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

Biodiesel 2013/2014

Report on the Current Situation and Prospects – Abstract from the UFOP Annual Report

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Biodiesel & Co.

During the period covered by this report, the debate was focused, as expected, on the future direction of the support framework for the development of renewable energy sources in general and the amendment to the Renewable Energy Sources Act (EEG) in particular. The resolutions passed by the Bundestag were aimed at preventing further increases in the Renewable Energies Act Levy for businesses and consumers. This amendment came into force on 1 August 2014, after the differences with the Commission were resolved. Particularly affected by the EEG amendment is the use of biogas from biomass for the production of electricity. Its further growth – including areas under cultivation – has been capped at a maximum increase of 100 MW per year, which is a massive blow. For new plants, the raw material mix must be predominantly waste based.

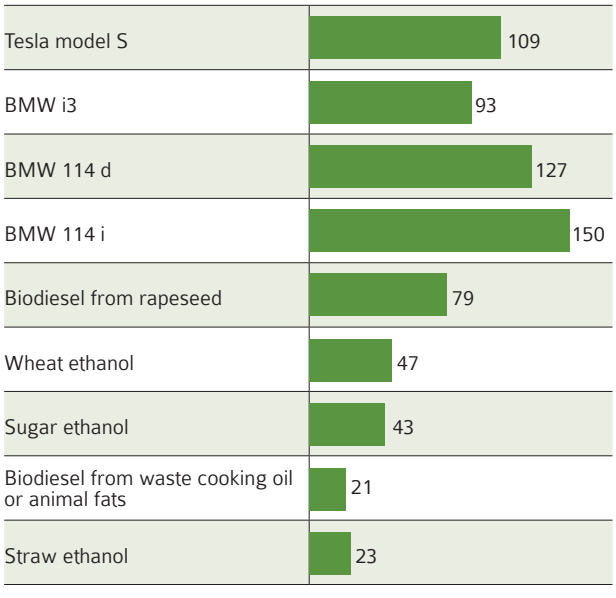
On the other hand, the share of energy from renewable sources in the electricity sector should and must be increased. With the national "Action programme for climate protection 2020", the Federal Government has set itself a target to reduce greenhouse gas (GHG) emissions to 40 % below 1990 levels by 2020. This ambitious commitment singles Germany out from the rest of the EU. A few months earlier, the Commission presented its own proposal for a climate and energy package 2020-2030. This provides for a greenhouse gas reduction target of 40 % for all member states. Furthermore, energy efficiency should increase to 30 % by 2030. At Germany's instigation, a sub-target of 27 % for the share of energy from renewable sources was incorporated, but without any further differentiation. This means that there is no mandatory sub-target for the transport sector from 2020 onwards. The question of the direction of future funding with regard to development and technology in the EU and Germany also remains open. In October 2014, government leaders must decide whether all targets for member states are binding.

Against this background, the entire bioenergy industry rightly fears that biomass on the whole as a source of energy might be phased out rather than developed further in the future. Particularly affected in this regard is cultivated biomass as an energy source regardless of whether it is used to produce electricity and/or heat or biofuel. The not always objective "food vs. fuel" debate about the impact of biofuels on commodity or food prices conducted by non-governmental organisations through the media and the issue of indirect land-use changes, which remains without satisfactory scientific explanation, have left their mark. It is now confirmed that the demand for reliable support arrangements for market access and technology development alone is not enough, and a broad-based biomass strategy focused on gaining public acceptance is also required. This is the responsibility of policymakers and the bioenergy sector.

This is also the background of the target sought by the Federal Government to have 1 million electric cars on German roads by 2020. Again, there are questions as to the origin of the green electricity and the composition of the energy mix for the calculation of the energy and GHG balance. E-mobility must also be able to compete with biofuels in this respect. This may not necessarily work in favour of the new drive concepts, as calculations confirm (Chart 1). The question as to what is meant by electric mobility, has not been conclusively answered. Will "plug-in" vehicles also count towards the fleet target? From a technological point of view, is this an evolutionary rather than a revolutionary development driven by physical limitations? It is more likely to be the former. In the view of UFOP, expectations for e-mobility belong in the field of climate protection and energy supply policy. Therefore, priority should be given to the question of assessment and integration into an overall concept for the further development of the mobility and fuel strategy (MKS) initiated by the last Federal Government. In 2014, the final report was submitted with a notice of retaining the principle as a "learning strategy". This

Chart 1: Electric car emissions

Greenhouse gas emissions in grams per kilometre (taking into account the emissions for the supply of energy)



Source: The Kiel Institute for the World Economy (IfW); Meo Carbon Solutions

Table 1 Renewable energy in Germany – key facts and figures for 2013 at a glance

		Renewable energy sources 2013 estimate [GWh]	Proportion of renewable energy sources 2013 [%]		Renewable energy sources 2012 [GWh]
Gross power generation from renewable energy sources	Onshore wind energy	52,430	in gross energy consumption	8.7	49,948
	Photovoltaics	30,000		5.0	26,380
	Biogenic solid fuels	12,400		2.1	12,090
	Biogenic liquid fuels	520		0.09	350
	Biogas	27,900		4.7	25,390
	Other	29,310		4.81	7,550
	Total	**152,560**		**25.4**	**143,463**
Final energy production Heating from renewable energy sources	Biogenic solid fuels (household)	66,230	in final energy consumption - heating	4.5	64,170
	Biogenic solid fuels (industry)	19,100		1.3	19,355
	Biogenic solid fuels (heat and combined heat and power plants)	7,700		0.5	7,226
	Biogenic liquid fuels	500		0.03	355
	Biogas	11,800		0.8	10,684
	Other	27,530		1.87	26,258
	Total	**132,860**		**9.0**	**128,048**
Biofuel production	Biodiesel	23,258	in fuel consumption	3.7	26,275
	Vegetable oil	13		0.002	258
	Bioethanol	8,892		1.4	9,207
	Bio-methane	450		0.07	390
	Total	**32,613**		**5.3**	**36,130**
	Total	**318,033**	in EEV	**12.3**	**307,641**

Source: The Centre for Solar Energy and Hydrogen Research Baden-Württemberg (ZSW) based on the Working Group on Renewable Energy Statistics (AGEE-Stat) as at February 2014

was stressed by State Secretary Rainer Bomba from the Federal Ministry for Transport and Digital Infrastructure, on the occasion of the 11th International Conference "Fuels of the future 2014" in Berlin.

The renewable energy statistics of the Federal Ministry for Economic Affairs (Table 1) underline this need and, not least, obviate the need to debate as to whether biofuels could be replaced in the short or medium term by renewable electricity. Measured on the current contribution of biofuels and onshore wind power to final energy consumption (32,600 GWh and 52,430 GWh, respectively), it is clear that the onshore wind power capacity would have to be increased massively if it were to replace the existing share of biofuel. The entire renewable energy industry – including the automotive industry – cannot afford the "luxury" of a substitution debate. This development strategy is therefore rather complementary in nature and aimed at increasing efficiency.

In this context, and against the background of the geopolitical issues involved in the supply of oil and gas, the question of developing shale gas reserves in the EU and Germany has been pushed to the forefront. This has led to an intense debate about the risks to human health and the environment that are involved in fracking. In particular, environmental organisations and many politicians in the European Parliament and the Bundestag called for strict EU rules on shale gas extraction. The European Commission as well as certain member states expect shale gas to

make a contribution to national energy supply and lower energy prices. At present, the German Farmers' Association opposes the technology due to the multitude of unanswered questions and unresolved issues. In particular, it sees the risk of possible groundwater contamination as a result of the chemicals needed for fracking. Specifically, it would have to be ensured that the "cause for concern" principle under the Water Resources Act is complied with, and that the groundwater quality is not affected by the chemicals used.

Reform of the EU biofuel policy

The Commission's proposals for the amendment of the Renewable Energies Directive (2009/28/EC) and the amendment of the Fuel Quality Directive (98/70/EC) sparked fierce and very lengthy discussions and consultation processes in the European Parliament as well as in the Council of Energy Ministers.

Resolutions passed by the European Parliament

The vote on a common position of the European Parliament as part of the codecision procedure on 11 September 2013 was preceded by an intensive discussion process between the responsible Environment Committee, its rapporteur Corinne Lepage and other relevant committees (economic, among others). Ms. Lepage agreed, in principle, to the restrictive proposals of the Commission for the continuation of its biofuels policy. This decision was mainly supported by European environmental organisations, who found that the Commission's proposals did not go far enough. It concerned the introduction of a 5 % cap for biofuels from cultivated biomass by 2020, as well as the so-called iLUC factors. UFOP has expressed its firm stance against this move in a letter from the UFOP Chairman, in numerous briefings, as well as in a position paper to the European Parliament (see UFOP position paper in the Annex). UFOP was particularly critical of the cap and the 2020 time limit and called for a European biofuel strategy that extends beyond 2020, promoting competition, which is open to all types of technology and raw materials and not distorted by weighting factors. Biofuels from cultivated biomass should serve as the basis for evolutionary development. Reliability and longevity are the decisive prerequisites for a raw material strategy and related investments to continue or be initiated on the basis of biofuels that have already been launched in the market. As a result, the EP changed its view and raised the cap from 5 % to 6 % while maintaining the time limit of 2020. In view of the potential for expansion of bioethanol (E10) and funding of second generation biofuels (bioethanol from waste), it adopted a new sub-target of 7.5% (energetic) as a compromise and incentive in this area.

UFOP used short studies carried out by the German Biomass Research Centre (DBFZ) to argue its position with regard to the criticism of excessive incentives for biofuels from waste and residual products to members of Parliament. This has exposed the urgent need for a revision of Greenhouse gas accounting for biofuels from waste oils and animal fats as well as residues (straw). UFOP demands that international standards applicable to environmental balance should also be factored into the GHG accounting for these raw materials. In addition to providing basic assumptions, data and calculation methodology (allocation) for the respective groups of raw materials, these studies also challenge, in particular, the potential availability of raw materials and the relatively poor efficiency of biofuel production from straw. Many members of Parliament were not aware that there are established markets for straw (animal feed, bedding, etc.) or that straw is an indispensable source of humus in conventional crop operations. Even with straw and other residues, there is the question of the most energy-efficient use. After all, a significant correction could be achieved on this issue. Following the Parliament's decision, a sub-target of 2.5 % is being called for with regard to the second generation of biofuels from waste and residual materials, but without double or quadruple counting. The argument that multiple counting proportionately lowers the sales potential of these biofuels and that the actual physical demand must be met by fossil fuels also makes sense. To describe this "creative counting" as a climate protection measure is a contradiction which cannot be resolved. After all, the sub-target is also the result of the ongoing "food vs fuel" debate and conventional biofuels reportedly driving food price inflation. Even with regard to this ethically important issue, UFOP could report on the current state of research and the need for research for an adequate assessment of the cause-effect relationships in the global agricultural markets. Prof. Dr. Michael Schmitz, Director of the Institute for Agricultural Policy and Market Research at the University of Giessen, introduced a study commissioned by UFOP and the Association of the German Biofuels Industry on "Determinants for the level and volatility of agricultural commodity prices on international markets" before a parliamentary panel and in a press conference. Finally, some improvements could be pushed through despite the rather heated debate conducted by non-governmental organisations from the environmental and charity sector through the media.

Nevertheless, in this context it should be noted that the resolution of the European Parliament of September 2013 was adopted with a very tight majority of 356 votes to 327. The result of this vote bears witness to the differences of opinion over the future direction of the biofuels policy, with a large majority in favour of a second reading. The MEPs clearly wanted a second round of consultation. The decision on the negotiation basis for the trialogue process is generally reserved for the new Parliament elected in May 2014. At the time of writing it was not yet known whether the Parliament will adopt the decision of 11 September 2013 or whether the debate in the committees preceding a vote on a common position will start over again.

The iLUC question

UFOP has intensified its information activities also with regard to the critical issue of assessing the so-called indirect land use change. The need for research as well as the question of alternative policies was reiterated in relation to the European Parliament, the European Commission and the representatives of the German federal states in Brussels. The pressure from professional associations, academics and the European Parliament on this issue prompted the European Commission to announce a new project. Under the leadership of the Dutch Institute ECOFYS,

Greenpeace report, October 2013

a consortium was tasked with the evaluation and recalculation of the iLUC phenomenon: "Quantifying the indirect land use change impact of biofuels consumed in the EU (iLUC)."

In contrast to the IFPRI study (see annual report 2012/2013, page 40), it will consult the stakeholders such as the UFOP and NGO representatives, and the consortium will also benefit from the support of an advisory committee. It is clear that the GLOBIOM model used in this project can only "model" rather than calculate iLUC factors based on historical data. In the view of UFOP, the uncertainties can be reduced on the basis of assumptions and the improved quality of statistical data. The project report will be available at the beginning of 2015 and will certainly be subject to fierce debate. Policymakers must realise that the basic principle of iLUC is applicable to other areas if the supply deficit thus created must be compensated for from elsewhere, for example by means of a politically motivated extensification (promotion of organic farming, "greening", etc.). The majority of the experts agree on this point. Furthermore, it is necessary to examine whether iLUC factors – if introduced – will have to be recalculated on an annual basis and what would be the consequences for the day-to-day business transactions, from agriculture to processing.

Prof. Dr. Uwe Lahl from the Technical University of Darmstadt examined this dilemma in an article in which he explains the background and weaknesses of the model calculations and discusses the scientific arguments as to why iLUC factors should be rejected in the light of the current legislative efforts of the EU Commission. He calls instead for a regulatory procedure, which would make an effective contribution against land use change (deforestation), and build on the principles of "good governance". Prof. Dr. Lahl, therefore, recommends regulatory alternatives, regardless of the purpose of the end use of the biomass material. UFOP has published the article "Indirect land use change (iLUC) – a critical evaluation for objective political decision-making" as a special edition.

From the perspective of UFOP, biofuels from cultivated biomass serve as "wildcards" in this debate, as public criticism is mainly levelled at palm oil as the "cause" of deforestation (see illustrations in the Greenpeace report). The use of palm oil for energy purposes plays a minor role in the European Union compared to the demand from the chemical or food industry. UFOP did point this out i.a. on the occasion of the BMEL workshop "Indirect land use change", adding that strategically, biofuels are the driving

force behind increasing political negotiating pressure (role model function) in order to also introduce analogous sustainability and certification requirements in other areas of use. In view of the current discussion on the continuation of EU biofuel policy after 2020, UFOP has called for iLUC-free sales prospects for the existing biofuel industry in the EU after 2020. At the same time, it is also important to secure the economic basis for the 17 international sustainability certification schemes and bodies approved by the European Commission. In this context, UFOP welcomes and endorses the position of the BMEL to safeguard the "real iLUC-free potential". All UFOP can do now is hope that this demand can be represented as a position of the Federal Government in the relevant Council of Energy Ministers.

