systems. Because of its role in ensuring grid stability, the Federal Network Agency for coal-fired power generation stations is therefore not being “discharged” from the network, especially since the last nuclear power stations need to be decommissioned in 2022. Securing grid stability, particularly in the event of a wind and solar lull, will have an impact on the price of electricity for all consumer groups if these power stations have to be brought online. It is for this reason that the Federal Minister for Economic Affairs recently met the request to publish the results of the Prognos study conducted to estimate the medium-term rise in demand: currently approx. 580 by 2030: 645 to 665 terawatt hours.

The CO_2 pricing is correspondingly adding to the cost of steel and fertiliser production in the EU, while impacting is ability to compete internationally at the same time. The use of hydrogen from renewable power in order to meet climate protection requirements is an equally expensive option. The steel industry is therefore calling for a “quota regulation” for climate-neutral steel. This example clearly shows the balancing act that will ultimately lead to mandatory price increases in many products (construction steel, steel for the automotive industry, etc.) or resources (fossil fuels as a consequence of the national CO_2 pricing) for agriculture.

The EU Commission’s proposal involves expanding emissions trading to shipping, road traffic and heating fuels (buildings), although in separate “systems” due to the differing greenhouse reduction costs. The idea is not only to prevent the “carbon leakage” of GHG reduction to other sectors, but also to continue the differentiation by “sectors” (see also the climate protection legislation) for the time being.

The pricing is impacting household income and is therefore the subject matter of regulations for a social climate fund to be drawn up at the same time. The “yellow vest protests” in France are testimony to the speed at which climate protection measures can lead to public criticism.

2. Social Climate Fund

The negative effects on household income described are to be compensated as far as possible by setting up a social climate fund. The focus will be on low-income households. However, a distinction is made between the member states based on economic strength. The EU’s funding for scaling up climate action must therefore also be geared towards meeting this criterion. In this respect, the funding framework in Germany for e-mobility is no benchmark for the “poorer” member states. This is evident from looking at the distribution of e-vehicle charging stations in the member states: 70% of charging stations are located in just three member states. At least 50% of the income generated by emissions trading is to go into the new social climate fund.

3. Effort Sharing Regulation

As a logical consequence of the EU climate protection target being raised to 55%, an equally ambitious adaptation to the effort sharing regulation is likewise required. Implemented at national level, the adaptation will concern the following sectors: agriculture, transport, buildings and waste, which account for approximately 60% of European GHG emissions. Based again on the existing assessment criteria of “capacity”, the proposal involves increased binding targets for all member states. The most important of these criteria is their economic power (gross domestic product – GDP). In Germany: increase from 38% to 50%. The following countries are also required to meet this target: Luxembourg, Sweden, Finland and Denmark, while France: 47.5%. Eastern European countries such as Hungary and Poland will also be called upon to reach their respective higher targets: Increase from 7% to 18.7% and 17.7% respectively.

This is the backdrop against which the German Federal Government, as part of the revision to the climate protection targets as of 2030 enforced by the ruling of the Federal Constitutional Court, simultaneously tightened up their own sector-specific targets (reduction in the annual emission limits) by 2030.

4. Regulation on land use and forestry (LULUCF)

This regulation compels every EU country to ensure that emissions from these sectors are compensated by CO_2 removals from the atmosphere (the so-called “No Debit” rule). For carbon sinks, the proposal states a target of 310 million tonnes of CO_2 for the EU as a whole from the year 2026 and, consequently a reduction target for Germany of approx. 25 million tonnes of CO_2 per annum. However, this target fails to consider the apparent consequences of climate change. The aridity and the associated large-scale impact on dried forest land call for a regionally adjusted management of resources or re-forestation. Forests are not able to perform the required sink function. The opposite could hold true in the future. The EU Commission also proposes that as of 2031, the emissions from LULUCF and agriculture are to be balanced jointly (“AFOLU”: Agriculture, Forestry and Other Land Use) coupled with the objective of the AFOLU sector being climate-neutral by 2035 and having negative emissions thereafter. In this regard, “carbon farming” will be key. The EU leaves unanswered the question of how, in arable farming, carbon can be verifiably and permanently absorbed from the atmosphere, although this goal is being also pursued with the “Farm to Fork” strategy.

5. Carbon Border Adjustment Mechanism

The proposal for a CO_2 border tax (Carbon Border Adjustment Mechanism, CBAM) is intended to protect European industry from unfair competition by raising the price of imports, of steel or fertiliser for example, based on their carbon footprint (levy) and granting relief for the export of relevant commodities. The long drawn-out critical discussion between industry, EU Commission and EU Parliament on the question of whether emission certificates will continue to be provided free-of-charge as compensation, and if so, until when, goes on and is even being stepped up. This compensatory measure, however, is inconsistent with WTO law (non-discrimination principle) and has therefore been considered discriminatory by some governments (Brazil, South Africa, India and China).

The measure aims to encourage companies in third countries to increase climate action in their production facilities (level adjustment) and prevent carbon leakage effects by relocating factories to third countries with less stringent climate regulations or making new investments there. The introduction of the carbon tax will compel the EU Commission to generate revenue to finance the social fund and climate protection measures, and also to repay the debt incurred by the creating of the "EU Recovery Fund".

6. Renewable Energy Directive (RED III)

The Renewable Energy Directive performs two primary functions: it defines which energy sources are considered "renewable" when sustainability is taken into account and, in the case of biofuels – differentiated by types of raw materials – sets out the so-called caps on biofuels from cultivated biomass and waste material, and stipulates binding targets for the proportion of renewable power in the European power mix. The EU's goal of achieving climate neutrality by 2050 requires all member states to dramatically ramp up their production capacities for renewable energies. In 2018, the EU set itself the goal of increasing the proportion of renewable energies in the European energy mix from currently around 20% to 32% by 2030.

The most important rules affecting biofuels/alternative fuels:

- Further raising of the target for the share of renewable energies in gross final energy consumption from 32% to 40% in 2030. The transport sector is under an obligation to reduce greenhouse gas emissions by at least 13% by 2030. The sub-quota for energy production from progressive biofuels (Appendix IX, Part A, Straw, etc.) is at least: 0.2% in 2022, 0.5% in 2025, 2.2% in 2030
- The introduction of a target of 2.6% for Renewable Fuels of Non Biological Origin – RFNBO (synthetic fuels, e-Fuels) in 2030 is a new development.
- With the cap on biofuels from cultivated biomass, the limit remains in place at national level (essentially max. 7%): consumption rate in 2020 + max. 1%).
- Biofuels which pose a high risk of change to land use (high iLUC – palm oil) are being frozen at the consumption level in 2019 for the respective member state – to be phased out by 2030 at the latest.
- The option of the introduction of the GHG quota regulation and the offsetting of renewable energy for quota trading being open to all member states is a new development. The regulation on the GHG quota introduced in Germany will be adopted as a result.
- In this respect, it is important for biodiesel that the Fuel Quality Directive is also amended to allow B7 as a protected variety, thereby creating the option for the first time.

7. Energy Tax Directive

This proposal to revise and restructure energy taxation pursues the aim of essentially taxing all energy sources based on their energy content (EUR/Gigajoule). The volume-based taxation in place until now (EUR/l) is being abolished, as is the difference in the level of taxation based on a ten-year adjustment phase. For Germany, this means that the difference in the level of taxation on diesel and petrol will be abolished.