Resolutions passed by the Council of Energy Ministers

On 13 June 2014, under the Greek Presidency of the Council, the Council of Energy Ministers were able to agree on a common position.

The Council resolved to increase the cap limit to 7 %, albeit amongst considerable controversy and differences of opinion. This is also an indicator of the different funding approaches and implementation strategies for achieving the 10 % target for the transport sector in the respective member states. In a joint statement, the member states Czech Republic, France, Spain, Hungary, Poland and Romania ultimately declared that the introduction of a 7 % cap (energy) for biofuels generated from cultivated biomass is the lowest acceptable target for biofuels from biomass crops enabling the biofuel sector to stabilise at a reasonable level. The above member states will only support further work in the legislative process if this cap is maintained. In a meeting held in December 2013, the Netherlands, Belgium, the UK, Italy and Denmark expressly rejected the 7 % cap and called for a 5 % cap, which is similar to the Commission's proposal. This example confirms once again that the true cause of this controversial discussion lies in the absence of a European biofuel strategy. Indeed, the binding 10 % target was set without specifying the path to meeting it. As a result, the implementation of the Renewable Energies Directive at the national level is rather patchy. This is demonstrated i.a. by the different and sometimes widely varying quota obligations within the EU. The Council followed the European Parliament in confirming the 2020 time limit. Not only in Germany, but also in other member states the discussion about iLUC-free protection must resume after 2020. The members of the European Oilseed Alliance (EOA) i.a. are called upon to work towards this.

With regard to the iLUC issue, the Council resolved to introduce iLUC factors as part of the reporting obligation. This must be based on the latest scientific evidence as well as information on volumes broken down by fuel type, place of purchase and origin to be provided by the oil industry. This form of reporting was also rejected by UFOP. It makes no sense to introduce iLUC factors indirectly through a report as part of a statutory scheme and at the same time to determine that there is still a significant need for scientific research. The required research support can also be ensured outside of these directives. In fact, the Commission and/or the member states should have a proper debate on the question of indirect land use change (see iLUC workshop of the BMEL). The scientific opinion is and remains very divided, with experts sharing the view that the introduction of iLUC factors will not contribute to habitat protection in third countries (circumvention cases).

Other resolutions of the Council:
Multiple counting:

1. Biomass from waste and residual materials (straw, biowaste, used vegetable oils, animal fats): multiplier of 2;
2. Use of renewable electricity in rail transport: multiplier of 2.5;
3. Use of renewable electricity in road transport: multiplier of 5.

By way of derogation from the Decision of the European Parliament, only a non-binding (indicative) sub-target of 0.5 % will be introduced for biofuels produced from waste. UFOP welcomed this move, as otherwise the target would be impossible to meet. This obviates the need for a member state, such as Germany, for example, to take this target into account when it delivers or provides proof of the relevant activities and results at the time of the launch of electric vehicles onto the market.

What is more, investors will stay away, not least because biofuels do not have a future in the energy and climate protection package of the European Commission beyond 2020. The policy-makers must therefore continue the sectoral sub-target for the transport sector used in applicable legislation as an important signal for investors, attesting to a reliable and binding biofuels policy.

National biofuel policy

The Biofuel Quota Act was amended in 2009 to the effect that on 1 January 2015, the energy quota requirement (2014: 6.25 % of the total sales of fossil fuels) was changed to a greenhouse gas (GHG) reduction target. This means that the targets are in fact already recognised in law: 2015–2016: 3 %, from 2017 to 2019: 4.5 %, and from 2020: 7 %.

The above amendment to the quota legislation was carried out in one phase, as the issue of maintaining the tax concession was seen from UFOP's perspective as a priority and biodiesel sales ranged between 3.2 (2007) and 2.7 (2008) million tonnes. Hydrogenated vegetable oil (HVO) and the double counting of biodiesel from waste cooking oil (UCOME) were not an issue at the time. In 2013, however, only around 2.2 million tonnes of biodiesel, 0.42 million tonnes of HVO and an estimated

0.25 million tonnes of bio-diesel from waste cooking oil were sold (Chart 6 "Rising HVO and UCOME participation in D"). Sales of conventional vegetable oil methyl ester (i.a. RME) plunged as a result to around 1.5 million tonnes.

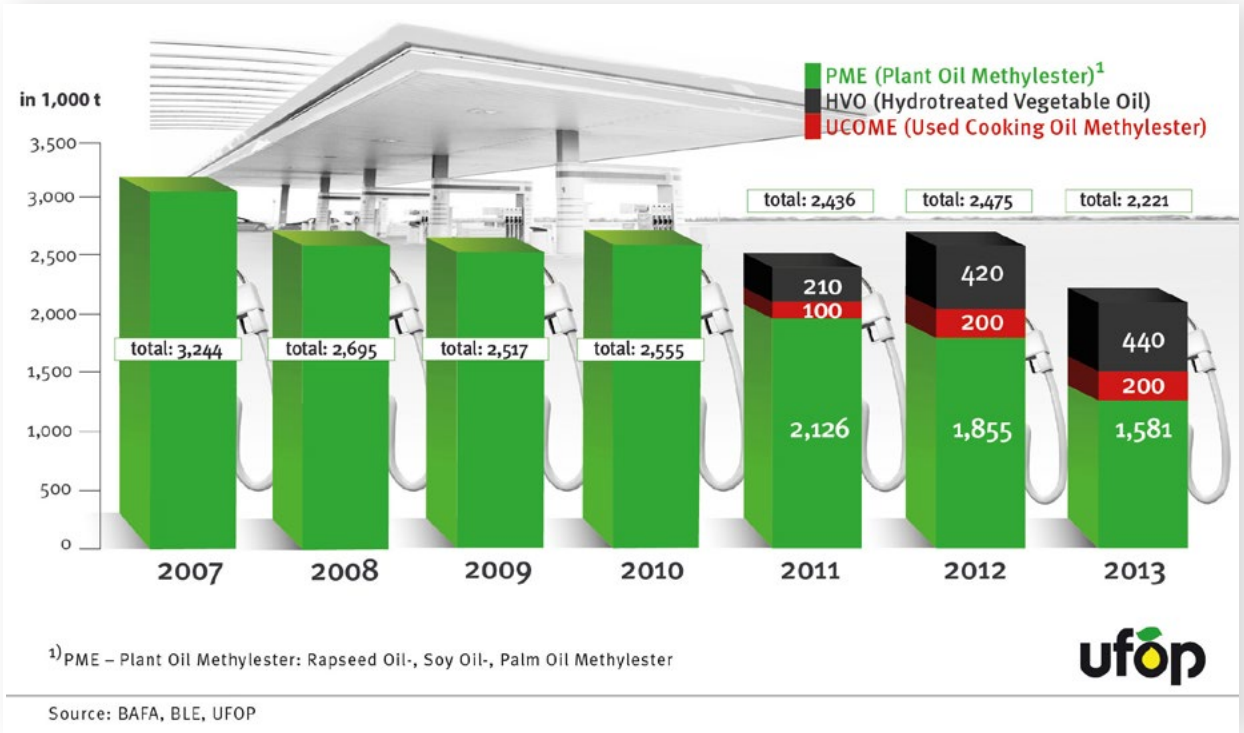
In order to simplify the administration and to take into account the existing experience and pending changes to the biofuels policy as a result of the trialogue process, the Federal Ministry for the Environment (BMUB) decided to submit a draft amendment of the Federal Immission Control Act (Articles 37 a-f BImSchG). However, the draft law did not yet incorporate the GHG reduction target. The introduction of an initial value of 3 % for 2015 and 2016 would have continued the dramatic sales decline and would likely have led to the closure of further biodiesel plants. The press release from UFOP demanding an increase in the GHG reduction target to 4.5 % has sparked an intense debate between the affected industry and the Federal Government. The need for a revised GHG reduction target was communicated to the relevant federal ministries in collaboration with the German Farmers' Association. As a result of the intense consultations between the various government departments, a draft law was finally put to a vote on 16 July 2014 and adopted by the Federal Cabinet. It contains the following figures:

2015–2016: **3.5 %** (instead of 3 % [1)])
2017–2019: **4 %** (instead of 4.5 % [1)])
from 2020: **6 %** (instead of 7 % [1)])

1) Federal Imission Control Act (BImSchG) 2009

While in UFOP's view the increase to 3.5 % is a step in the right direction, it does not go far enough to compensate for the expected decline in sales. UFOP demands an increase to 4 % by 2015 in the further legislative process in the Bundestag. This is because GHG efficiency, in conjunction with the GHG reduction target and the price, will be a key competitive factor and will reduce the volume requirement. With the switch to the GHG reduction target the legal basis will change from 2015 onwards from the Renewable Energies Directive to the Fuel Quality Directive. As a consequence, it may no longer be possible to count biofuels from waste and residual materials multiple times and

Chart 2: Rising proportion of HVO and UCOME in biodiesel



sellers will no longer be in the position to impose an adequate premium. This is because the biodiesel industry expects that rapeseed oil methyl ester will be offered in the future with a GHG saving of 60 % on average (GHG default value UCOME: 85 %). While this could reduce the decline in sales, the draft law foresees that non-exhausted quota quantities with a GHG reduction value of 48 % could be carried forward to 2015.

Should the rapeseed oil producers respond to this, and if yes – how? UFOP has recommended in a number of information campaigns to specify the relevant so-called NUTS2 region in the producer self-declaration. As a result, the GHG balance is improved at the cultivation stage compared with the GHG standard value by an average of 4 to 5 g CO_2/MJ. The certification system REDcert has created a user-friendly database for this purpose (http://nuts.redcert.org/) which can be used to determine the NUTS2 region by entering the licence plate number.

In view of the further discussion in the Bundestag, UFOP points out that the GHG reduction target must also be oriented towards the blending limits stipulated by the relevant fuel standards (B7, E5/E10). An improper increase would immediately trigger a penalty discussion. The draft law provides for a penalty payment of EUR 0.47 per kg CO_2 equivalent (470 EUR/t CO_2 equivalent). In this respect, an immediate increase to 4 % is possible. The time period should be sufficient to increase the proportion of biofuels in petrol or diesel. However, this requires the approval of the oil and automotive industries. Therefore, the Federal Government must be actively committed to this objective as part of its mobility and fuel strategy (MFS). That this is possible has recently been confirmed by the US State of Minnesota. For the summer period, a mandate for a blend of 10 % biodiesel (B10) will be introduced from 2014.

The reporting requirements will be tightened and extended by law. From 2015, the responsible entity (company in the oil industry that operates a tax warehouse) must report the following information:

- Total volume of biofuels, broken down by the type of biofuel;
- Place of purchase and origin/source of the biofuels;
- Greenhouse gas emissions per unit of energy.

However, this competent assessment/inspection body is yet to be determined.

From the perspective of UFOP, this task should be taken on by the Federal Agency for Agriculture and Food (BLE), as it already collects information on sustainability certificates and partial certificates via the Nabisy database, which is published annually as part of the Evaluation and Empirical Report.

In addition, the results can be discussed among the representatives from the sectors affected and government departments in the BLE Advisory Board "Sustainable biomass".

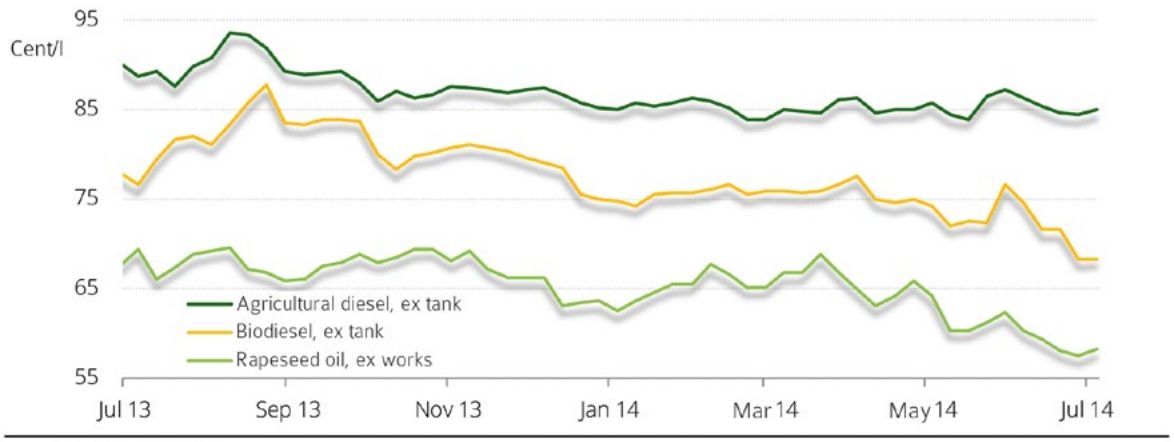
This platform will also likely be used to discuss the German biofuel industry's fears that certification requirements, in particular at the stage of the biofuel producer (last interface), will have to be tightened and the certification bodies adequately qualified. Some of the GHG reduction targets for biofuels from cultivated biomass being mentioned appear rather implausible. This change in the law also presents extreme challenges for certification systems at extremely short notice. In this context, the need for the harmonisation of European legislation is once again evident.

Market incentive programme promoting the use of biofuels in agriculture and forestry

As part of the Climate protection package 2020 of the Federal Government, agriculture is recognised as a separate sector and invited to contribute to GHG reduction in order to achieve the overall target. The German Farmers' Association (DBV) and UFOP have therefore submitted a proposal for a market incentive programme. The trouble-free use of biodiesel and rapeseed oil fuel has been repeatedly proven in practice. As part of the project funding by UFOP, relevant rig tests and field trials have been successfully completed in cooperation with DEUTZ AG. Similar results can also be taken from the project reports of the Technology and Support Centre (TFZ), Straubring. The latter formed the basis for the decision of the Bavarian State Government to launch the RapsTrak200 programme in autumn of 2014. A corresponding programme is also offered in lower Austria, and this should be launched nationwide in the near future.

The price advantage is currently due to the very low rapeseed oil and biodiesel prices (Chart 7). The price development of rapeseed oil fuel, biodiesel and agricultural diesel is published on the UFOP website and updated on a regular basis. The basic concept and the key elements were presented at a UFOP conference which was held in Berlin towards the end of 2013 (http://www.ufop.de/fachtagung/dokumente/).