In Annex I, the draft directive provides for a base value for minimum taxation, differentiated by fuel type and sector of use (general and reduced, e.g. agriculture), which will be followed by increase steps for the minimum tax rate to be reached in 2030 (see tables in the appendix). As Table 2 shows, a minimum tax rate is to be introduced for diesel fuel in the agricultural sector, which will replace the expiring authority of the member states to exempt "energy commodities" (fuels and combustibles) from taxation (tax rate "0").

Crucially, it should be noted that the "spirit" of the Green Deal to abolish environmentally harmful "fossil" subsidies is apparent. However, the EU Commission has not delivered on its announcement to accelerate the voting procedure in the EU. This directive therefore has to be adopted unanimously. Given the importance of these regulations for national budgets, an extremely difficult voting process is expected. However, this cannot be swept under the carpet like the last proposal made by the EU Commission in 2015 (draft presented in 2011). This directive is at the heart of the Green Deal for climate protection and a number of compromises over accompanying measures are likely to be required to alleviate tensions and achieve a consensus.

8.Alternative Fuels Infrastructure Directive

By updating this directive from 2014, the EU Commission's intention is to accelerate the expansion of infrastructure for alternative fuels (hydrogen, bio-LNG, alternative marine and aviation fuels, etc.) and the charging infrastructure, appropriately designed (charging speed) for vehicles (passenger cars, commercial vehicles). The aim is an EU-wide network of charging stations, since so far 70% of all stations have been located in just three member states. This is halting the expansion of e-mobility and the level of acceptance among consumers who should be increasingly moving over to electric vehicles. The European Commission has already announced that it intends to increase the number of electric charging stations to one million by 2025 and to three million by 2030.

The proposal also envisages mandatory national targets for the expansion of an adequate infrastructure for alternative fuels for road vehicles, ships and aircrafts in the EU. It defines common technical specifications and requirements for user information, data provisioning and payment requests for the infrastructure for alternative fuels. The draft therefore contains regulations for the national political framework to be established by the member states and, at the same time, introduces a reporting mechanism designed to encourage cooperation and guarantee solid progress tracking.

9. Directive on emissions performance standards for passenger cars and light commercial vehicles

The main proposal, which is currently also shaping opinion in the vehicle industry as a whole, is the regulation that would allow only "emission-free" passenger cars to be registered from 2035. With the proposal, the EU Commission is effectively setting a date for the phase-out of the combustion engine. The EU Commission draft for a Euro 7 emissions standard should also be seen in this context. The automotive industry

regarded this draft as ban through the back door. Given the economic importance of this sector (income, jobs & tax revenues) and the fact that combustion engines will continue to play a key role globally, it is necessary to question whether the EU Commission is deliberately trying to bring about carbon leakage discussed under the other proposals.

10. ReFuelEU Aviation – Sustainable Aviation Fuels

The aim of the proposal is a commitment to gradually reduce aircraft emissions through the increased use of Sustainable Aviation Fuels (SAF). This is to be achieved by raising the blending proportion of SAF in kerosene: at least 2% and 5% in 2025 and 2030 respectively, and ultimately 63% in 2050. The proposal encourages the use of synthetic kerosene from renewable power, along with bio-kerosene from raw materials from Annex IX Part A (progressive biofuels from straw, etc.) and Part B (biofuels from waste oils and waste animal fats). Raw materials from cultivated biomass are expressly ruled out to prevent any further increase in the competition in the food and animal feed markets. In this context, the proposal regards the environmental advantage of biofuels from cultivated biomass as "limited". Under the proposal, all aircrafts departing from any airport within the EU have to be fuelled with a blend of kerosene and SAF. Consequently, ticket prices will increase because the SAF proportion is more expensive – kerosene accounts for around 25% of the operating costs. On the other hand, the EU is expecting the gradual increase to achieve scaling effects if production volumes are ramped up. The practical implementation of the monitoring procedure and verifications of physical usage and sustainability will present a challenge. These issues were discussed in detail during the consultation process.

11. FuelEU Maritime – Sustainable Shipping Fuels

This regulation proposal sets out common rules for limiting the greenhouse gas intensity of the energy (fuels and shore power) used on-board ships (freight or passenger ships) that sail into ports in member states, stop off and sail out again. The proposal provides for an obligation to use the shore power supply in the port (mandatory from 01/2030) or "zero emission technologies" for generating power on-board. The average annual greenhouse gas intensity of the energy consumed on-board a ship must not exceed specific thresholds during a particular reporting period. The basis is a reference value, which is to be reduced by the following percentages: -2% as of 1 January 2025; -6% as of 1 January 2030; -13% as of 1 January 2035; -26% as of 1 January 2040; -59 % as of 1 January 2045; -75% as of 1 January 2050. This is based on an extensive control and monitoring system that the shipowners have to implement. Where biofuels are used, the emission factors and the calculation formula defined in the Renewable Energy Directive (RED II) are to be applied. Biofuels from cultivated biomass (food and feed crops), however, are not taken into account.

12. Energy Efficiency Directive

The proposed regulation sets out more ambitious targets for reducing energy consumption at EU level. The obligation of member states to save energy is doubled, and the public sector's commitment is increased with the requirement to renovate the energy systems in at least 3% of its existing buildings. The EU Commission is expecting this to create jobs and reduce costs for the taxpayer due to the lower energy consumption.

ASSESSMENT BY UFOP:

With its package of proposals, the EU Commission is writing the script for climate policy in the years to come. Although the allocation of roles at the institutions is indeed clear, the voting process will be measured by the existence of a comparable political will at national level to accept the new regulations and implement them in the fastest possible time. The issues surrounding the implementation of the Renewable Energy Directive (RED II) already evidence that there are doubts among member states. Only a small number of member states met the deadline of the end of June 2021. In view of the proposals, the national energy and climate plans presented to the EU Commission by the member states in late 2020 will have to be adapted immediately.

However, the EU Commission has not followed up on its announcement to adapt the voting procedure for important legal regulations from unanimity to a qualified majority. This concerns in particular the tax regulations and the proposal for the regulation to change the energy tax system.

The EU Commission has ignored consumer acceptance completely. The EU Commission does not make any proposals as to how to persuade the general public to buy into this increasingly fast-paced transformation path. This "deficiency" can not only be observed in Germany, for example, with the civil protests against wind turbines, but will also be evident in the future when the inflation-driving effect of these proposals is a burden on the wallets of each and every individual. The comparatively "harmless" yellow vest protests in France should serve as a a warning.

Appendix: Information on the "Fit for 55" policy: Annex (from COM(2021) 563 final, annex 1)

Table A.– Minimum tax rates for engine fuels (general) in EUR/Gigajoule

	Start of the transition period (01/01/2023)	Final price at the end of the transition period (01/01/2033) prior to indexing
Petrol	10.75	10.75
Diesel	10.75	10.75
Kerosene	10.75	10.75
Non-sustainable biofuels	10.75	10.75
Non-renewable fuels of non-biological origin	7.17	10.75
Sustainable biofuels from food and feed crops	5.38	10.75
Sustainable biogas from food and feed crops	5.38	10.75
Sustainable biofuels	5.38	5.38
Sustainable biogas	5.38	5.38
Low-carbon fuels	0.15	5.38
Renewable fuels of non-biological origin	0.15	0.15
Progressively sustainable biofuels and biogas	0.15	0.15

Table B. – Reduced minimum tax rates for engine fuels, among others, for the agricultural sector

	Start of the transition period (01/01/2023)	Final price at the end of the transition period (01/01/2033) prior to indexing
Gas oil	0.9	0.9
Heavy oil	0.9	0.9
Kerosene	0.9	0.9
Non-sustainable biofuels	0.9	0.9
Liquid gas	0.45	0.9
Non-renewable fuels of non-biological origin	0.45	0.9
Sustainable biofuels from food and feed crops	0.45	0.9
Sustainable biogas from food and feed crops	0.45	0.45
Sustainable biofuels	0.45	0.45
Sustainable biogas	0.45	0.45
Low-carbon fuels	0.15	0.45
Renewable fuels of non-biological origin	0.15	0.15
Progressively sustainable biofuels and biogas	0.15	0.15

Sources/links to the EU Commission's "Fit for 55" proposals:

(Note: the proposals are also published in German and/or all official languages under the links below)

Delivering the European Green Deal | European Commission (europa.eu)

- Chapeau Communication: fit for 55 delivering EU's 2030 climate targets https://ec.europa.eu/info/files/communication-fit-55-delivering-eus-2030-climate-target-way-climate-neutrality_en
- Revision of the EU Emission Trading System: https://ec.europa.eu/info/files/revision-eu-emission-trading-system_en
- Revision of the EU Emission Trading System for Aviation: https://ec.europa.eu/info/files/revision-eu-emission-trading-system-aviation_en
- Notification on the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA): https://ec.europa.eu/info/files/notification-carbon-offsetting-and-reduction-scheme-international-aviation-corsia_en
- Revision of the Market Stability Reserve: https://ec.europa.eu/info/files/revision-market-stability-reserve_en
- Social Climate Fund: https://ec.europa.eu/info/files/social-climate-fund_en
- Revision of the Land, Forestry and Agriculture Regulation: https://ec.europa.eu/info/files/revision-regulation-inclusion-greenhouse-gas-emissions-and-removals-land-use-land-use-change-and-forestry_en
- Revision of the Effort Sharing Regulation: https://ec.europa.eu/info/files/effort-sharing-regulation_en
- Revision of the Renewable Energy Directive: https://ec.europa.eu/info/files/amendment-renewable-energy-directive-implement-ambition-new-2030-climate-target_en
- Revision of the Energy Efficiency Directive: https://ec.europa.eu/info/files/amendment-energy-efficiency-directive-implement-ambition-new-2030-climate-target_en
- ReFuel EU Aviation: https://ec.europa.eu/info/files/refueleu-aviation-sustainable-aviation-fuels_en
- Fuel EU maritime: https://ec.europa.eu/info/files/fueleu-maritime-green-european-maritime-space_en
- Revision Alternative Fuels Regulation https://ec.europa.eu/info/files/revision-directive-deployment-alternative-fuels-infrastructure_en
- Revision CO_2 standards for cars: https://ec.europa.eu/info/files/amendment-regulation-setting-co2-emission-standards-cars-and-vans_en
- Regulation on Carbon Border Adjustment Mechanism: https://ec.europa.eu/info/files/carbon-border-adjustment-mechanism_en
- Revision Energy Taxation Directive: https://ec.europa.eu/info/files/revision-energy-tax-directive_en

Status: 26 July 2021

TABULAR ANNEX

Legend/explanation of symbols in the tables:

– nothing or less than one unit
. no information available until editorial deadline
0 less than half of 1 in the final digit shown, but more than nothing
/ no information, since the numeric value is not reliable enough
() Numeric value statistically relatively unreliable

Biofuels

Table 1: Germany: Development of fuel consumption since 1990

Jahr	Biodiesel[1)]	Vegetable oil	Bioethanol	Total renewable fuel supply
				Data in 1,000 tonnes
1990	0	0	0	**0**
1995	35	5	0	**40**
2000	250	16	0	**266**
2001	350	20	0	**370**
2002	550	24	0	**574**
2003	800	28	0	**828**
2004	1,017	33	65	**1,115**
2005	1,800	196	238	**2,234**
2006	2,817	711	512	**4,040**
2007	3,318	838	460	**4,616**
2008	2,695	401	625	**3,721**
2009	2,431	100	892	**3,423**
2010	2,529	61	1,165	**3,755**
2011	2,426	20	1,233	**3,679**
2012	2,479	25	1,249	**3,753**
2013	2,213	1	1,208	**3,422**
2014	2,363	6	1,229	**3,598**
2015	2,149	2	1,173	**3,324**
2016	2,154	3	1,175	**3,332**
2017	2,216	0	1,156	**3,372**
2018	2,324	0	1,187	**3,511**
2019	2,348	0	1,161	**3,509**
2020	3,025	0	1,097	**4,122**

Sources: BAFA, BLE
[1)] as of 2012 incl. HVO

Table 2: Germany: Domestic consumption of biofuels 2015 – 2020 in 1,000 t

	2015	2016	2017	2018	2019	2020
Biodiesel admixture	2,144.9	2,150.3	2,215.9	2,323.3	2,301.4	3,025.3
Biodiesel pure fuel	3.5	.	.	.	.	.
Total biodiesel	**2,144.9**	**2,150.3**	**2,215.9**	**2,323.3**	**2,301.4**	**3,025.3**
Vegetable oil	2.0	3.6	.	.	.	.
Total biodiesel & veg oil	**2,150.3**	**2,153.9**	**2,215.9**	**2,323.3**	**2,301.4**	**3,025.3**
Diesel fuel	36,756.4	35,751.0	36,486.7	35,151.7	35,546.8	32,139.4
Share of admixture in %	5.8	5.7	5.7	6.2	6.1	8.6
Total fuels	**36,761.8**	**35,754.6**	**38,702.5**	**37,475.0**	**37,848.2**	**35,164.8**
Share biodiesel & veg oil in %	5.8	5.7	.			
Bioethanol ETBE	119.2	128.8	111.4	109.9	88.1	125.8
Bioethanol admixture	1,054.2	1,046.7	1,045.1	1,077.4	1,054.6	971.7
Bioethanol E 85	6.7	.	.	.	.	.
Total bioethanol	**1,174.5**	**1,175.4**	**1,156.5**	**1,187.4**	**1,142.7**	**1,097.5**
Petroleum fuels	17,057.0	17,062.3	17,139.5	16,649.7	16,823.2	15,120.4
Petroleum + bioethanol fuels	18,230.4	18,237.7	18,296.0	17,837.1	17,965.9	16,217.9
Share of bioethanol in %	6.9	6.4	6.3	6.7	6.4	6.8

Sources: German Federal Office of Economics and Export Control, AMI

Table 3: Germany: Monthly domestic consumption of biofuels 2015 – 2020 in 1,000 t

	2015	2016	2017	2018	2019	2020
Biodiesel admixture						
January	159.92	174.56	160.22	182.81	182.62	221.72
February	173.73	167.74	134.45	176.12	145.13	212.69
March	188.86	194.59	206.45	203.28	172.67	221.96
April	190.02	191.14	174.91	196.00	180.57	194.34
May	204.96	184.26	178.44	204.94	185.78	242.25
June	191.21	203.36	190.17	197.08	191.11	227.75
July	190.25	194.50	205.92	225.16	220.98	288.80
August	185.33	186.81	207.11	212.19	214.37	282.56
September	165.14	172.73	200.18	190.39	204.33	303.29
October	159.41	159.06	189.94	184.91	198.19	271.76
November	167.24	160.88	193.99	173.29	204.24	229.77
December	168.83	160.68	174.14	177.17	201.44	209.55
Average	**178.74**	**179.19**	**184.66**	**193.61**	**191.79**	**242.20**
Total volume	**2,144.90**	**2,150.29**	**2,215.90**	**2,323.33**	**2,301.42**	**2,906.44**
Bioethanol						
January	78.98	93.38	88.22	104.92	95.26	102.21
February	85.04	80.02	77.26	87.45	81.95	95.53
March	90.78	89.75	90.33	98.15	82.28	84.99
April	98.76	90.30	99.86	95.30	89.45	60.84
May	108.24	98.41	105.50	106.85	103.94	89.23
June	100.65	107.85	95.47	103.01	100.48	93.68
July	107.01	112.06	106.32	104.91	99.77	112.67
August	109.16	103.16	102.98	109.72	94.37	105.04
September	99.39	96.38	96.11	92.64	96.81	92.12
October	99.15	101.30	102.59	95.94	101.45	100.67
November	94.53	99.65	91.55	93.70	100.66	86.26
December	101.78	103.20	100.33	94.75	96.28	75.84
Average	**97.79**	**97.95**	**96.38**	**98.95**	**95.22**	**91.59**
Total volume	**1,173.48**	**1,175.45**	**1,156.52**	**1,187.36**	**1,142.68**	**1,099.08**