Chart 3: Fuel wholesale prices in agriculture excluding VAT



Note: Rapeseed oil and biodiesel for agricultural use are energy tax exempt. Diesel for agricultural use is taxed at 25.56 cent per litre. All prices exclude freight charges. Source: AMI

Table 2 GHG optimisation (cultivation/processing)

	RME	RME	Rapeseed fuel
gCO_2/MJ	Standard value set out in Annex V of the EU Directive 2009/28/EC	GHG optimised value	
Cultivation	29	23.5–24,8*	23.5–24,8*
Transport	1	1	1
Processing	22	16**	4**
Total	**52**	**40.5–41.8**	**28.5–29.8**
Reference value Fossil diesel fuel	83.8	83.8	83.8
GHG reduction in %	38	50–52	64–66

*NUTS2 regional value – cultivation; *Typical value - processing.
Source: UFOP in accordance with EU Directive 2009/28/EC.

The use of biofuels in agriculture is supported by a range of positive arguments: Self-sufficiency (oats principle) with drive power while producing rapeseed meal which has not been genetically modified, as well as a high level of acceptance by policymakers, the general public and non-governmental organisations. Germany is therefore also able to set an example internationally for the production and application of locally produced energy in rural areas.

In the view of the DBV and UFOP, a financing framework is required for the temporary financing of a market launch programme, consisting of public relations, networking for consulting and investment grants for vegetable oil tractors.

A further incentive for the farmers could be a change to the agricultural diesel refund procedure. Farmers need to be able to purchase biodiesel or rapeseed oil energy tax free without a subsequent bureaucratic refund procedure. The biofuels could then be even more attractively priced. The bureaucratic refund procedures could then be omitted. This clean fuel volume could be subject to subsequent taxation by way of quota trading and offered to the entity responsible for the quota to meet the GHG target. The tax incentives would then flow back into the federal budget. With the introduction of the GHG reduction target from 2015, rapeseed oil fuel in particular will become more attractive thanks to its CO_2 advantage (Table 3).

We can now only hope that the Federal Government takes up this proposal and implements it cooperation with the associations concerned. We do not expect a switch-over boom, but a gradual transition in the sense of having an additional choice between biodiesel/rapeseed oil fuel or agricultural diesel.

Public relations activities

Focus on "Biofuels in agriculture and forestry"

Conference

The German Farmers' Association (DBV), the Federal Association of Decentralised Oil Mills and Vegetable Oil Technology (Bundesverband Dezentraler Ölmühlen und Pflanzenöltechnik e. V./BDOel) and UFOP have initiated a joint market incentive programme for the promotion of the use of biofuels in agriculture and forestry. A conference, organised by the above associations together with the Technology and Support Centre (TFZ) and the Federal Machinery Ring Association (MR), took place on 29 November 2013 in Berlin. The well-attended event, held in the

Haus der Land- und Ernährungswirtschaft (House of Agriculture and Food Industry) in Berlin, addressed the political, technical and economic aspects of the increased use of biofuels in agriculture. First, it covered the support framework and the market situation on the fuel and rapeseed and vegetable oil markets. Under the main theme of "Biodiesel and rapeseed oil fuel – use in practice", the Agency for Renewable Resources (FNR) and the TFZ informed participants about projects and experiences with long-term use. Specialists from Deutz AG and John Deere presented the successfully implemented projects for approving biodiesel and rapeseed oil fuel for the latest agricultural engines from the perspective of engine manufacturers and the agricultural machine industry.

Agritechnica 2013

UFOP used Agritechnica 2013, which was held from 10 to 16 November 2013, to address the use of rapeseed oil-based biofuels in agriculture. As part of the presentation of the German Farmers' Association, UFOP presented information on the use of rapeseed oil fuel and biodiesel in agricultural machinery with the slogan "Fill your tank with rapeseed oil; because it's worth it!"

UFOP database "Statements of tractor manufacturers"

To promote the use of biodiesel in agriculture, UFOP has carried out a comprehensive update of its database of "Statements of tractor manufacturers regarding the use of biodiesel". The results of the extensive research are available at www.ufop.de in the form of a database which can be used to access information about the approval status for the use of biodiesel in tractors, combine harvesters, etc. The database provides a quick overview of the approvals granted for the various types of machinery and the specific approval conditions of the manufacturers.

Publications

UFOP publishes a list of demands for the 2013 German general election

The leading themes among the key demands submitted to the policymakers by UFOP in the run-up to the 2013 general elections were "Sustainable biofuel and resource policies that spur growth" and "Further development of the protein plant strategy for competitive domestic production". These were presented in the form of concise two-page information sheets entitled "Today's Politics", outlining the regulatory framework needed in UFOP's view to ensure biodiesel and rapeseed oil fuel have reasonable future prospects at a European and national level. At the same time, the necessary measures for the increase of grain legume cultivation were identified.

iLUC special edition

On 11 September 2013, the European Parliament rejected the Commission's proposal for the introduction of so-called iLUC factors. The European Parliament made it clear that scientific research has not fully proven a direct causal link between demand for raw materials and land use changes in a third country, such as Indonesia for example. The majority of academics agree that it is not be possible to provide proof, and the land use effect can

only be "indirectly" calculated using models and assumptions. Prof. Dr. Uwe Lahl from the Technical University of Darmstadt examined this dilemma in an article, published as a special edition by UFOP. iLUC expert Prof. Dr. Lahl explains in his article the background and weaknesses of the model calculations and discusses the scientific arguments as to why iLUC factors should be rejected in the light of the current legislative efforts of the EU Commission.

The article by Prof. Dr. Uwe Lahl: "Indirect Land Use Change (iLUC) – A critical inventory for objective political decision-making" is available for download from the UFOP website.

Study on "Biofuels and world hunger"

At the focus of the debate on the future direction of European funding policy for biofuels is their significance as a contributing factor to insufficient food supply in developing countries. The preconception, in a nutshell, is that biofuels are partly responsible for rising food prices and world hunger. Moreover, the biofuel policy of the European Union has led to legally dubious land-grabbing and price speculation. In order to address this criticism and to present and discuss the facts objectively, UFOP and the Association of the German Biofuels Industry (VDB) agreed to conduct a study and commissioned a scientific working group led by Prof. Dr. Michael Schmitz of the Institute of Agricultural Policy and Market Research and the Centre for International Development and Environmental Research at Justus Liebig University Giessen. The results were published under the title "Determinants for the level and volatility of agricultural commodity prices on international markets". The scientists analysed the causes of hunger and food pricing in developing countries decoupled from the world agricultural market. It examines the consequences of


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

UFOP „POLITIK AKTUELL“

BIOKRAFTSTOFF- UND RESSOURCENPOLITIK NACHHALTIG AUF WACHSTUM AUSRICHTEN!

Forderungen der UFOP zur Bundestagswahl 2013

Biokraftstoffe

Die UFOP fordert auf europäischer Ebene:

1. **Die Weiterentwicklung der EU-Biokraftstoffpolitik auf Basis der vorhandenen Produktionskapazitäten und dem nachhaltig verfügbaren Rohstoffpotenzial.**
2. **Die Beendigung der Mehrfachanrechnung von Biokraftstoffen aus Abfall oder Reststoffen.**


„indirect Land Use Change“ (iLUC)

Eine kritische Bestandsaufnahme für eine sachgerechte politische Entscheidungsfindung.

Ein Beitrag von Prof. Dr. habil. Uwe Lahl – erschienen in ReSource (4/2013) –

policy mistakes and contrasts this with a prudent biofuels and commodity policy. From the perspective of the associations, this study is also a recommended reference in investigating interrelationships and interactions on the agricultural markets in the light of the biofuels policy. As with all UFOP publications, this is available free of charge at www.ufop.de.

UFOP positions on the further development of European biofuels policy and the question of "indirect land use change (iLUC)"

With the two position papers

- Will EU climate protection and resource protection policy exclude biofuels in the future?
- iLUC and sustainability certification – consequences for all areas of use

UFOP explained the key points to be observed from its perspective and the necessary framework in several rounds of talks with the members of the European Parliament to develop biofuels into a leading alternative in the foreseeable future and beyond 2020. This concerns the current legal framework for biomass production and processing that extends beyond EU borders (including quality improvement of sustainability certification) as well as fundamental aspects in the iLUC debate to be taken into account regardless of the end use of the biomass.

Rmax project report

Since with the support of UFOP different rapeseed oil-based fuels and fuel mixtures have been successfully used in the context of endurance races for more than 10 years, the Reutlingen racing company Four Motors has developed the idea of creating a fuel mix optimised specifically for motor racing. UFOP, which supported this fuel project, published a detailed report in March 2014. The result of the project is a blend of 50 % rapeseed oil methyl ester (RME) and hydrogenated vegetable oil (HVO) called Rmax. The accompanying studies showed that this 50/50-blend complies with the requirements of EN 590 except for in terms of density; this mixture is free of aromatic compounds and largely sulphur-free and demonstrates a high ignitability. The necessary oxidation stability could be ensured by adding an antioxidant.

UFOP study of service stations: Rapeseed oil determines the raw material mix in winter

In winter 2013/14 the Union again performed a study of the raw material composition of diesel fuel at public service stations. Accordingly, at 89 %, rapeseed oil is the most important raw material of the biodiesel content contained in diesel fuel, followed by palm kernel oil at 6 % and palm oil and soybean oil, at 4 % and 1 %, respectively. The result of the study was announced i.a. in the form of a press chart (see Annex 1).

Further publications

- Renews special publication "Criticism of biofuels – checking the facts"
- MTZ special publication: "Reducing emissions using biofuel blends from engines with SCR catalytic converters"
- Final report: UFOP-funded project for the approval of biodiesel as a pure fuel for DEUTZ Agripower engines
- Special edition of "Biodiesel 2012/2013"

Events

UFOP Forum

The well-established UFOP Forum took place on 16 September 2013, attended by around 100 participants, on the occasion of the UFOP members' meeting. The event addressed the subject "Food, feed and fuel – contradictions or synergies?" in lectures and a high-level panel discussion.

The key outcome of the discussion was that the impact of biofuels on the global supply and pricing of food and feed is manageable on the whole. In general, government intervention and market fundamentals have a much bigger impact on the global supply of agricultural products and prices.

11. BBE/UFOP international conference "Fuels of the Future"

More than 500 participants from over 30 countries accepted the invitation from five associations from the German energy industry to the biofuels conference held on 20 and 21 January 2014 to learn about market developments, exchange experiences with certification systems and discuss the policy framework. The conference was organised by the German Federal Bioenergy Association (BBE), the Bioethanol Industry Association (BDBe), the Association of the German Biofuels Industry (VDB), the German Biogas Association and UFOP. The central theme of the conference was possible changes to EU biofuels policy. For this reason, the organisers have also organised a panel discussion with members of the European Parliament as well as several thematic blocks and panel discussions. The focus of this discussion was the question of the impact of the future EU biofuel policy on the international biofuels industry and related trade flows.

Several forums of the conference dealt with the scientific state of the discussion on the connection between biofuel production and indirect land use change (iLUC). As was the case with previous conferences, it became apparent that the results of the fledgling iLUC research varied greatly, and even academics had conflicting views on whether the existing models and assumptions can lead to viable results in support of the new legislative measures.

BBE/UFOP – Technical seminar on "Sustainability of Biofuels"

Together with the Federal Bioenergy Association (BBE), UFOP organised the second technical seminar in the House of Agriculture and Food Industry in Berlin (HdLE) held on 6 May 2014, in which the current aspects for the implementation of the Biofuel Sustainability Directive and the Federal Imission Control Act (36th BImSchV) were discussed and the updated methods for calculating greenhouse gas emissions, including practical exercises, were introduced. The event was aimed at all companies in the value chain, from raw material production to raw material or waste collection and biofuel production, as well as the relevant authorities and certification bodies. At the same time, the seminar was the ideal platform to address the future need for coordination and action across various stages and to exchange experiences. The participants were given the opportunity to submit specific questions to the speakers in writing – which they

UFOP Forum

could address to UFOP or the BBE – in order to ensure a high level of focus of the lectures and discussions, for example in relation to the registration of sustainability credentials in Nabisy or GHG calculation.

Trade shows and exhibitions

Party conferences

During the period covered by the report, UFOP took part once again in a shared renewable energy sector exhibition stand organised by the Renewable Energies Agency (AEE) at federal party conferences. The UFOP showcased its work at the SPD party conference in Leipzig from 14 to 16 November 2013, at the CSU party conference in Munich from 22 to 23 November 2013 and at the German Green Party conference in Dresden from 7 to 9 February 2014. The overriding objective of AEE's presence at these events is to communicate the benefits of environmental and resource protection policies as well as the necessary support framework for renewable energies to politicians across the political spectrum. For UFOP, participation in these events is not only an opportunity to present its position on current, politically relevant topics such as iLUC, the "food vs. fuel" debate or fiscal policy, but also to have detailed discussions with politicians and get answers to questions on general conditions relating to oil and protein crops.

IAA 2013

At the International Motor Show 2013 (IAA), UFOP together with the Finnish oil company Neste Oil and the Four Motors racing team of the musician and racing driver Smudo presented the rapeseed-based fuel Rmax, developed as part of a funded project. The Four Motors racing team was invited to the IAA by the German Association of the Automotive Industry (VDA) to present the exceptional BioConcept car to the broad public. In addition to an exhibition stand, a separate press day was also arranged at which Smudo provided extensive information on the project to media and visitors.

International Green Week Berlin 2014

In addition to being among the key exhibitors at the "ErlebnisBauernhof" (farm experience), UFOP showcased its work again from 17 to 26 January 2014 at the International Green Week in Berlin as part of the trade show "nature.tec". The central theme of the exhibition stand shared together with the German Bioethanol Industry Association (Bundesverband der deutschen Bioethanolwirtschaft e. V./BDBe) and the Federal Association of Decentralised Oil Mills and Vegetable Oil Technology (Bundesverband Dezentraler Ölmühlen und Pflanzenöltechnik e. V./BDOel) was the address to the policymakers. The discussions were focused on the proposals of the European Commission to change the biofuel policy as well

Fuels of the Future Conference 2014

SPD party conference 2013 in Leipzig

as the position of the European Parliament, and in particular the question of rules on indirect land use change (iLUC) as well as the possibility that support for food-based biofuels may be phased out by 2020. Federal Ministers and State Secretaries of the new Federal Government were welcomed at the stand.