Note: Data for 2020 provisional
Source: German Federal Office of Economics and Export Control, AMI

Table 4: Germany: Foreign trade with biodiesel 2015 – 2020 in t

	2015	2016	2017	2018	2019	2020
Biodiesel import						
January	43,895	48,778	43,930	85,583	97,340	118,503
February	27,362	61,229	45,251	78,473	71,163	101,957
March	32,017	78,121	58,354	115,706	86,856	93,790
April	50,179	105,342	67,174	116,581	122,073	119,514
May	54,036	66,152	69,232	138,737	124,686	141,545
June	58,882	61,900	57,016	130,556	107,161	182,379
July	57,543	75,016	78,880	121,159	159,543	164,656
August	48,775	60,430	80,471	92,421	126,501	159,193
September	38,478	74,432	75,286	127,237	155,319	122,840
October	28,195	50,256	82,373	79,313	112,635	87,543
November	35,383	40,634	70,296	55,765	111,581	91,980
December	46,227	34,433	59,883	75,638	130,722	86,409
Total	**520,972**	**756,722**	**788,145**	**1,217,168**	**1,405,579**	**1,470,308**
Biodiesel export						
January	139,212	86,117	113,367	141,104	183,590	206,446
February	100,653	105,759	121,281	156,687	193,992	195,023
March	89,716	103,757	101,721	143,594	205,928	192,021
April	134,858	102,930	152,217	172,016	169,000	181,654
May	127,422	138,783	137,679	114,487	230,393	129,267
June	120,061	121,659	148,797	166,584	163,145	236,953
July	137,746	135,787	114,460	155,086	172,055	185,629
August	116,958	130,781	127,871	191,730	192,742	212,926
September	134,234	118,485	155,532	173,519	197,228	235,530
October	141,910	178,807	165,812	181,676	193,140	165,250
November	124,179	180,361	120,172	170,864	181,609	181,040
December	124,996	139,180	149,643	176,551	177,904	247,227
Total	**1,491,944**	**1,542,406**	**1,608,550**	**1,943,897**	**2,260,727**	**2,368,966**

Note: Data for 2020 provisional
Sources: Federal Statistics Office of Germany, AMI

Table 5: Germany: Export of biodiesel [FAME] (2015 – 2020) in t

	2015	2016	2017	2018	2019	2020
Belgium	120,899	89,366	84,487	132,413	264,411	344,593
Bulgaria	981	1	1	1	1	1,200
Denmark	39,953	43,271	88,317	39,511	27,269	24,667
Estonia	.	.	24	.	.	1,890
Finland	855	8,512	12,734	9,156	2,626	609
France	182,315	85,006	76,339	64,945	53,701	69,678
Greece	29,623	12,581	40,016	50,581	107,902	67,028
Ireland	2,225	886	.	.	.	0
Italy	44,221	12,954	11,698	5,410	12,829	17,823
Croatia	.	.	.	.	500	2
Latvia	143	.	.	50	0	242
Lithuania	769	407	1,198	660	977	1,920
Luxembourg	0	.	0	308	417	.
Malta	43	.	.	.	.	.
Netherlands	419,613	588,598	583,289	667,121	855,472	1,024,616
Austria	134,615	71,627	97,500	185,335	171,617	130,028
Poland	125,453	229,517	236,404	242,008	239,225	246,238
Portugal	0		9	8	8	4
Romania	0	11,912	0	0	0	3,935
Sweden	111,136	60,176	73,089	138,524	135,833	112,796
Slovakia	155	939	5,595	12,486	21,271	3,425
Slovenia	1,530	165	1,651	14,988	34,917	32,719
Spain	7,799	30,865	33,388	274	350	698
Czech Republic	120,092	98,446	88,212	61,155	56,036	26,308
Hungary	7,664	56	3,488	4,902	315	7,072
United Kingdom	25	6	2	3	1	
Cyprus	81	.	.	.	.	.
EU-28	**1,320,566**	**1,332,708**	**1,397,422**	**1,579,258**	**1,877,773**	**2,050,462**
USA	10,870	84,953	70,091	197,412	183,250	164,062
Switzerland	17,813	45,321	70,152	97,819	83,865	79,358
Other countries	142,695	79,424	70,885	69,408	115,839	75,084
Total	**1,491,944**	**1,542,406**	**1,608,550**	**1,943,897**	**2,260,727**	**2,368,966**

Note: Data for 2020 provisional
Sources: Federal Statistics Office of Germany, AMI

Table 6: Germany: Import of biodiesel [FAME] (2015 – 2020) in t

	2015	2016	2017	2018	2019	2020
Belgium	82,412	101,252	136,199	236,150	293,449	296,667
Bulgaria	.	3,664	20,388	33,142	24,954	25,302
Denmark	29	217	3,599	532	1,001	785
Estonia	.	.	.	.	23	.
Finland	.	.	.	.	.	1,992
France	22,446	8,774	14,283	9,678	21,749	73,519
Greece	.	.	.	.	.	.
Italy	15,776	.	3,003	827	33	177
Lithuania	.	.	.	536	.	.
Netherlands	132,452	286,324	300,959	618,523	713,134	699.156
Austria	60,225	95,174	92,837	90,538	80,537	84,273
Poland	64,119	93,602	70,498	88,955	94,316	128,416
Romania	.	.	.	.	25	3,440
Sweden	277	168	140	1	9	2
Slovakia	1,096	15,604	6,549	959	1,464	2,278
Slovenia	76	1,190	1,929	1,341	.	0
Spain	.	10	.	1,001	27	.
Czech Republic	5,989	12,384	2,460	922	12,987	6,985
Hungary	.	50	193	.	.	.
United Kingdom	942	954	608	709	5,992	354
Cyprus	.	.	.	.	.	.
EU-28	**385,837**	**619,369**	**653,647**	**1,083,813**	**1,249,650**	**1,323,346**
Malaysia	132,041	129,042	124,458	128,109	153,182	139,309
Morocco	.	.	.	.	.	4,723
Canada	.	.	.	.	.	968
Norway	491	547	1,024	593	522	509
Other countries	**2,603**	**7,764**	**9,016**	**4,653**	**2,225**	**1,453**
Total	**520,972**	**756,722**	**788,145**	**1,217,168**	**1,405,579**	**1,470,308**

Note: Data for 2019 provisional
Sources: Federal Statistics Office of Germany, AMI