Rapeseed-based biofuel on the race track and in the media

In the period under review, the racing project involving the prominent musician Smudo was once again the key PR project showing off the performance of rapeseed oil-based fuels. For Smudo and the team manager and former DTM driver Thomas von Löwis of Menar, this was their twelfth start at this 24-hour race with rapeseed-based biodiesel in their tank. From the outset, it has been the objective of the two drivers and their Four Motor racing team to pioneer sustainable motorsport. One of the highlights so far has been the development is the BioConcept Car III based on a VW Scirocco. Even after more than a decade, the two biofuel pioneers remain highly motivated to banish the

IAA 2013

last fossil relic from their cars and replace it with plant-based materials and fuels. Where this is not (yet) technically possible, they use recycled products, e.g. in the case of the engine and gearbox oil. This commitment has made German policymakers take notice. The Federal Minister for Education and Research, Johanna Wanka, and the Federal Minister for Food and Agriculture, Christian Schmidt, invited the team in June 2014 to the most important bioeconomy conference of the year, which was held in Berlin. Smudo presented the BioConcept car – which puts the idea of bioeconomy into practice by replacing finite fossil resources with renewable raw materials – to both ministers and hundreds of experts. In addition to many of the vehicle components being constructed from biocomposites and biopolymers, the project stands out in particular through its drive concept, which relies completely on sustainably produced rapeseed fuel (see Rmax project report and IAA 2013).

Market coverage

For many years now, among the most important elements of UFOP's PR work in the area of biofuels and oilseeds are the monthly online publications of the "UFOP market information on oilseeds and biofuels" as well as the weekly market and price reports on biodiesel, oilseed, vegetable oil and oil meal prices. This information attracts large number of visitors to the UFOP website. The "Chart of the week", available in German and English, is frequently cited and used both nationally and internationally.

Ongoing media relations activities

Traditional press work has been a core element of UFOP's public relations policy over the reporting period. Around 30 press releases relevant to various aspects of biodiesel and biofuel have been published. Here, the provision of information and the formulation of positions and demands within the context of biodiesel legislation and sustainability have been the most important concerns. The press releases can be viewed at www.ufop.de/presse/aktuelle-pressemitteilungen.

An overview of the most important press releases on the topic of biodiesel and other fuels (September 2013 to August 2014):

nature.tec 2014

19.07.2013

Biodiesel offers great potential for reducing particulate emissions within the engine

Tests performed by regineering GmbH on a 1-cylinder test engine confirm a great potential for particle reduction when using biodiesel compared to diesel.

23.08.2013

New biofuel Rmax subjected to rigorous endurance testing

This year the Four Motors team, comprising the musician and racer Smudo, TV test driver Tim Schrick and team manager and former DTM driver Thomas "Tom" von Löwis of Menar, has once again more than lived up to its reputation of a "green racing team".

05.09.2013

UFOP Chairman Vogel calls on the European Parliament to reject iLUC factors

Ahead of the crucial debate on 9 and 10 September 2013 in the European Parliament on the European Commission's proposals to amend the EU biofuels policy, the Chairman of the UFOP appealed to the members of the relevant committees.

06.09.2013

Federal Government releases incomplete biofuel report

In UFOP's opinion, the biofuel report submitted by the Federal government in late August 2013 is incomplete. The Union has found that information on the volume of quota trading and double counting, in particular, is missing.

06.09.2013

Rapeseed oil fuel – price difference compared to agricultural diesel rises to € 0.24/l

The recent rise in the price of oil and agricultural diesel has made rapeseed oil fuel and biodiesel a particularly attractive alternative for use in agriculture and forestry.

09.09.2013

Rmax: Rapeseed fuel 2.0

Rapeseed oil-based fuels have been around in Germany for more than 20 years The spectrum ranges from pure rapeseed oil fuel to rapeseed methyl esters and hydrogenated rapeseed oil. At the IAA 2013, UFOP, Neste Oil and Four Motors presented a new fuel mix that is based completely on sustainably produced rapeseed oil.

17.09.2013

UFOP's Board reviews resolutions of the European Parliament on biofuel policy

At its meeting on Monday this week, UFOP's Board discussed the resolutions of the European Parliament from 11 September 2013 on the EU biofuel policy change proposed by the European Commission.

23.09.2013

UFOP-funded project for the approval of biodiesel as a pure fuel for DEUTZ Agripower engines

DEUTZ Agripower engines from the series TCD 7.8 L6, TCD 6.1 L6 and TCD 4.1 L4 can be released for operation with biodiesel as a pure fuel. This is the result of a successful project completed by DEUTZ AG.

11.10.2013

Are biofuels responsible for price fluctuations and hunger in the world?

The publication of a study by the University of Giessen. At the focus of the ongoing fierce debate on the future direction of European funding policy for biofuels is their significance as a contributing factor to insufficient food supply in developing countries.

12.11.2013

UFOP Chairman Wolfgang Vogel reiterates his rejection of the EU biofuel plans

At Agritechnica 2013, the Chairman of the Union for the Promotion of Oil and Protein Plants (UFOP), Wolfgang Vogel, reiterated his clear rejection of the proposed capping of biofuels from food raw materials and the introduction of ILUC factors.

05.12.2013

Biofuels in agriculture and forestry – industry representatives discuss conditions for the launch

The experts and participants that took part in a conference held on 29 November 2013 in Berlin agreed in principle that there were good reasons to use a market incentive programme to promote the use of biofuels in agriculture and forestry.

05.12.2013

Studies show no link between biofuels, hunger or land grabbing

Biodiesel and bioethanol have a much smaller impact on prices on agricultural markets than it is often assumed.

12.12.2013

UFOP calls for more intensive research addressing the iLUC phenomenon

After the EU energy ministers failed to agree a compromise proposal to amend the EU biofuels policy in their meeting today, the Chairman of UFOP, Wolfgang Vogel, called for a more intensive work on the scientific basis of assessing possible iLUC effects over the coming months.

20.01.2014

Biofuels: essential for energy transformation in the transport sector

At the international conference "Fuel of the future" at the ICC Berlin, the alternative fuel producers called for the targets for biofuels in Europe to be maintained. The climate targets in the transport sector can only be achieved with an integrated approach and combined forces.

28.02.2014

UFOP database "Statements of tractor manufacturers"

UFOP has updated its database "Statements of tractor manufacturers" offering comprehensive information on the use of biodiesel in tractors, combine harvesters, etc.

11.03.2014

Biodiesel sales witness sharp decline in 2013

According to the German Federal Office for Economic Affairs and Export Control (BAFA), biodiesel sales declined sharply in 2013 to 300,000 tonnes.

17.03.2014

Export record for biodiesel

At just under 1.6 million tonnes, the German biodiesel industry notched up a new export record in 2013. This is the result of an appraisal by the Agricultural Market Information Company (AMI) based on data from the Federal Statistical Office.

25.03.2014

Will EU climate protection and resource protection policy exclude biofuels in the future?

UFOP believes that there is still a significant need for research and development when it comes to second and third generation biofuels. They were therefore unable to close the supply gap

which will emerge as of 2020 when the promotion of conventional biofuels is set to be phased out, as proposed by the European Commission.

28.03.2014

Reducing emissions using biofuel blends from engines with SCR catalytic converters

By optimising the dosing quantity of urea in the exhaust after-treatment (AdBlue), a further reduction of nitrogen oxides at higher levels of biodiesel in diesel fuel is possible.

04.04.2014

Biodiesel: UFOP calls for a 4.5 % rather than a 3 % greenhouse gas reduction target

In a letter to Barbara Hendricks, German Federal Minister for the Environment, the Chairman of UFOP, Wolfgang Vogel, demanded that the 4.5 % greenhouse gas (GHG) reduction target to be met by 2017 be brought forward to 1 January 2015.

28.05.2014

Fuelling the mobility of the future

Fuels from fossil resources are finite. The first meeting of the Fuels Joint Research Group (FJRG) on 24/25 September 2014 dealt with ways to close this gap, as well as the resulting consequences and challenges.

10.07.2014

UFOP information 2014: indicate the NUTS2 region in the rapeseed self-declaration

UFOP hereby recommends specifying the so-called NUTS2 region in the self-declaration in order to ensure successful marketing of the rapeseed crop in 2014. Only by inserting the NUTS2 code in the appropriate form field is it possible to use a regional value for rapeseed grown in Germany when calculating the greenhouse gas emissions for biofuels production.

Expert Commission on Biofuels and Renewable Resources

During the period covered by this report, the Expert Commission on Biofuels met on 14 May 2014. Ms Margret Schmidt from Shell Global Solutions was discharged from among the members of the Commission. The Chairman of the Commission, Prof. Dr. Ing. Axel Munack from the Thünen Institute, was also discharged. UFOP's Managing Director Stephan Arens thanked him for the long-standing cooperation, which began in the field of biodiesel research even before the establishment of the Expert Commission. Prof. Dr. Munack has actively supported the establishment and professional formation of the Commission and contributed significantly to UFOP's expertise, enabling it to comment on a range of topics relating to biodiesel and biofuels not only with regard to policy, but also on the basis of an expert network. The UFOP Board appointed Prof. Dr. Jürgen Krahl from Coburg University of Applied Sciences as his successor.

Other appointments: Klaus Schlame, Shell Solutions GmbH, and Dr. Klaus Lucka, Managing Director of the Oel-Wärme-Institut, Aachen.

Stephan Arens spoke at the beginning of the meeting about the resolutions passed by the European Parliament and the Council of Ministers on the amendments to the Renewable Energies Directive and the Fuel Quality Directive. The discussion was centred around the introduction of ILUC factors, multiple counting of biofuels from waste and residual materials, and the introduction of a cap for biofuels from cultivated biomass (rapeseed, soybean and palm oil; corn; sugar beets; sugar cane). The European Commission's proposal for a "Climate and energy package 2020 to 2030" in January 2014 gave rise to criticism because it does not foresee a sub-target for the transport sector or for biofuels. In view of the legislative procedure which is expected to introduce greenhouse gas reduction targets from 1 January 2015, the meeting examined the consequences for growth in sales in the biodiesel industry in accordance with the existing scheme (3 % from 2015, 4.5 % from 2017, 7 % from 2020). An increase in the initial value by 2015 was necessary to prevent a slump in sales. UFOP proposes a moderate increase, so that the oil industry as a quota provider can prevent the risk of not being able to comply with the applicable statutory requirements with regard to blending if the reduction targets were to increase significantly. The talk ended with a presentation of the initiative of UFOP, DBV and BDOel on the introduction of a market incentive programme to promote the use of biofuels in agriculture. Bavaria is going ahead with its "RapsTrak 200" programme (promoting rapeseed fuel use in 200 tractors). All parties involved – from the agricultural machine industry, as well as the associations – are clear that the success of the programme will be determined not only by the supported ojects, but also in particular by the public relations activities.

Dr. Klaus Lucka from the Oel-Wärme-Institut talked about the extensive field of activity of his institute in the area of fuel and biofuel research. This includes issues relating to ageing mechanisms, stability criteria, material compatibility with combustible and fuel-carrying components, product evaluation, fuel analysis and the study of combustion characteristics such as emissions, as well as particle and deposit formation. An important principle is the close integration with DGMK and the IWO, as well as with companies operating in the field of the production of burners, fuels or biofuels and additives.

On the basis of some select current research questions, Dr. Lucka outlined important issues for market access – such as the use of fatty acid methyl ester as a blending component in heating oil:

- Studies on the product quality of biocomponents during long term storage;
- Studies on microbiological contamination, and on material interaction in the combustion chamber and in fuel lines;
- Studies on the product quality of biofuel oil during long term storage;
- Determination of application-specific properties on the test bench developed by OWI;
- Research on fuel lines (tank and tank pump, filter, high pressure pump, injector, etc.).

UFOP commissioned ASG Analytik GmbH to analyse the composition of raw materials in biodiesel in both summer and winter at public service stations (B7). Dr. Thomas Wilharm presented the results. In both July and December 2013, 60 samples – weighted by the market share of the respective oil companies - were collected at public service stations. In comparison to the summer campaign (53 %), the proportion of rapeseed oil as a raw material increased to 89 % in winter. Noteworthy was the increased proportion of service station samples without any biodiesel content (from 20 % to 25 %) At the same time, the proportion of samples with hydrogenated vegetable oil (HVO) increased. While biodiesel fulfils the winter quality requirements, in particular through its raw material composition – especially rapeseed oil methyl ester – the required winter quality can be ensured even at higher blending proportions by chemically adjusting the hydrogenated vegetable oil. A result of this study is also the geographical allocation of the raw material composition of B7 according to refinery locations.

Dr. Peter Emberger from the TFZ in Straubing presented the results of his doctoral thesis on the subject of "The ignition, combustion and emission behaviours of different vegetable oils". The study examined the emission effects of different vegetable oils with steadily increasing proportions of unsaturated fatty acids (from coconut oil to linseed oil). The examined parameters included: density, calorific value, kinematic viscosity at 40° C and iodine value, as well as other fuel properties not included in the standard: elemental composition and surface tension. As a result, the vegetable oils differed in the rate of pressure rise and in their ignition delay. Two tractors suitable for running on vegetable oil were used as prototypes for the emission tests (a John Deere 6930 Premium 6-cylinder, 167 HP, stage III A compliant, and a Fendt Farmer Vario 412, 4-cylinder, 125 HP, stage I compliant). The results measured on the tractor test stand confirmed the influence of vegetable oil on the emission behaviour. At medium and high loads, the increasing number of double bonds leads to higher emissions of nitrogen oxides, and to increasingly incomplete combustion at low loads and in no-load operation.

Kristin Götz, project leader of the joint research project Diesel R33 at Coburg University of Applied Sciences, spoke about the status of this fleet project. The biogenic portion consists of 7% waste cooking oil methyl ester and 26% HVO. The fuel meets the requirements of DIN EN 590 and can be distributed through public service stations in accordance with the Fuel Quality Directive (10th BImSchV). Altogether there are 19 partners involved in the project from the automotive and biofuel industries and from the petroleum industry and agriculture (UFOP), as well as academic institutions, including the Thünen Institute. The test fleet comprises approximately 280 vehicles of emission standard EURO 0 to VI. The scientific objectives of the study are: emissions and health effects, fuel-oil interactions, fuel-fuel interactions and material compatibility, and with regard to the biogenic blending components, questions about sustainability. Vehicles of the emission standards EURO III, EURO V and EURO VI are placed on a chassis dynamometer with and without diesel particulate filter and checked for regulated emissions, and one vehicle is also checked for non-regulated emissions (including mutagenicity). In order to establish whether the engine oil change intervals specified by the vehicle manufacturers can or have to be changed (lengthened or shortened) and to examine engine oil interactions, samples are taken from 39 short and long-haul vehicles. Sampling takes place every 10,000 km for buses and every 5,000 km for passenger cars. The study also examines deposit formation and wear to fuel injectors, fuel management systems, and fuel and oil filters.