Table 7: Biodiesel production capacities 2020 in Germany

Operator / Plant	Location	Capacity (t/year)	
ADM Hamburg AG - Hamburg plant	Hamburg	not available	●
ADM Mainz GmbH	Mainz	not available	●
Bioeton Kyritz GmbH	Kyritz	80,000	
BIO-Diesel Wittenberge GmbH	Wittenberge	120,000	
Viterra Rostock GmbH	Rostock	200,000	●
Biowerk Sohland GmbH	Sohland	80,000	●
Bunge Deutschland GmbH	Mannheim	100,000	●
Cargill GmbH	Frankfurt/Main	300,000	●
ecoMotion GmbH	Sternberg	100,000	●
ecoMotion GmbH	Lünen	162,000	●
ecoMotion GmbH	Malchin	10,000	●
german biofuels gmbh	Falkenhagen	130,000	
Glencore Magdeburg GmbH	Magdeburg	64,000	
Gulf Biodiesel Halle GmbH	Halle	56,000	●
KFS Biodiesel GmbH	Cloppenburg	50,000	
KFS Biodiesel GmbH	Niederkassel-Lülsdorf	120,000	
KFS Biodiesel GmbH	Kassel/Kaufungen	50,000	●
Louis Dreyfus commodities Wittenberg GmbH	Lutherstadt Wittenberg	200,000	
Mercuria Biofuels Brunsbüttel GmbH	Brunsbüttel	250,000	●
NEW Natural Energie West GmbH	Neuss	260,000	●
Rapsol GmbH	Lübz	6,000	
REG Germany AG	Borken	85,000	●
REG Germany AG	Emden	100,000	●
Tecosol GmbH	Ochsenfurt	75,000	
UPBM GmbH & Co.	Kirchdorf	not available	●
Verbio Diesel Bitterfeld GmbH & Co. KG (MUW)	Greppin	190,000	●
Verbio Diesel Schwedt GmbH & Co. KG (NUW)	Schwedt	250,000	
Total (without ADM)		**3,038,000**	

Note: ● = AGQM member;
Sources: UFOP, FNR, VDB, AGQM/Some names abbreviated
DBV and UFOP recommend the biodiesel reference from the members of the working group
Status: July 2020

Table 8: EU production of biodiesel 2013 – 2020 in 1,000 t

	2013	2014	2015	2016	2017	2018	2019	2020
Belgium	300	446	248	235	290	252	254	220
Denmark	200	200	140	140	120	130	130	125
Germany	2,911	3,352	3,085	3,119	3,208	3,344	3,583	3,400
France	2,091	2,171	2,386	2,224	2,245	2,606	2,523	1,800
Italy	459	710	777	786	932	1,005	1,183	1,285
Netherlands	1,375	1,720	1,629	1,462	1,929	1,839	1,902	1,770
Austria	217	292	340	307	295	287	299	290
Poland	648	692	759	871	904	881	966	920
Portugal	306	335	363	337	356	363	292	262
Sweden	202	231	249	241	193	258	322	260
Slovenia	15	0	0	0	0	0	0	0
Slovakia	105	101	125	110	109	110	109	116
Spain	720	1,188	1,175	1,486	1,878	2,143	2,040	1,450
Czech Republic	182	219	168	149	157	194	248	260
EU others	1,060	1,081	1,214	1,216	1,502	1,620	1,880	1,789
EU-27	**10,791**	**12,738**	**12,658**	**12,683**	**14,118**	**15,032**	**15,731**	**13,947**
United Kingdom	267	143	149	342	467	476	510	480

Source: IHS Markit

Table 9: Global biodiesel and HVO production 2013–2020 in 1,000 t

	2013	2014	2015	2016	2017	2018	2019	2020
Biodiesel production								
EU	9,469	10,790	10,531	10,495	11,332	12,242	12,399	10,562
Canada	154	300	260	352	350	270	350	350
USA	4,523.2	4,230.1	4,216.8	5,226	5,316	6,185.3	5,742.3	6,052.1
Argentina	1,997.8	2,584.3	1,810.7	2,659.3	2,871.4	2,429	2,147.3	1,157.4
Brazil	2,567.4	3,009.5	3,464.8	3,345.2	3,776.3	4,708	5,193	5,660.2
Colombia	503.3	518.5	513.4	447.8	509.8	555	530	530
Peru	16	2	1	0	33	99	135	100
China	950	997	693	800	918	734	826	1,250
India	120	114	119	123	132	141	200	200
Indonesia	2,411	3,162	1,425	3,217	3,006	5,428	7,391	7,560
Malaysia	449	418	654	512	900	968	1,400	1,225
Philippines	136	151	180	199	194	199	170	140
Thailand	923.6	1,032	1,089	1,084.2	1,256.3	1,391.8	1,624.4	1,621.9
Rest of the world	1,195	1,022	1,103	1,266	1,440	1,625	1,770	1,740
Total	**25,415.4**	**28,330.3**	**26,060.6**	**29,726.5**	**32,034.8**	**36,975.1**	**39,877.9**	**38,148.6**

Renewable Diesel/HVO	2013	2014	2015	2016	2017	2018	2019	2020
EU	1,322	1,948	2,127	2,188	2,786	2,790	3,332	3,385
USA	60	409	755	1,040	1,170	1,270	1,890	2,015
Other	831	908	973	1,015	975	783	922	815
Total	**2,213**	**3,265**	**3,855**	**4,243**	**4,931**	**4,843**	**6,144**	**6,215**

Sum total Biodiesel/HVO production world-wide	**27,628.4**	**31,595.3**	**29,915.6**	**33,969.5**	**36,965.8**	**41,818.1**	**46,021.9**	**44,363.6**

Source „F.O.Licht/IHS Markit, April 2021"

Table 10: Global biodiesel and HVO consumption 2013–2020 in 1,000 t

Biodiesel consumption	2013	2014	2015	2016	2017	2018	2019	2020
EU-27	10,030	10,886	10,199	10,153	10,619	12,082	12,559	11,429
Canada	148	141	365	393	379	439	241	202
USA	4,759.2	4,719.3	4,976.7	6,946	6,611.6	6,311.9	6,032.1	6,205.3
Argentinia	885	970,1	1,013.9	1,033.3	1,173.3	1,098.5	1,071	477.5
Brazil	2,510	2,879.6	3,367.7	3,332.5	3,753.4	4,677.8	5,166.6	5,189
Colombia	505.7	518.7	523.4	507	513.3	552	533	513
Peru	261.2	257.2	277.8	293.6	290.4	291.2	293.3	250.9
China	250	850	208	240	275	700	800	100
India	45	30	35	45	65	75	75	77
Indonesia	737	1,299	585	2,306	1,999	2,900	5,510	7,300
Malaysia	251	352	453	449	456	502	695	620
Philippines	135	143	177	192	180	170	180	175
Thailand	897.8	1,074.8	1,134.9	1,025.3	1,254.5	1,422.3	1,448.7	1,420
Rest of the world	1,685	3,207	1,734	1,743	1,789	2,596	2,884	2,481
Total	**23,099.9**	**27,327.7**	**25,050.5**	**28,658.8**	**29,358.6**	**33,817.7**	**37,488.6**	**36,439.7**

HVO consumption*	2013	2014	2015	2016	2017	2018	2019	2020
EU	1,176	1,762	2,043	2,081	2,418	2,244	2,627	3,589
Canada	149	154	77	63	67	56	72	86
USA	279	1,230	1,440	1,745	1,799	1,817	2,694	2,861
Thailand	10	15	15	15	15	15	15	15
Rest of the world	43	184	126	171	371	213	290	275
Total	**1,657**	**3,345**	**3,701**	**4,075**	**4,670**	**4,345**	**5,698**	**6,826**