The creation of a biodiesel-based fuel with low NO_2 emissions and high oxidation stability is the subject of the project by Ferdinand Bär from Coburg University of Applied Sciences. This project, funded by UFOP, focuses on the positive influence of hydrazides on the formation of nitrogen oxides in the exhaust, which was established in a preceding project, as well as on increasing oxidation stability. These properties should be improved by chemical modifications. Where it becomes a challenge is in the necessary structural adjustment of these additives to ensure their solubility and temperature stability. This requirement is particularly important when a higher proportion of biodiesel (B30) is blended into conventional diesel fuel. It has not been possible thus far to reproducibly demonstrate the NOx reducing effect of hydrazides as part of the project. The use of the so-called AFIDA combustion chamber to study this effect with small sample amounts has so far provided no or too few reproducible results. Nevertheless, it was possible to confirm the positive effect of this additive group on the oxidation stability as part of the project.

In his work funded by a scholarship grant, Markus Knorr from Coburg University of Applied Sciences examines the interaction between biodiesel and fossil fuel as a cause for the formation of oil sludge in the engine oil. The purpose of the project is to clarify the mechanisms, intermediate products and reaction pathways that can lead to sludge formation. This requires a chemically distinct reference substance instead of the conventional base oil used in the production of engine oils. In the context of the project, a suitable model substance was found in squalane.

As part of a comprehensive evaluation, Rolf Luther from Fuchs Europe Schmierstoffe GmbH discussed the current status of European standardisation activities with regard to biolubricants. The members of the standardisation working group "WG 33" under Technical Committee (TC) 19 of the European Committee for Standardisation (CEN) are dealing with this challenge. These standardisation activities are based on a mandate from the European Commission. The consultation process was completed in April 2014, paving the way for the standard CEN TR 16227 to be published in 2014. Under this standard, biolubricants must contain at least 25% renewable raw materials. The European Ecolabel for Lubricants has even more stringent requirements with regard to the "proportion of renewable raw materials": Hydraulic oils ≥ 50%, greases ≥ 45%, total loss lubricants ≥ 70%, two-stroke oils ≥ 50% and gearbox oils ≥ 50% The lubricant industry has been critical of the Federal Environmental Agency, which awards the Blue Angel. As of yet, the Blue Angel does not have a criterion for renewable raw materials.

Action is needed for the development of a robust test method for determining the biodegradability of lubricants in products intended for sale. More extensive standardisation activities have been carried out since July 2011 by Technical Committee 411 of the European Committee for Standardisation (CEN), "Bio-based products". Five working groups (WG) were created to cover the following topics: WG 1 "Terminology", WG 2 "Biosolvents", WG 3 "Bio-based content", WG 4 "Sustainability criteria life cycle analysis" and WG 5 "Certification and declaration". A group of experts for bio-based products has been working on recommendations for the European Lead Market Initiative for bio-based products in the field of biolubricants since September 2013. These include, for example, regulatory requirements that prescribe the use of biolubricants as preventive soil and water conservation measures. It is the position of the lubricant industry that, due to the continuing price difference between conventional and biodegradable lubricants, a regulatory approach/instrument is needed to drive their introduction to the market.

UFOP project – biodiesel for use as fuel

Research grant: "Examinations of sludge formation in engine oil when using biogenic fuels"

Project management: Coburg University of Applied Sciences (TAC), Friedrich-Streib-Str. 2, 96450 Coburg

Duration: September 2013 to August 2016

So-called sludge formation can come about in the engine oil pan if the enrichment of biodiesel in engine oil and the impact of heat have a corresponding reaction medium. The reactive groups (i.a. double bonds) that exist in the fatty acid methyl ester molecule bond with other components of the fuel.

This leads to polymerisation, which is irreversible and produces deposits in the oil pan. This sludge formation is a long known phenomenon, which was first observed in practice in commercial vehicles using biodiesel as a pure fuel (in some cases, this even lead to engine damage).

Engine oil dilution and the occurrence of the aforementioned sludge formation are essential reasons behind the automotive industry's insistence on enforcing an upper limit of 7% by volume with regard to the maximum blending of biodiesel in diesel fuel as provided for by the diesel fuel standard. The circumstances leading to the emergence of this sludge formation are very complex. As part of this grant, specific research will be carried out into the causes of oil sludge formation in engine oil. Specifically, it will deal with the reaction mechanisms which bring about oil sludge formation.

This problem may be exacerbated due to increased technical demands placed on engines arising from the introduction of engines that meet the EURO VI emissions standard in passenger cars and commercial vehicles. This is due to the increasing injection pressures, and the fact that German automobile manufacturers do not use any additive-based after-injection methods (as is the case e.g. with Peugeot => B30 approval) in order to reduce fuel requirements for the burnout of the particle filter.

Creation of a biodiesel-based fuel with low NO_2 emissions and high oxidation stability

Project coordination: Coburg University of Applied Sciences (TAC), Friedrich-Streib-Str. 2, 96450 Coburg

Duration: August 2013 to December 2014

In the past, UFOP has repeatedly supported projects that test emissions regulated by law on the basis of different engine types (passenger car/commercial vehicle) and emission classes with a view to showing that biodiesel meets the legal requirements set out in the respective emissions standards (EURO III/IV, currently V/VI). When using pure fuels or fuels with an increasing proportion of biodiesel in the diesel fuel mix, the increased emission of nitrogen oxide compared to pure diesel fuel is a problem. This problem is relevant as the respective exhaust standards for biodiesel also need to be met in order to be approved for road use. With the market launch of EURO stage V and VI compliant engines, NO_x storage catalytic converters are simultaneously integrated into the exhaust after-treatment in order to fulfil the NO_x emissions requirement.

The objective of this project is to examine the question of whether NO_x emissions can be reduced with suitable additives. The first tests with biodiesel and higher proportions of blending confirm the reduction effect, although this was achieved with conventional additives, i.e. additives that have not yet been optimised to the chemical structure of biodiesel as a pure fuel or blending component.

The aim of the project is to adjust the additives with regard to their chemical effectiveness by way of testing the existing additive options and in the best case scenario to develop additives which can simultaneously increase the biogenic proportion in the fuel on the basis of renewable resources. The fundamental advantage of this additive group scheduled for testing is the effect of improving the "oxidation stability" parameter, which is an important parameter for fuel quality. At the same time, it is important to ensure that the additives retain their functionality at different temperatures and at low temperatures in particular.

Operational behaviour of industrial and agricultural engines meeting the EU COM IV emissions standard in biodiesel operation (B100).

Project coordination: Institute of Piston Machines and Internal Combustion Engines, University of Rostock, Albert-Einstein-Str. 2, 18059 Rostock

Duration: 2014 to 2015

The aim of this project is to continue the on the whole very successful collaboration with DEUTZ AG, working towards having biodiesel approved as a pure fuel. In this regard it was only recently possible to complete the final report of the project on "Endurance tests on DEUTZ Stage III compliant Agripower engines using SCR systems for the approval of biodiesel". This project a) facilitated the granting of approval for biodiesel as a pure fuel for today's primarily market-sold DEUTZ diesel engines for use in agricultural power units and b) simultaneously confronted the reservations about B100 approval with higher emission requirements.

This project pursued the aim of achieving a basis for pure fuel approval for the next generation of engines so that "connections" in this regard remain intact and are safeguarded.

The project, comprised of six work packets, aims to test B100 in relation to its compatibility with a modern exhaust after-treatment system in order to safeguard fault-free operation. The background to this is that with this emission standard, on-board diagnostics (OBD) will be introduced, including in the off-road

area (e.g. agricultural farming, construction machinery). OBD constantly monitor compliance with emission requirements during operation. As soon as, for example, NO_x emissions exceed the specified emissions standard, the driver receives a signal alerting him to this problem and is prompted to have the problem area checked and/or resolved.

Against this background, a number of parameters will be tested while under load at the University of Rostock over the course of several months and, if the tests prove positive, testing under real-life conditions will begin in order to validate these engines in the next step.

The following tests will be carried out:
- Emission data before and after exhaust after-treatment,
- Function check of particle filter regeneration,
- Identification of the conversion rates in the exhaust tract (SCR - use of urea in NO_x reduction),
- Analysis of the OBD function,
- Rail behaviour when under pressure,
- Behaviour on cold start-up,
- Addition of biodiesel to engine oil,
- Identification of wear-and-tear metals in the engine oil, carbon particulate matter percentage, viscosity and density.

Project: Fleet test: "Diesel R33"

Project management: University of Applied Sciences Coburg Automotive Technology Transfer Centre (TAC), Friedrich-Streib-Str. 2, 96450 Coburg

Duration: July 2013 to February 2015

This project is based on the "renewable diesel" project, a fuel mix of 93 % HVO and 7 % biodiesel (UFOP Report 2010/2011, p. 69). This fuel mix was successfully tested in a fleet test. UFOP supported this project with the objective of promoting rapeseed oil as a resource in the production of HVO and of the biodiesel component. It was possible to demonstrate the "path to certification" from rapeseed cultivation to its processing in Germany. The project was presented at the international BBE/UFOP Biofuels conference and as part of the "nature.tec" trade show at the 2011 International Green Week.

In an extensive fleet test consisting of 280 vehicles, a marketable fuel mix will be demonstrated for the first time in R33, which is made up of 7 % biodiesel, 26 % HVO and diesel. This fuel mix meets all of the requirements of the diesel fuel standard EN 590 that are specific to fuel quality. This project forms part of applied basic research. The project partners Volkswagen AG and Daimler AG will carry out systematic checks of the vehicles. The vehicle fleet covers all of today's exhaust emission standards. The main purpose of the project is to increase consumer acceptance of biofuels. For this reason, project-related public relations activities should be a particular focus of attention.

UFOP project - biodiesel (FAME) for use as fuel

UFOP is a member of the "Fuels" committee of the German Society for Petroleum and Coal Science and Technology (Deutschen Wissenschaftlichen Gesellschaft für Erdöl, Erdgas und Kohle e. V./DGMK).

With regard to the use of biodiesel as a blending component in heating oil (biofuel), UFOP contributes to the funding of the following projects:

Creation of a database of results of various fuel analyses.

Project management: Jan Ludzay, German Society for Petroleum and Coal Science and Technology (DGMK), Überseering 40, 22297 Hamburg

Duration: 2013 to 2014

As part of the comprehensive support activities of the DGMK in the field of biofuel research, a number of fuel analyses have been carried out under the various projects. As part of this project, the results of the analyses have been compiled together in a database. The database is available to the members of the DGMK committee and to the scientific institutes involved in the projects for future research projects, so as to avoid unnecessary duplicate analyses.

Development of a new test method to evaluate the stability of heating oils with biogenic components

Project management: Jan Ludzay, German Society for Petroleum and Coal Science and Technology (DGMK), Überseering 40, 22297 Hamburg

Duration: January 2014 to December 2015

This project is focused on measuring the long-term oxidation stability behaviour of biofuel in tests under ideal conditions. The background to this is the fact that compared to fuels, heating oils are stored for relatively long periods of time and higher amounts of residues are therefore mixed with new materials in the storage tank. This project involves storing biofuels with different FAME components for varying length of time (for up to 12 months) and exposing them to different pressure and heat conditions. This simulates the behaviour during storage, and at the same time allows for the recording of measurements relating to the changing properties such as e.g. the oxidation stability, thermal stability, water acidity and other quality parameters.

Members of UFOP expert commissions

As at August 2014

Expert commission on biofuels and renewable resources

Chairman until 14.05.2014:

Prof. Dr.-Ing. Axel Munack
Thünen-Institut für Agrartechnologie
Bundesallee 50, 38116 Braunschweig

New Chairman:

Prof. Dr. Jürgen Krahl
Coburg University of Applied Sciences
Friedrich-Streib-Straße 2, 96450 Coburg

Members:

Elmar Baumann
Verband der Deutschen Biokraftstoffindustrie e. V.
Am Weidendamm 1a, 10117 Berlin

Dr. Jürgen Fischer
ADM Research GmbH
c/o ADM Hamburg AG-Werk Noblée & Thörl
Seehafenstraße 24, 21079 Hamburg

Dr. Thomas Garbe
Volkswagen AG
EADA/6 Otto- und Dieselkraftstoffe
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Dr. Klaus Lucka
OWI Oel-Waerme-Institut GmbH
Affiliated institute of RWTH Aachen
Kaiserstraße 100, 52134 Herzogenrath

Rolf Luther
Fuchs Europe Schmierstoffe GmbH
Friesenheimer Straße 15, 68169 Mannheim

Dr. Edgar Remmele
Technology and Support Centre (TFZ)
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Margret Schmidt (until 14.05.2014)
Shell Global Solutions (Deutschland) GmbH, PAE lab, GSMR/1
Hohe-Schaar-Straße 36, 21107 Hamburg

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Klaus Schlame
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Dr. rer. nat. Ulrike Schümann
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Albert-Einstein-Straße 2, 18059 Rostock

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Fachagentur Nachwachsende Rohstoffe e. V.
OT Gülzow, Hofplatz 1, 18276 Gülzow

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TOTAL Deutschland GmbH
TOUR TOTAL – Europacity
Jean-Monnet-Straße 2, 10557 Berlin

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Forschungsvereinigung Verbrennungskraftmaschinen e. V. (FVV)
Lyoner Straße 18, 60528 Frankfurt

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Institute for Mobile Systems at the Otto-von-Guericke University Magdeburg
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Markus Winkler
DEUTZ AG
R & D Centre
Ottostraße 1, 51149 Cologne

Annex 1

Raw Material Basis for Biodiesel Components in Diesel Fuels

Germany-wide filling station sampling of „standard" diesel fuels – comparative investigation of summer and winter fuel 2013

Sample selection

1. Only "standard" diesel fuels were analysed as samples, because so-called premium fuels do not usually contain biodiesel components (fatty acid methyl esters, FAME).
2. The samples – 60 filling stations in total – were taken from the areas surrounding various refinery locations in order to gain a representative picture of the fuel composition in Germany.
3. In the summer and winter campaign, the same filling stations were sampled (apart from two deviations).
4. In addition, the sampling was conducted corresponding to the market relevance of various fuel suppliers (see www.ed-info.de/edplus/ArtikelAnsichtArc.php?newsId=269).

Analytical methods

1. In an initial analysis step, the biodiesel components of the samples were determined according to DIN EN 14078.
2. Samples with a biodiesel content greater than and equal to 1.4 % (V/V) were then processed in accordance with DIN EN 14331. For this, the diesel matrix was separated from the biodiesel.
3. Finally, the fatty acid patterns of the biodiesel fractions obtained were determined according to DIN EN 14103.
4. The fatty acid pattern obtained was compared with fatty acid patterns of known oils, such as rapeseed, soya, palm, palm kernel and coconut.
5. Ideally, the raw material basis of the analysed biodiesel was then identified by a simulation calculation.
6. Finally, various mixed samples were produced to enable conclusions to be drawn with respect to possible hydrated vegetable oil components (HVO). The analysis was carried out analogously to DIN EN 15440 (14C content by means of liquid scintillation measurement).

Brand share of the sample scope – 60 filling stations in total

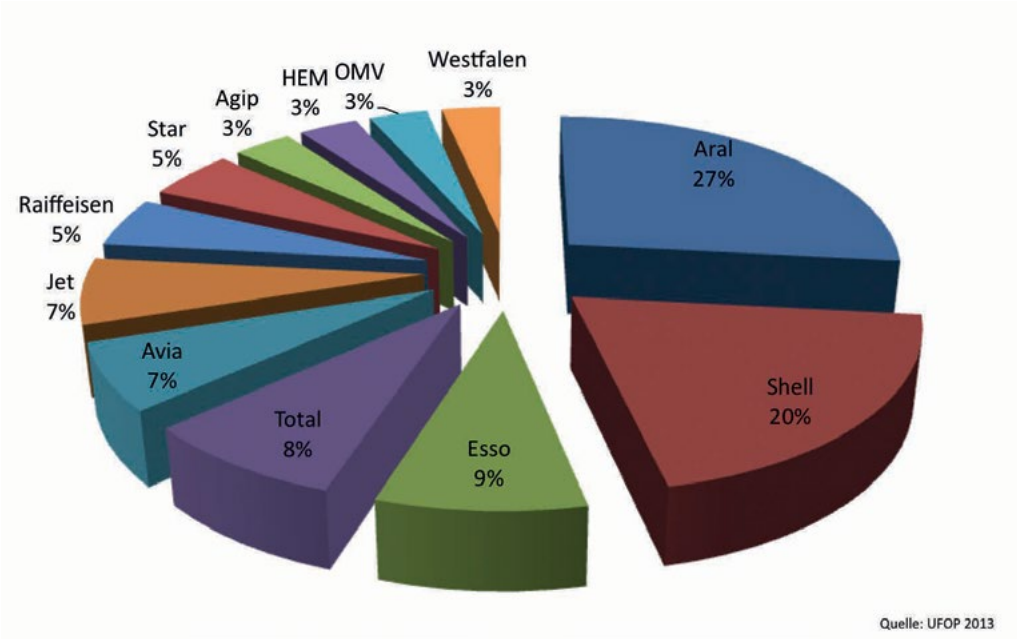

Figure 1: Representation of the brand share of the samples investigated in the total sample scope

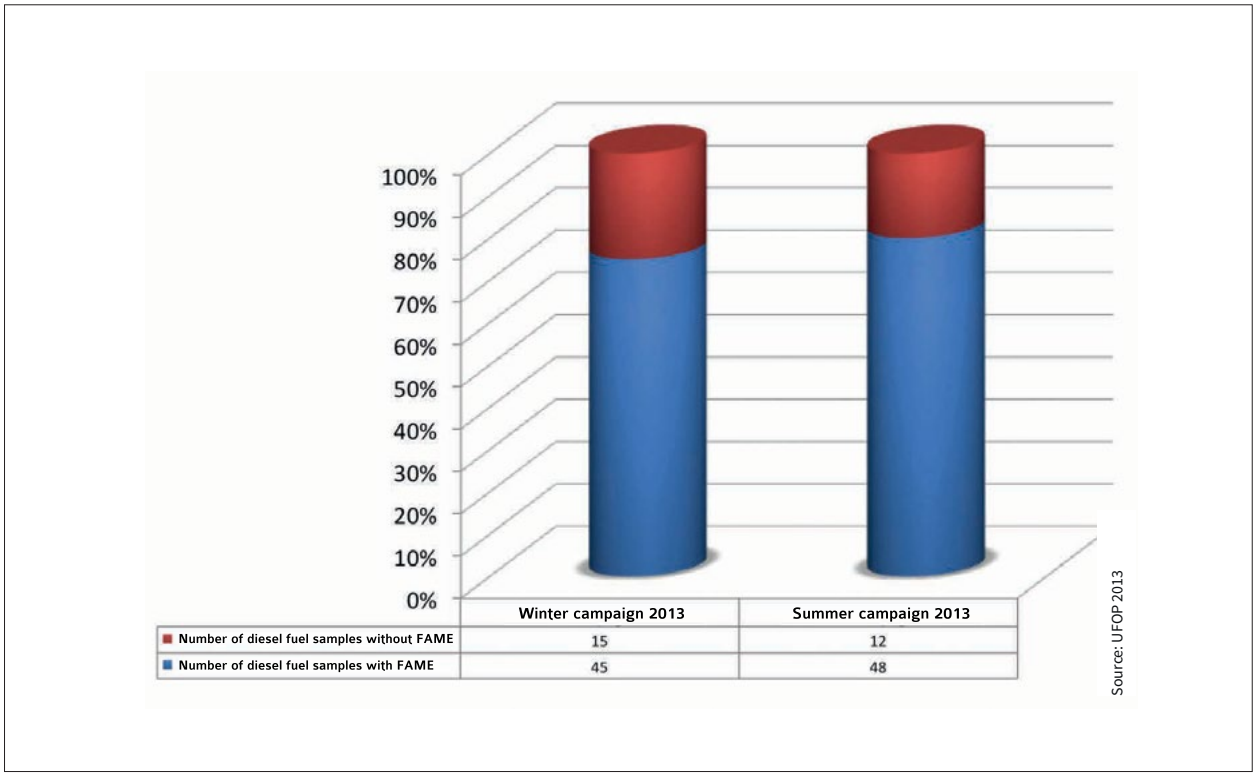

Figure 2: Representation of the percentage shares of diesel fuel samples with and without FAME

Results

Figure 1 shows the distribution of filling station brands to be sampled for the winter campaign. Owing to the deviation in the case of two filling stations as described in the chapter "Sample selection" under point 3, the market share of Aral for the summer campaign was 25 %, for Total 9 % and for Avia 8 %.

All samples with a biodiesel content of less than 1.4 % (V/V) were designated as diesel fuels without FAME component. This corresponds to a total number of 15 (winter campaign) and 12 (summer campaign) samples out of a total of 60 in each case. Expressed in percentages, 25 % of the samples were without FAME in the winter and 20 % in the summer.

The samples without FAME content can be differentiated further for both seasons. Of the 15 samples of winter fuel, 14 samples had a biodiesel content of less than 1.0 % (V/V) and 11 samples less than 0.5 % (V/V). For the 12 samples of summer fuel, 10 were found with a biodiesel content of less than 1.0 % (V/V) and 5 with a content of less than 0.5 % (V/V).

It must be noted here that biogenic components for fulfilment of the quota obligation which are present, for example, in fuel based on hydrated vegetable oils cannot be detected using the test methods according to DIN EN 14078 (infrared spectroscopy) as applied here.

The following Figure 3 shows the calculated raw material mix in the analysed biodiesel components.

It becomes clear that rapeseed oil dominates as biodiesel raw material in the winter (89 %). The better winter capability of the resulting methyl ester is the reason for this. The percentages of soya, palm and palm kernel oil/coconut oil (fat) are reduced accordingly for the same reason. These raw materials are more or less only suitable for the production of biodiesel in the summer months.

As there are only very few differences analytically in the fatty acid distribution of a biodiesel originating from palm kernel or coconut, the violet coloured areas represent both raw materials. In no case was there evidence of the use of animal fats. Owing to the lack of analytical procedures, it was also not possible to state the content of so-called „used cooking oils" as a raw material for the biodiesel production.

Figures 4 and 5 show the regional distribution of the raw material mixes for the winter and summer campaign.

The regional evaluations show in some cases considerable differences in the raw material mix of the biodiesel components. While, for example, significant quantities of soya-derived methyl esters were detected in winter only in the postcode areas 2 and 8 (cf. Fig. 4), soya components could be found in almost the whole of Germany in the summer campaign samples.

The evaluation of the regional distribution (by postcode area) is roughly oriented on the refinery locations in Germany. Based

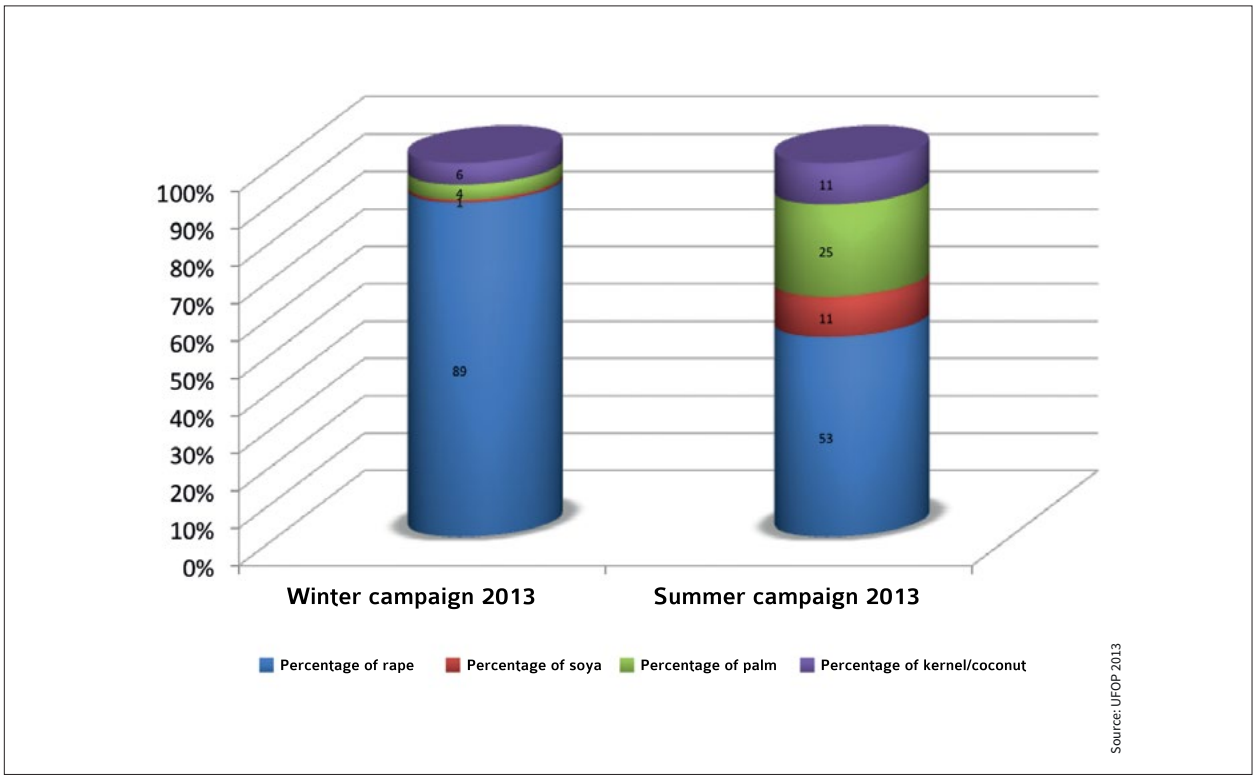

Figure 3: Raw material mix in the analysed biodiesel components

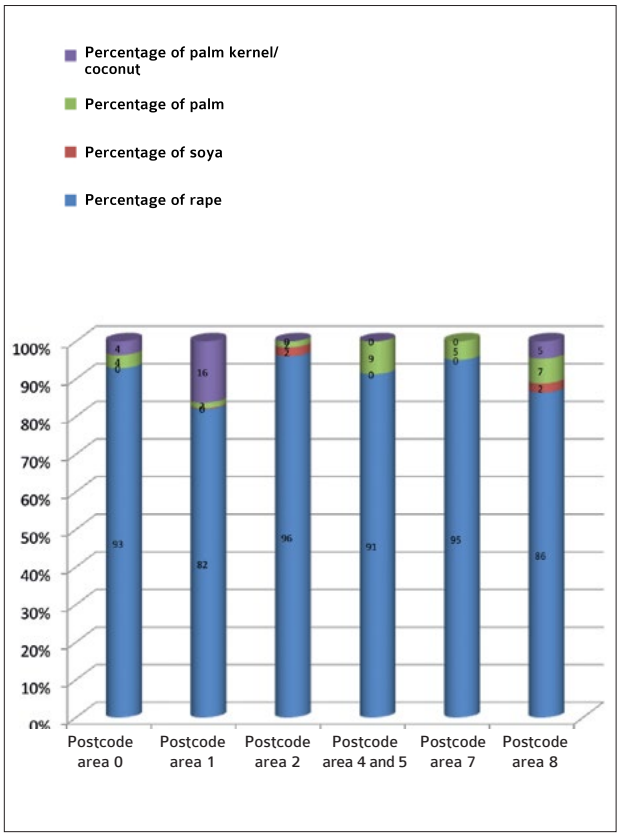

Figure 4: Regional distribution of the raw material mix in the analysed biodiesel components - summer

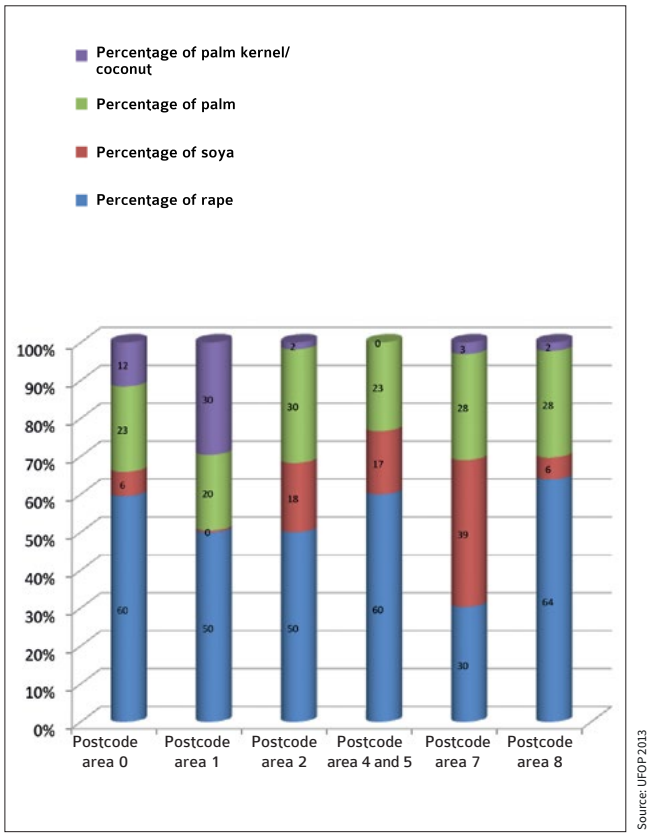

Figure 5: Regional distribution of the raw material mix in the analysed biodiesel components - winter

Table 1: Relationship between the postcode areas and the refinery locations

Postcode area	Refinery location
0	Leuna
1	Schwedt
2	Hamburg and Heide
4 and 5	Gelsenkirchen and Cologne
7	Karlsruhe
8	Burghausen, Ingolstadt and Vohburg

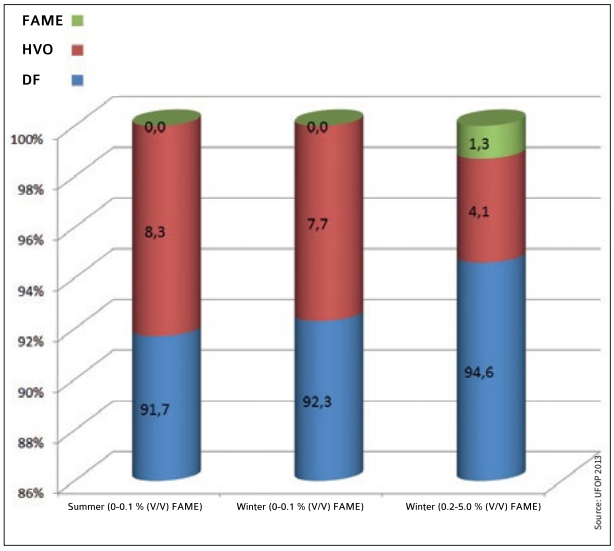

Figure 6: Potential composition of the mixed samples of the summer and winter campaign.

on the 15 or 12 diesel fuel samples without FAME content, Figures 3 to 5 represent a sample scope of 45 or 48 (instead of 60) samples. Table 1 clearly illustrates the relationship between postcode area and the approximate refinery location.