Sum total biodiesel/ HVO consumption worldwide	**24,756.9**	**30,672.7**	**28,751.5**	**32,733.8**	**34,028.6**	**38,162.7**	**43,186.6**	**43,265.7**

* HVO = Hydrogenated Vegetable Oil
Source: F.O. Licht, status April 2020

Biofuel mandates

Table 11: National biodiesel mandates 2021

	Type	Minimum total biofuel (%)	Progressive biofuels* (%)	Biofuel in petrol (%)	Biofuel in diesel (%)	Reduction of the GHG intensity of the fuels (%)
Austria	Energy	5.75[1]	0.5	3.4	6.3	-6
Belgium	Energy	9.55	0.1	6.5	6.5	-6
Bulgaria	Volume	-	1 (in diesel)	9	6	-6
	Energy	-	0.05	-	-	-6
Croatia	Energy	8.81	0	0.1	8.71	-6
Cyprus	Energy	7.3	-	-	-	-6
Czech Republic	Volume	-	-	4.1	6	-6
Denmark	Energy	7.6	0.3	5	-	-6
Estonia	Energy	10[2]	0.5	-	-	-6
Finland	Energy	18[3]	2	-	-	-6
France	Energy	-	1.6 (in petrol) 1 (in diesel)	8.6[4]	8[4]	-10
Germany	Energy	-	0.1	-	-	-6
Greece	Energy	-	-	3.3	-	-6
	Volume	-	0.2	-	7	-6
Hungary	Energy	8.2	-	6.1 (RON 95 petrol)	-	-6
Ireland	Volume	12.36	0.25	-	-	-6
Italy	Energy	10	2[5]	-	-	-6
Latvia	Volume	-	-	9.5[6] and 5[5]	6.5-7[7]	-6
Lithuania	Volume	-	0.5	10[8]	7	-6
Luxembourg	Energy	7.7[9]	-	-	-	-6
Malta	Energy	10	0.1	-	-	-6
Netherlands	Energy	17.5	≥1.2	-	-	-6[10]
Poland	Energy	8.7	0.1	3.2	4.95	-6
Portugal	Volume	11	0.5	-	-	-10
Romania	Volume	-	-	8	6.5	-6
Slovakia	Energy	8	0.3	-	-	-6
	Volume	-	-	9	6.9	-6
Slovenia	Energy	10[11]	-	-	-	-6[11]
Spain	Energy	9.5	0.1 (indicative)	-	-	-
Sweden		-	-	-	-	-4.2 for petrol[12] -21 for diesel[12]
United Kingdom	Volume	10.1[13]	-	-	-	-

*After double counting
Source: www.ePURE.org (retrieved: 01.04.2021)

1 Until 1 July, 2021, the use of palm oil is limited to the 2019 level. After that, it will be phased out
2 Blending commitments should not apply to petrol ROZ 98.
3 As of 2021, it is no longer possible to double count progressive biofuels.
4 In addition to the non-eligibility of palm-based biofuels, the use of soya blended with petrol as a biofuel is limited to 0% and for those blended with diesel to 0.7%.
5 At least 0.5% of this amount is reserved for biofuels other than biomethane.
6 For RON 95 and RON 98 petrol.
7 Not in winter.
8 Optional for petrol with 98 octane.
9 9.7% after double counting. After double counting, progressive biofuels must account for at least 50% of the biofuel mix.
10 UER can no longer be applied to comply with Art. 7a of the FQD.
11 According to the draft ordinance.
12 According to a draft proposal awaiting discussion, these values are to be retained until 31/07/2021, after which 6% will apply for petrol and 26% for diesel.
13 The top limit for plant-based raw materials fell from 4% to 3.83% in 2021.

Table 12: Biodiesel mandates in the EU in 2020 for selected member states[1]

a) Austria

	Total quota (energy content, % cal.)	Biodiesel (% cal.)	Bioethanol (% cal.)	Double assessment*
2020	5.75 plus 0.5 advanced biofuels	6.3	3.4	No
2021	**5.75**	**6.3**	**3.4**	**No**

Source: Fuel Ordinance 2012, version 2020

*Double assessment: Waste and residual materials from agricultural and forestry production, including fisheries and aquaculture, processing residues, cellulosic non-food materials or ligno-cellulose materials

b) Belgium

	Total quota	Biodiesel (% energy content)	Bioethanol (% energy content)	Double assessment
From 1 April 2020 to 31 December 2020		9.9	9.9	
From 1 Januar 2021		**9.55**	**9.55**	**Max 0.6%**

Source: Law of July 7, 2013; Law of July 21, 2017; Law of May 4, 2018

c) Bulgaria

Biodiesel (% vol.)	Bioethanol (% vol.)		Upper limit for vegetable biofuels (% vol.)	2nd generation (% cal.)	Double assessment
6%*	1 September 2018	8			No
	1 March 2019	9			
	1 January 2020	**10**	**7**	**0.05**	

**Since 1 September 2018, the mandate has been split into five percent conventional first generation biodiesel and one percent second generation biodiesel.

d) Croatia

	Total quota (% cal.)	Biodiesel	Bioethanol	Double assessment
2019	7.85	6.61	0.98	for advanced and waste-based biofuels
2020	**8.81**	**7.49**	**1.00**	
2030	13.2 (14)			

Quelle: Act on Biofuels for transport (Official Gazette 65/09, 145/10, 26/11 and 144/12)
https://www.zakon.hr/z/189/Zakon-o-biogorivima-za-prijevoz
National Action Plan for Renewable Energy Sources to 2020:
https://mzoe.gov.hr/UserDocsImages/UPRAVA%20ZA%20ENERGETIKU/Strategije,%20planovi%20i%20programi/National_Action_Plan%20for%20Renewable%20Energy%20Sources%20to%202020.pdf

[1] **Source: table 12 (pages 38 - 43) and further information:**
GAIN Report Biofuel Mandates in the EU by Member State and United Kingdom – 2021
(Nr. E42021-0049, published 08 June 2021, author Sabine Lieberz), available online https://www.fas.usda.gov/search?keyword=Biofuel+Mandates+in+the+EU+by+Member+State+and+United+Kingdom+-+2021

Table 12: Biodiesel mandates in the EU in 2020 for selected member states – continued

e) Czech Republic

	Obligation to reduce total greenhouse gas emissions by (%)	Biodiesel (% vol.)	Bioethanol (% vol.)	Double assessment
2019	3.5	6	4.1	Yes
Since 2020	**6**			

f) Denmark

	Total quota (% cal.)	Progressive biofuels (% cal.)	Biodiesel (% cal.)	Bioethanol (% cal.)	Double assessment
Seit 2012	5.75				
Since 2020	**5.6**	**0.9***			

Source: Stratas
* The expanded mandate for progressive Biofuels excludes UCO and animal fats.

g) Finland

	Total quota (% cal.)	Biodiesel	Bioethanol	Double assessment
2019	18			
Since 2020	**20**			

Source: Stratas.
The finish parliament has passed a law stipulating that the country gradually increase its biofuel-aim to a total 30% by 2029. In addition, Finland has passed a law which foresees an increase of the amount of advanced biofuel from 2% in 2023 to 10% in 2030. (Source: IEA country report).

h) France

	Bioethanol (target, % cal.)	Biodiesel (target, % cal.)	Double assessment
2020	8.2	8	Yes
2021 – 2022	**8.6**	**8**	

Table 12: Biodiesel mandates in the EU in 2020 for selected member states – continued

i) Germany

	Total GHG quota (minimum GHG reduction of fuels)	Biofuels from feedstocks (uper limit, energetic)	Biofuels from UCO and animal fats (upper limit, energetic)	Advanced biofuels (minimum for energy purposes[1]
2021	6%	Max. 4.4%	Max 1.9%	0.05%
2022	7%			0.2%
2023	8%			0.3%
2024	9.25%			0.4%
2025	10.5%			0.7%
2026	12%			1.0%
2027	14.5%			1.0%
2028	17.5%			1.7%
2029	21%			1.7%
2030	25%			2.6%

GHG quota:
- Electricity for e-vehicles: triple credit
- 1) double credit for amounts over the minimum

1) Exclusion iLUC raw material/palm oil:
by 2022: 0.9 % (energetic)
by 2023: 0,0 %

Year	Penalty payment for undercutting
Since 2015	0.47 EUR per kg CO_2aq
By 2022	0.60 EUR per kg CO_2aq

Source: https://dserver.bundestag.de/btd/19/274/1927435.pdf
(Decision by Bundesrat expected in September 2021)

j) Greece

	Total quota (% cal.)	Biodiesel	Bioethanol	Double assessment
2020	10	7	3.3	No
2021	**10**	**7**	**3.3**	

k) Hungary

	Biodiesel (% cal.)	Bioethanol (% cal.)	Double assessment
1.1.2020–31.12.2020	8.2	6.1	No
2021	**8.2**	**6.1**	

Source:
Government Decree No. 343/2010 on requirements and certification of sustainable biofuel production (overruled in 2017)
Government Decree No. 279/2017 on sustainability requirements and certification of biofuels
Double counting: §2 (4) of CXVII/2010 Act on promoting the use of renewable energy and the reduction of greenhouse gas emission of energy used in transport
Hungary's National Renewable Energy Action Plan.

Table 12: Biodiesel mandates in the EU in 2020 for selected member states – continued

l) Ireland

	Gesamtanteil (% vol von fossilen Brennstoffen zu sein hinzugefügt)	Entspricht % vol des gesamten Brennstoff-verbrauchs	Double assessment
2019	11.11	10	UCO, Cat. 1 Tallow, used bleached earth (SBE), waste water from palm oil mills (POME), whey permeate
Since 2020	**12.359**	**11**	

Further information on Ireland's Biofuels Obligation Scheme can be found at:
http://www.nora.ie/biofuels-obligation-scheme.141.html
Section 44C(3)(b) of the NATIONAL OIL RESERVES AGENCY ACT 2007
http://revisedacts.lawreform.ie/eli/2007/act/7/revised/en/html#SEC44C.

m) Italy

	Biofuels total (% by energy content)	Including progressive biofuels (% by energy content, double-counted)	Progressive biofuels required to reach the targets. (% by energy content)	
			% of "progressive" bio-methane	% of other "progressive" biofuels
2020	9	0.9	0.68	0.23
2021	**10**	**2.0**	**1.13**	**0.38**
2022 and beyond	10	2.5	1.39	0.46

n) Netherlands

	Total quota (% cal.)	Including advanced biofuels (% cal.)	Upper limit for biofuels recovered from agricultural raw materials (% cal.)	Double assessment
2020	16.4	1.0	5	Yes
2021	**17.5**	**1.2**	**5**	

Source: Dutch Emission Authority.

o) Poland

	Total quota (% cal.)	Biodiesel (% cal.)	Bioethanol (% cal.)	Double assessment
2020	8.5			Yes
2021	**8.7**			
2022	8.8			
2023	8.9			
2024	9.1			

Source: FAS Warsaw.

Table 12: Biodiesel mandates in the EU in 2020 for selected member states – continued

p) Portugal

	Total quota (% cal.)	Biodiesel (% cal.)	Bioethanol / ETBE (% cal.)	Fortschrittliche Biokraftstoffe	Double assessment
2020	10		-		Yes
2021	**11**			**0.5**	

Sources: Consumption targets: Decree-Law 117/2010, Decree-Law 69/2016, Law 42/2016 , Budget Law for 2018 und 2019. Double counting: Decree-Law 117/2010 and Annex III in Implementing Order 8/2012.

q) Romania

	Total quota (% cal.)	Biodiesel (% cal.)	Bioethanol (% cal.)	Double assessment
2020	10	6.5	8.0	Yes
2021	**10**	**6.5**	**8.0**	

Sources: Government Decisions 1121/2013 und 931/2017.

r) Slovakia

	Total quota* (% cal.)	2nd generation biofuels (% cal.)	Double assessment
2020	7.6		
2021	**8**	**0.5**	Yes
2022 – 2024	8.2		
2025 – 2030		0.75	

Source: Act no. 309/2009 amended by Act no. 309/2018 on Support of Renewable Energy Resources.
* with minimum E9 and B6.9

s) Slovenia

	Total quota (% cal.)	Biodiesel (% cal.)	Bioethanol (% cal.)	Double assessment
2020	10			Yes
2021	**10**			

Source: FAS Wien

t) Spain

	Total quota (% cal.)	Biodiesel (% cal.)	Bioethanol (% cal.)	Double assessment
2020	8.5	-	-	
2021	9.5			Yes
2022	**10**			

Table 12: Biodiesel mandates in the EU in 2020 for selected member states – continued

u) Sweden

The Swedish government submitted a proposal in 2017, which was later implemented on 1 July 2018. The framework's structure builds upon an incremental reduction of greenhouse gas emissions through the addition of biofuels in both petrol and diesel. From 1 July 2018, the framework is to reduce diesel emissions by 19,2% and petrol emissions by 2.6%. The reduction targets are to be progressively increased in line with the 2030 aim of reducing greenhouse gas emissions by 40% (Source: IEA country report).

v) United Kingdom

	Total quota (% cal.)	Development fuel target (% cal.)	Double assessment
2020	10.637	0.166	
2021	**10.679**	**0.556**	
2022	10.714	0.893	**Specific waste/residual-material, alongside energy crops and renewable fuels of a non-biological origin; development fuels.**
2023 – 2031	Rising every year In 0.025 percent Volume steps until:	Rising every year in 0.23 percent Volume steps Up to:	
2032	10.959	3.196	

Tables of the German Federal Office for Agriculture and Food

Table 13: Germany: Feedstocks of the biofuels in Terajoules [TJ][1]

Fuel type	Bioethanol			FAME			Biomethane			HVO			Vegetable oil			
Quota year	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019	Quota year
Feedstock																Feedstock
Waste/residual material	46	419	698	31,508	41,144	33,139	1,615	1,329	736	80	77	24				Waste/residual material
Ethiopian mustard					52	98										Ethiopian mustard
Barley	1,665	1,326	424													Barley
Maize	14,369	15,484	19,623													Maize
Palm oil				18,373	17,790	22,523				1,361	1,106	1,812		5	19	Palm oil
Rapeseed				28,381	25,105	29,600							26	19	18	Rapeseed
Rye	2,272	1,439	1,148													Rye
Silage maize					675			80	491							Silage maize
Soya				62	1,898	1,215										Soya
Sunflowers				1,631		3,073										Sunflowers
Triticale	1,753	1,956	1,493													Triticale
Wheat	7,940	8,622	5,394													Wheat
Sugar cane	1071	498	1,429													Sugar cane
Sugar beets	875	1042	603													Sugar beets
Total	29,991	30,785	30,808	79,955	86,663	89,646	1,615	1,408	1,227	1,442	1,184	1,836	26	24	37	Total