As described at the beginning, various mixed samples were produced at the end of the investigation to enable conclusions to be drawn with respect to possible hydrated vegetable oil components (HVO). For the mixed sample of the summer campaign, only such samples were considered whose fatty acid methyl ester content was analysed with a maximum of 1.0 % (V/V). In contrast, two mixed samples were produced for the winter campaign. On the one hand, also from the samples with a maximum FAME content on 0.1 % (V/V), and on the other hand with samples whose FAME content was between 0.2 and 5.0 %. The latter sample had a fatty acid methyl ester content of 1.3 % (V/V) or 1.1 % (m/m) - with an assumed average density of 883 kg/m³. Figure 6 shows the potential composition of the mixed samples for the summer and winter campaign. In addition, shown in table 2 is the number of samples with a FAME content of below 5 % (V/V). The use of biogenic fuel components which are not based on fatty acid methyl ester is concentrated in particular at the filling stations in the wider areas around the refinery locations of Hamburg and Heide as well as Gelsenkirchen and Cologne.

The calculation of the potential composition is based on the following procedure. The mixed samples were analysed in a laboratory specialised and accredited for liquid scintillation measurement. The result of the determinations was the percentage content of biogenic carbon. In conventional diesel fuels (without biogenic content), the average carbon content is c. 85 % (m/m). On the basis of this, the biomass content for the whole sample was calculated (e.g.: 7.1 % biogenic carbon corresponds to 6.0 % (m/m) biomass content). Assuming that, for example, hydrated vegetable oil (HVO) was mixed in, this results in an HVO volume content of 7.7 % (V/V) based on an average density of 780 kg/m³.

Table 2: Number of filling station samples with a FAME content of below 5 % (V/V)

Postcode area	Winter campaign 2013	Summer campaign 2013
0 and 1	0	1
2	11	9
4 and 5	11	10
7 and 8	0	0

Annex 2
UFOP position paper

Will EU climate protection and resource protection policy exclude biofuels in the future?

The European resolution and discussion situation with respect to European Commission proposals for amendments to the Renewable Energies Directive (RED) and the Fuel Quality Directive (FQD) only permits one conclusion at present: policies are far removed from identifying - let alone establishing - reliable framework conditions for agriculture and the biofuel sector.

On the contrary, with the "Climate and Energy Package 2030" presented by the EU Commission, the intention is obviously to phase out subsidies for traditional biofuels. It should be left to the member states to meet the GHG reduction target of 40 % specified by the EU as part of national measures. The sub-target of 27 % of renewable energy sources could only be incorporated into the package through concerted action by some member states.

Away from the media spotlight and the at times highly emotionally charged debate, policymakers must recognise the successes of the EU climate protection policy achieved with first generation biofuels in the meantime. First generation biofuels alone play a crucial role through the mandatory target specification of the RED as the sole renewable energy source thus far in the area of mobility. They pave the way towards introducing certification systems in the EU and third countries, thereby setting the standards for market access to the EU. Continued subsidies are essential to keep the momentum going across the entire biofuel sector, instead of choking off a successfully introduced and established development.

It is a fact that:

- First generation biofuels alone play a crucial role through the mandatory target specification of the RED as the sole renewable energy source thus far in the area of mobility; all other concepts such as electric mobility are far removed from a broad market introduction.

- First-generation biofuels pave the way towards introducing certification systems in the EU and third countries and thus spur on action to introduce and monitor defined sustainability requirements stipulated under EU law.

- First-generation biofuels have triggered intense debate on the need for research and "regulation" with regard to direct or indirect land use changes (iLUC), even though the biomass requirement to fulfil the EU biofuel targets is comparatively low measured by other non-food or even fodder applications.

- In terms of volume, second or third generation biofuels cannot replace first generation biofuels from 2020 onwards in any way. The raw material potential available for their production both economically and sustainably is extremely dubious and drastically overestimated. Investors are not interested, as the investment risk is very high due to the lack of a European biofuel strategy after 2020.

- Second or third generation biofuels still have to demonstrate a climate balance advantage in comparison to the first generation, as both the volume requirement and energy consumption for the conversion are extraordinarily high in comparison to first generation biofuels. Moreover, these biofuels do not produce any valuable by-products which can be used for protein fodder, for example.

- The example of biofuels from waste oils confirms that incentives like a multiple apportionment lead to unexpected intrinsic dynamics in raw material procurement (increasing imports of used waste oils and animal fats from third countries). At present, new incentives for biofuels from residual materials

are being discussed. These are to stimulate new investments – possibly with public funding – although an economic prospect will be absent after 2020. The multiple apportionment must be monitored urgently with respect to excessive funding and crowding-out effects in the market associated with this.

- In contrast to fossil fuels, biofuels must satisfy increasing requirements for greenhouse gas reduction over the entire origination chain, from the field through to arrival at the biofuel production plant. The introduction of greenhouse gas quotas in Germany from 1 January 2015 will boost this competition further; greenhouse gas and cost efficiency will determine the competition in future.

- Biofuels make an important contribution to saving resources and safeguarding supply security. The speed at which energy supply routes believed to be safe and reliable can be called into question can be witnessed in the current developments in international foreign policy.

For first-generation biofuels, a legally binding requirement framework was established for market access to the EU which is today exemplary in other application fields for renewable raw materials for energy or material utilisation. The further development of the European bioeconomy and national biorefinery strategy will also have to be measured by this.

There is still considerable need for research and development when it comes to second and third generation biofuels. In terms of equal treatment, their market launch must occur in unison with the first generation. A potential gradual replacement would be based on competition open to technology, taking EU fuel requirements into account. It makes little sense to produce bioethanol from straw using energy intensive processes when there is still an abundance of petrol and when there is an urgent lack of primarily fuels substituting diesel in the EU.

Policymakers must ask themselves what instruments they will be losing with respect to subsidies, the environment and resources if first generation biofuels disappear from the market after 2020.

Without continuing a balanced biofuel strategy after 2020, the relevant businesses in the European Union, and in particular in the other countries in focus (Argentina, Brazil, Indonesia, Malaysia), will sell their products to other markets in which sustainability requirements do not play a role for market access.

In particular the question of iLUC makes it clear that a new political approach is needed for effective international biotope and resource protection. The introduction of iLUC factors would considerably exacerbate the pressure to look for means of circumvention. The experts agree: iLUC factors will not rescue a single hectare of rainforest.

On the contrary, in excluding first-generation biofuels from 2020 onwards, the EU Commission's proposal takes away the negotiation basis in the form of EU market access and, consequently, the incentive for third countries to deal more intensively with sustainability requirements and certification systems or become more committed in this regard.

Away from the media spotlight and the at times highly emotionally charged debate, policymakers must recognise the successes of the EU climate protection policy achieved with first generation biofuels in the meantime. The regulatory framework established in just a few years with internationally anchored certification systems does not have to be abolished, but instead developed further and improved with a view to implementation quality. The challenge presented by continually having to improve GHG reduction – measured in terms of a fossil reference value – has led to intensive optimisation activities and successes, beginning with raw material cultivation and extending through to biofuel production.

These activities must now be accompanied by funding policy measures both on EU and national level. Agriculture, in particular, would benefit from relevant achievements in optimising raw material cultivation for biofuel production. This is because these measures are implemented independently of the end use of the biomass raw material and therefore also to the benefit of food production. Continued subsidies are now essential to keep this momentum going across the entire biofuel sector, instead of choking off an effective and established development.

Berlin, 24 March 2014

List of tables

Biofuels

Photo credits

Bernd Roselieb, Greenpeace, doris oberfrank-list – Fotolia.com

Table 1: Domestic consumption – biofuels 2008-2013 in 1,000 tonnes

	2008	2009	2010	2011	2012	2013
Biodiesel blended fuel	1,622.9	2,190.7	2,236.0	2,329.0	2,347.6	2,181.4
Biodiesel pure fuel	1,082.5	240.6	293.1	97.2	131.0	30.1
Biodiesel total	**2,705.4**	**2,431.3**	**2,529.1**	**2,426.2**	**2,478.7**	**2,211.5**
Vegetable oil	401.4	100.0	60.9	19.6	24.7	1.2
Biodiesel & VO total	**3,106.8**	**2,531.3**	**2,590.0**	**2,445.9**	**2,503.4**	**2,212.8**
Diesel fuel	29,905.6	30,936.2	32,128.0	32,963.8	33,678.0	34,840.4
Proportion in the blend in %	5.4	7.1	7.0	7.1	7.0	6.3
Fuel total	**31,389.4**	**31,276.8**	**32,481.9**	**33,080.7**	**33,833.7**	**34,871.8**
Proportion of biodiesel & VO in %	9.9	8.1	8.0	7.4	7.4	6.3
Bioethanol ETBE	366.9	197.6	122.2	162.5	141.7	154.5
Bioethanol blended fuel	251.0	687.4	1,028.1	1,054.3	1,089.7	1,040.5
Bioethanol E85	8.5	9.0	18.1	19.7	21.3	13.6
Bioethanol total	**626.3**	**893.9**	**1,168.4**	**1,236.5**	**1,252.7**	**1,208.6**
Petrol	20,561.4	20,177.9	19,614.8	19,601.1	18,486.8	18,422.3
Petrol + bioethanol fuel	20,568.5	20,185.3	19,629.8	19,617.4	18,504.3	18,433.5
Proportion of bioethanol in %	3.0	4.4	6.0	6.3	6.8	6.6

Source: Federal Office for Economic Affairs and Export Control, AMI

Table 2: Monthly domestic consumption of biofuels 2008-2013 in 1,000 tonnes

	2008	2009	2010	2011	2012	2013
Biodiesel blended fuel						
January	135.05	125.55	175.66	157.32	161.02	146.27
February	117.40	179.80	149.07	149.26	172.99	156.15
March	122.26	181.10	190.61	172.71	220.94	183.56
April	135.35	195.36	207.83	186.92	194.71	156.84
May	130.45	194.28	202.72	205.23	210.06	191.17
June	137.81	192.06	193.79	176.67	209.83	189.65
July	143.87	203.74	200.04	224.75	220.32	189.72
August	133.63	209.86	190.56	215.32	223.92	210.23
September	139.32	204.82	191.20	190.48	213.08	192.94
October	149.92	194.01	198.09	214.12	173.56	193.04
November	130.71	211.37	196.24	219.27	178.68	187.05
December	137.06	184.35	166.38	216.99	168.52	184.43
Average	**134.40**	**189.69**	**188.52**	**194.09**	**195.64**	**181.75**
Total volume	**1,612.83**	**2,276.30**	**2,262.18**	**2,329.03**	**2,347.62**	**2,181.05**
Biodiesel pure fuel						
January	64.93	14.12	18.79	3.59	5.26	7.19
February	37.15	7.85	10.98	4.97	4.77	3.01
March	73.75	32.01	19.04	2.22	4.93	9.24
April	84.91	28.10	22.96	3.36	19.98	1.40
May	114.10	16.09	38.84	4.69	13.79	2.37
June	139.25	14.05	39.44	7.32	5.04	0.60
July	120.95	20.01	27.75	4.77	9.10	-1.58
August	111.74	21.23	40.02	5.05	12.77	1.51
September	111.42	31.47	36.13	10.39	18.80	1.43
October	114.81	21.71	22.90	9.42	9.49	2.41
November	59.31	21.41	10.70	8.32	8.64	2.27
December	50.14	12.49	5.50	33.06	18.47	0.29
Average	**90.21**	**20.04**	**24.42**	**8.10**	**10.92**	**2.51**
Total volume	**1,082.46**	**240.54**	**293.05**	**97.16**	**131.03**	**30.13**
Biodiesel total						
January	199.98	139.67	194.46	160.91	166.28	153.46
February	154.55	187.65	160.05	154.23	177.76	159.16
March	196.01	213.11	209.66	174.93	225.87	192.80
April	220.26	223.46	230.79	190.28	214.69	158.24
May	244.56	210.47	241.56	209.91	223.85	193.54
June	277.05	206.11	233.22	183.99	214.86	190.25
July	264.82	223.75	227.79	229.54	229.42	188.15
August	245.37	231.09	230.58	220.37	236.69	211.74
September	250.74	236.29	227.32	200.86	231.88	194.37
October	264.73	215.72	220.99	223.54	183.06	195.45
November	190.02	232.78	206.95	227.59	187.32	189.32
December	187.20	196.84	171.88	250.05	186.99	184.71
Average	**224.61**	**209.74**	**212.94**	**202.18**	**206.55**	**184.27**
Total volume	**2,695.29**	**2,516.93**	**2,555.24**	**2,426.20**	**2,478.65**	**2,211.19**