Source: BLE (Report online at *www.ufop.de/ble-en*)
[1] Discrepancies in totals are due to rounding

Table 14: Germany: Feedstocks of the biofuels in 1,000 t[1,2]

Fuel type	Bioethanol			FAME			Biomethane			HVO			Vegetable oil			
Quota year	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019	Quotenjahr
Feedstock																Ausgangsstoff
Waste/residual material	2	16	26	843	1,101	887	32	27	15	2	2	1				Waste/residual material
Ethiopian mustard					1	3										Ethiopian mustard
Barley	63	50	16													Barley
Maize	543	585	741													Maize
Palm oil				492	476	603				31	25	42		0,1	1	Palm oil
Rapeseed				759	672	792							1	1	0.5	Rapeseed
Rye	86	54	43													Rye
Silage maize								2	10							Silage maize
Soya				2	18	32										Soya
Sunflowers				44	51	82										Sunflowers
Triticale	66	74	56													Triticale
Wheat	300	326	204													Wheat
Sugar cane	40	19	54													Sugar cane
Sugar beets	33	39	23													Sugar beets
Total	1,133	1,163	1,164	2,140	2,319	2,399	32	28	25	33	27	42	1	1	1	Total

Source: BLE (Report online at *www.ufop.de/ble-en*)
[1] Discrepancies in totals are due to rounding
[2] the values are calculated into tonnage based on the quantities in the analyses

Table 15: Germany: Feedstocks of the biofuels according to origin in Terajoules [TJ][1]

Region	Africa			Asia			Australia			Europe			Central America			North America			South America			
Quota year	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019	Quota year
Feedstock																						Feedstock
Waste/residual material	287	391	174	6,947	12,180	13,122	46	84	18	23,412	27,096	19,924	11	14	11	1,983	2,682	969	562	523	379	Waste/residual material
Ethiopian mustard																		9		52	89	Ethiopian mustard
Barley										1,665	1,326	424										Barley
Maize		9								14,369	15,475	19,607						15				Maize
Palm oil				17,464	17,867	21,409							2,270	1,029	2,970					5	39	Palm oil
Rapeseed					17	71	333	3,104	5,014	28,075	22,002	24,533										Rapeseed
Rye										2,272	1,439	1,148										Rye
Silage maize											80	491										Silage maize
Soya								10		35	19	27							27	646	1,188	Soya
Sunflowers										1,631	1,898	3,073										Sunflowers
Triticale										1,753	1,956	1,493										Triticale
Wheat										7,940	8,622	5,394										Wheat
Sugar cane													324	247	350				746	251	1,076	Sugar cane
Sugar beets										875	1,042	603										Sugar beets
Total	**287**	**400**	**174**	**24,411**	**30,065**	**34,603**	**379**	**3,198**	**5,031**	**82,027**	**80,954**	**76,716**	**2,606**	**1,290**	**3,331**	**1,983**	**2,682**	**993**	**1,335**	**1,477**	**2,771**	**Total**

Source: BLE (Report online at *www.ufop.de/ble-en*)
[1] Discrepancies in totals are due to rounding

Table 16: Germany: Feedstocks of the biofuels according to origin in 1.000 t[1,2]

Region	Africa			Asia			Australia			Europe			Central America			North America			South America			
Quota year	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019	2017	2018	2019	Quota year
Feedstock																						Feedstock
Waste/residual material	8	10	5	186	326	351	1	2	0.5	616	721	536	0.3	0.4		53	72	26	15	14	10	Waste/residual material
Ethiopian mustard																		0.2		1	2	Ethiopian mustard
Barley										63	50	16										Barley
Maize		0.3								543	585	741						1				Maize
Palm oil				462	474	566							61	28	79					0.1	1	Palm oil
Rapeseed					0.5	2	9	83	134	751	589	656										Rapeseed
Rye										86	54	43										Rye
Silage maize											2	10										Silage maize
Soya								0.3		1		1							1	17	32	Soya
Sunflowers										44	51	82										Sunflowers
Triticale										66	74	56										Triticale
Wheat										300	326	204			13							Wheat
Sugar cane													12	9					28	9	41	Sugar cane
Sugar beets										33	39	23			93							Sugar beets
Total	**8**	**11**	**5**	**648**	**800**	**919**	**10**	**86**	**135**	**2,503**	**2,490**	**2,368**	**73**	**37**	**124**	**53**	**72**	**27**	**44**	**42**	**86**	**Total**

Source: BLE (Report online at *www.ufop.de/ble-en*)
[1] Discrepancies in totals are due to rounding
[2] the values are calculated into tonnage based on the quantities in the analyses

Table 17: Germany: Total feedstocks of the biofuels[1]

	[TJ]			[kt]		
	2017	2018	2019	2017	2018	2019
Feedstock						
Waste/residual material	33,249	42,971	34,598	879	1145	928
Ethiopian mustard		52	98		1	3
Barley	1,665	1,326	424	63	50	16
Maize	14,369	15,484	19,623	543	585	741
Palm oil	19,734	18,901	24,418	523	502	646
Rapeseed	28,408	25,124	29,618	760	672	793
Rye	2,272	1439	1,148	86	54	43
Silage maize		80	491		2	10
Soya	62	675	1,215	2	18	32
Sunflowers	1631	1,898	3,073	44	51	82
Triticale	1,753	1956	1,493	66	74	56
Wheat	7,940	8,622	5,394	300	326	204
Sugar cane	1071	498	1,426	40	19	54
Sugar beets	875	1,042	603	33	39	23
Total	**113,029**	**120,066**	**123,619**	**3,339**	**3,538**	**3,632**

Source: BLE (Report online at *www.ufop.de/ble-en*)
[1] Discrepancies in totals are due to rounding

Table 18: Germany: Emissions and emission savings of biofuels[1]

	Emissions [t CO_{2eq} / TJ]			Savings [%][2]		
	2017	2018	2019	2017	2018	2019
Biofuel type						
Bioethanol	14.58	12.69	11.04	82.60	86.40	88.16
Biomethane	7.77	9.19	10.12	90.73	90.23	89.24
Biomethanol		8.30			91.27	
FAME	16.10	16.26	18.37	80.79	82.90	80.68
HVO	29.64	21.93	19.45	64.64	76.94	79.55
CP-HVO			20.43			78.52
Vegetable oil	30.09	30.18	25.90	64.09	68.26	72.77
Weighted average of all biofuels	**15.75**	**15.32**	**16.48**	**81.20**	**83.81**	**82.59**

Source: BLE (Report online at *www.ufop.de/ble-en*)
[1] Discrepancies in totals are due to rounding
[2] the values are calculated into tonnage based on the quantities in the analyses

Table 19: Germany: Emissions and emission savings of bioliquids[1]

	Emissions [t CO_{2eq} / TJ]			Savings [%][2]		
	2017	2018	2019	2017	2018	2019
Bioliquid type						
from the cellulose industry	1.80	1.86	1.72	98.02	97.95	98.11
FAME	37.18	34.65	34.80	59.14	61.93	61.76
HVO	44.50			51.10		
Vegetable oil	33.73	31.99	29.83	62.93	64.85	67.22
UCO						
Weighted average of all bioliquids	**5.99**	**6.62**	**6.43**	**93.41**	**92.73**	**92.94**

Quelle: BLE (Report online at *www.ufop.de/ble-en*)
[1] Discrepancies in totals are due to rounding
[2] Savings compared to fossil reference value for liquid fuel for electricity generation 91.0 g CO_{2eq} / MJ

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