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	2008	2009	2010	2011	2012	2013
Vegetable oil (VO)						
January	25.84	9.19	4.12	0.51	0.23	0.07
February	24.16	4.68	2.76	1.21	2.91	0.02
March	20.52	5.81	7.97	1.06	1.79	0.06
April	28.38	8.40	6.60	3.24	1.86	0.10
May	32.44	6.48	5.68	2.41	1.04	0.14
June	38.30	8.37	5.83	0.97	1.09	0.08
July	33.31	8.91	6.37	0.43	7.34	0.12
August	49.66	8.83	6.33	0.57	5.44	0.13
September	44.09	11.99	3.97	2.53	1.45	0.14
October	41.49	11.10	4.99	2.27	0.74	0.17
November	28.02	8.54	3.98	2.18	0.28	0.12
December	35.17	7.70	2.32	2.26	0.55	0.07
Average	**33.45**	**8.33**	**5.08**	**1.64**	**2.06**	**0.10**
Total volume	**401.39**	**100.00**	**60.92**	**19.63**	**24.71**	**1.21**
Bioethanol						
January	40.51	67.37	92.82	95.38	87.26	84.24
February	38.12	59.37	80.65	94.63	95.57	75.44
March	52.99	76.23	99.73	107.54	85.31	86.96
April	51.17	86.58	98.98	110.89	88.36	92.54
May	53.82	80.26	108.11	112.74	107.67	103.94
June	45.31	77.39	110.36	106.79	108.30	104.77
July	50.46	88.63	111.92	107.92	111.14	118.04
August	49.68	76.15	103.73	104.14	113.14	106.03
September	46.41	76.47	101.06	100.87	112.00	102.64
October	63.41	68.13	108.73	114.03	110.15	99.22
November	61.95	65.43	97.95	105.81	106.48	96.01
December	72.44	71.93	94.54	91.99	111.13	98.66
Average	**52.19**	**74.50**	**100.72**	**104.39**	**103.04**	**97.37**
Total volume	**626.27**	**893.94**	**1,208.58**	**1,252.73**	**1,236.49**	**1,168.48**

Source: Federal Office for Economic Affairs and Export Control, AMI

Table 3: International trade with biodiesel 2008-2013 in tonnes

	2008	2009	2010	2011	2012	2013
Imports of biodiesel						
January	13,716	64,876	67,044	35,999	28,314	24,087
February	38,647	51,191	74,784	26,463	24,575	18,575
March	35,093	75,210	88,039	48,629	37,962	26,266
April	66,413	60,175	58,430	78,277	57,864	50,057
May	80,127	96,561	150,943	82,276	98,630	62,615
June	84,964	84,527	154,608	124,658	107,837	60,834
July	113,357	89,319	136,781	114,971	83,011	78,428
August	122,054	134,946	136,321	105,697	92,707	73,279
September	68,727	94,197	128,279	86,085	73,889	50,622
October	41,455	73,277	87,527	86,125	78,031	42,601
November	25,767	55,632	104,588	62,443	34,383	42,407
December	30,342	111,047	73,386	70,318	44,436	29,741
Total	**720,663**	**990,964**	**1,260,730**	**921,941**	**761,639**	**559,512**
Exports of biodiesel						
January	51,785	28,703	68,836	61,252	74,819	114,874
February	75,034	55,936	97,385	129,323	70,808	80,559
March	51,083	54,081	95,514	101,078	89,012	134,774
April	57,621	36,946	78,214	135,813	83,517	92,598
May	66,792	41,715	103,827	131,876	92,820	116,369
June	27,728	46,299	114,460	157,211	107,396	118,692
July	117,267	73,904	89,507	116,598	102,486	143,145
August	94,855	68,716	166,430	99,556	115,680	185,277
September	71,094	106,998	85,514	144,816	131,896	159,922
October	137,769	85,795	107,993	105,822	124,902	144,816
November	57,572	81,105	78,703	85,557	93,297	158,488
December	77,464	81,202	126,207	74,957	126,942	135,309
Total	**886,064**	**761,400**	**1,212,590**	**1,343,859**	**1,213,575**	**1,584,823**

Source: Federal Statistical Office, AMI

Table 4: EU production capacity for biodiesel 2008-2013 in 1,000 tonnes

	2008	2009	2010	2011	2012	2013
Germany	5,085	5,086	4,933	4,932	4,968	3,965
France	1,980	2,505	2,505	2,505	2,456	2,480
Italy*	1,566	1,910	2,375	2,265	2,310	2,340*
Netherlands	571	1,036	1,328	1,452	2,517*	2,250*
Belgium	665	705	670	710	770	959
Luxembourg	.	.	.	.	20	.
UK	726	609	609	404	574	577
Ireland*	80	80	76	76	76	76
Denmark	140	140	250	250	250	250
Greece	565	715	662	802	812	.
Spain	1,267	3,656	4,100	4,410	4,391	4,320
Portugal	406	468	468	468	483	470
Austria	485	707	560	560	535	500
Finland*	170	340	340	340	340	340
Sweden	212	212	277	277	270	270
Estonia	135	135	135	135	110	.
Latvia	130	136	156	156	156	.
Lithuania	147	147	147	147	130	.
Malta	8	8	5	5	5	.
Poland	450	580	710	864	884	900
Slovakia	206	247	156	156	156	156
Slovenia	67	100	105	113	113	125
Czech Republic	203	325	427	427	437	410
Hungary	186	186	158	158	158	.
Cyprus	6	20	20	20	20	.
Bulgaria	215	435	425	348	408	.
Rumania	111	307	307	277	277	.
EU-27	**15,782**	**20,795**	**21,904**	**22,257**	**23,626**	**20,388**

Note:
* = including production capacity for hydrogenated vegetable oil (HVO)

Sources: European Biodiesel Board, national statistics, AMI

Table 5: EU production of biodiesel 2006-2013 in 1,000 tonnes

	2006	2007	2008	2009	2010	2011	2012[1]	2013[2]
Belgium	1	145	277	416	350	472	291	500
Denmark	70	70	98	86	76	79	109	110
Germany	2,200	2,890	2,600	2,500	2,350	2780	2600	2700
UK	256	427	282	196	154	177	246	250
France	592	954	1,763	2,089	1,996	1700	1900	1800
UK	594	470	668	798	799	591	287	450
Netherlands	18	85	83	274	382	491	377	550
Austria	122	242	250	323	337	310	264	260
Poland	89	44	170	396	371	364	592	630
UK	79	181	169	255	318	366	304	300
Sweden	48	114	145	110	130	130	150	200
Slovenia	2	7	8	7	21	0	6	15
Slovakia	43	46	105	103	113	125	110	105
Spain	125	180	221	727	841	649	472	550
Czech Republic	110	82	75	155	198	210	173	182
EU-27	**4,434**	**6,129**	**7,321**	**8,888**	**8,981**	**8998**	**8547**	**9240**

Note: [1] = provisional data
[2] = projection
Source: F.O. Licht

Table 6 a: Germany biodiesel [FAME] trade in tonnes – imports

Imports	2008	2009	2010	2011	2012	2013
Belgium	103,514	102,466	206,884	102,112	199,491	131,387
Bulgaria	1	1				
Denmark	7,079			1,212	1,051	699
Estonia	2,644					
Finland	2,011	11,473	15			
France	4,256	1,093	1,175	5,881	5,796	615
UK	16,837	14,960	21,379	41,439	21,372	3,460
Italy	411	3,862	13	2,713	1,720	157
Latvia	2,103			11,859		
Lithuania	102	76				
Luxembourg	2					
Netherlands	362,945	806,880	960,512	611,904	406,474	341,884
Austria	6,227	11,199	17,122	26,063	30,216	26,608
Poland	26	2,325	9,740	83,791	54,348	47,683
Portugal	8					
Sweden	15	1,342	2,963	163	58	38
Slovakia	3				276	
Slovenia	-					156
Spain	1,139	72	3,004	5		
Czech Republic	2,380	4,828	7,701	10,451	420	2,253
EU	**511,703**	**960,577**	**1,230,508**	**897,593**	**721,222**	**554,940**
Argentina	**1,999**					
Indonesia			**2,960**	**5,046**		**7,585**
US	**178,325**	**1,139**	**10**	**1**	**58**	**1**
Other countries	**28,636**	**29,249**	**27,259**	**19,308**	**40,365**	**913**
Total	**720,663**	**990,965**	**1,260,737**	**921,948**	**761,645**	**563,439**

Source: Federal Statistical Office, Wiesbaden and own calculations

Table 6 b: Germany biodiesel [FAME] trade in t – exports

Exports	2008	2009	2010	2011	2012	2013
Belgium	33,997	57,695	136,304	90,826	117,539	78,995
Bulgaria	25	5	15	2	14,245	6,101
Denmark	6,278	4,771	1,512	36,453	26,341	16,120
Estonia	10,018	2,603		.	5	.
Finland	1,056	818	493	29,659	13,348	19,562
France	92,050	60,779	113,072	43,050	72,597	92,077
Greece	18	30	99	35	106	389
UK	81,256	71,807	74,654	115,139	24,586	92,994
Ireland	159	1	2	2	3,004	18
Italy	14,068	33,918	58,036	32,255	69,056	63,920
Croatia	11	9	4	5	.	.
Latvia	10,202			2,482	5	2
Lithuania	26	125		117	132	5,704
Luxembourg	178	55	75	59	4,027	13
Malta					1,240	1
Netherlands	327,004	224,294	239,384	305,201	305,170	502,476
Austria	59,436	41,039	68,705	68,547	171,604	149,285
Poland	166,938	150,856	388,839	484,059	200,131	131,003
Portugal	22	3,733	35	12	26	.
Romania	17,874	10,097	4,208	10,760	13,600	3,954
Sweden	9,221	33,120	8,192	20,162	41,840	24,025
Slovakia	19,437	33	13,696	15,787	4,875	3,180
Slovenia	29	49	14,763	4,339	6,529	1,410
Spain	5,824	6,383	12,407	223	4,547	42,632
Czech Republic	11,324	38,085	22,607	61,187	95,526	47,018
Hungary	8,450	5,306	2,439	62	33	55,467
Cyprus	1,897	7,996	1,407	4,949	14,899	22,391
EU	**876,798**	**753,607**	**1,160,948**	**1,325,372**	**1,205,011**	**1,358,737**
US	**749**	**801**	**1,165**	**1,083**	**405**	**180,200**
Other countries	**8,517**	**6,998**	**50,486**	**17,414**	**8,171**	**32,890**
Total	**886,064**	**761,406**	**1,212,599**	**1,343,869**	**1,213,587**	**1,571,827**

Source: Federal Statistical Office, Wiesbaden and own calculations

Table 7: Bio diesel production capacity 2014 in Germany

Operator/ Works	Location	Capacity (t/year)	
ADM Ölmühle Hamburg AG -Hamburg works-	Hamburg	not stated	●
ADM Ölmühle Hamburg AG -Empty-	Empty	not stated	●
ADM Soya Mainz GmbH & Co. KG	Mainz	not stated	●
BDK Biodiesel GmbH Kyritz	Kyritz	80,000	
Biodiesel Wittenberge GmbH	Wittenberge	120,000	
BIOPETROL ROSTOCK GmbH	Rostock	200,000	
Biowerk Sohland GmbH	Sohland a. d. Spree	50,000	●
BKK Biodiesel GmbH	Rudolstadt	4,000	
Cargill GmbH	Frankfurt/Main	300,000	●
EAI Thüringer Methylesterwerke GmbH (TME)	Harth-Pöllnitz	55,000	
ecoMotion GmbH -Lünen works-	Lünen	100,000	●
ecoMotion GmbH -Malchin works-	Malchin	10,000	●
ecoMotion GmbH -Sternberg works-	Sternberg	100,000	●
gbf german biofuels Gmbh	Falkenhagen	130,000	●
Gulf Biodiesel Halle GmbH	Halle	58,000	
KFS Biodiesel GmbH	Cloppenburg	30,000	
KL Biodiesel GmbH & Co. KG	Niederkassel-Lülsdorf	120,000	
Louis Dreyfus commodities Wittenberg GmbH	Lutherstadt Wittenberg	200,000	●
Mannheim Biofuel GmbH	Mannheim	100,000	●
NEW Natural Energie West GmbH	Neuss	260,000	●
Petrotec AG -Emden works-	Emden	100,000	
Petrotec AG -Südlohn works-	Südlohn	85,000	
PROKON Pflanzenöl GmbH	Magdeburg	180,000	●
Rapsol GmbH	Lübz	6,000	●
Tecosol GmbH	Ochsenfurt	75,000	●
Ullrich Biodiesel GmbH	Kaufungen	35,000	
Verbio Diesel Bitterfeld GmbH & Co. KG	Greppin/Bitterfeld	190,000	●
Verbio Diesel Schwedt GmbH & Co. KG	Schwedt/Oder	250,000	●
Vesta Biofuels Brunsbüttel GmbH	Brunsbüttel	150,000	
Vogtland Bio-Diesel GmbH	Großfriesen	2,000	
Total (incl. ADM)		**3,965,000**	

Note: ● = AGQM member;
Source: UFOP, FNR, VDB, AGQM/Names sometimes shortened
The DBV and UFOP recommend the biodiesel reference from the membership of the Working Group
As at August 2014

Table 8: Supply of fuel from renewable energy sources

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Biofuel (in 1,000 t)										
Biodiesel [1]	1,017	1,800	2,817	3,318	2,695	2,431	2,529	2,426	2,479	2,192
Vegetable oil	33	196	711	838	401	100	61	20	25	1
Bioethanol	65	238	512	460	625	892	1,165	1,233	1,249	1,206
Total	**1,115**	**2,234**	**4,040**	**4,616**	**3,721**	**3,423**	**3,755**	**3,679**	**3,753**	**3,399**
Biofuel supply [GWh]										
Biodiesel [1]	10,493	18,572	29,065	34,239	27,810	25,086	26,095	24,920	26,275	23,258
Vegetable oil	345	2,047	7,426	8,748	4,192	1,044	636	205	258	13
Bioethanol	486	1,780	3,828	3,437	4,673	6,673	8,713	9,091	9,207	8,892
Biomethane [2]	0	0	0	0	4	15	162	190	390	450
Total	**11,324**	**22,399**	**40,319**	**46,424**	**36,679**	**32,818**	**35,606**	**34,406**	**36,130**	**32,613**

Source: The Centre for Solar Energy and Hydrogen Research Baden-Württemberg (ZSW) based on the Working Group on Renewable Energy Statistics (AGEE-Stat) as at February 2014; provisional figures

[1] in the case of the amount of biodiesel collected by 2006 in the mineral oil tax statistics, it should be taken into account that this also contained vegetable oil until August 2006.
[2] biomethane amounts exempted by the energy tax or marketed through the biofuel quota

Table 9: Development of fuel supply from renewable energies since 1990

Year	Biodiesel	Vegetable oil	Bioethanol	renewable fuel supply
				Given in thousand 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	2,192	1	1,206	3,399

Source: The Centre for Solar Energy and Hydrogen Research Baden-Württemberg (ZSW) based on the Working Group on Renewable Energy Statistics (AGEE-Stat) as at February 2014; provisional figures

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