Federal Republic of Germany

Eighth national report on the implementation of Directive 2003/30/EC of 8 May 2003 on the promotion of the use of biofuels or other renewable fuels for transport

2010

The rate of use of biofuels in Germany rose to around 5.8 % in 2010. Therefore Germany met the target of 5.75 % laid down for 2010 under Directive 2003/30/EC of 8 May 2003 on the promotion of the use of biofuels or other renewable fuels for transport.

1. Measures to promote the use of biofuels or other renewable fuels for transport

1.1 Statutory measures

The Biofuel Quota Act (*Biokraftstoffquotengesetz*) entered into force on 1 January 2007, replacing most of the previous wide-ranging fiscal measures to promote biofuels with regulatory requirements. The main features of the new rules are:

- Since 2007, undertakings which place fuels on the market are required to market a statutory minimum amount (quota) of their fuel in the form of biofuels. For 2010 to 2014, the quota has been set at 6.25 %.
- In addition to blending, the quota can also be achieved by marketing pure biofuels, carry-overs from previous years or transferring the obligation to third parties.
- From 2015 the benchmark for biofuel quotas will switch from the current energy evaluation to the greenhouse gas reduction. This will particularly promote biofuels offering a high rate of greenhouse gas reduction.
- To take account of the overcompensation ban, tax relief will be granted for a transitional period on pure vegetable oil and pure biodiesel (B100) and for pure biofuels substituting comparable diesel fuels (e.g. fatty acid ethyl ester) not used for quota purposes. The energy tax on these biofuels will be approx. 18 cents per litre up to the end of 2012 (compared to approx. 47 cents for fossil diesel fuel). Almost all tax relief will expire at the end of 2012.

- To take account of the overcompensation ban, second-generation biofuels, biomethane and the bioethanol component of 'E85 fuel' will be exempt from the tax up to the end of 2015. However, this only applies to biomethane and the bioethanol component of E85 fuel where these biofuels are not used for quota purposes.
- The sustainability criteria for biofuels agreed at EU level under the Renewable Energy Directive and the Fuel Directive were transposed into national law in 2009. Since 1 January 2011, economic operators have to provide evidence of compliance with the sustainability criteria in order for their biofuels to count towards the quota or receive tax relief.

The amendment to the Fuel Quality Directive requires the Member States to introduce, by the end of 2010, the legislation needed to place E10 fuel (petrol with up to 10 % bioethanol by volume) on the market. In Germany, this was transposed by means of the revised version of the Regulation on the Characteristics and Labelling of the Quality of Fuels – *Verordnung über die Beschaffenheit und die Auszeichnung der Qualitäten von Kraftstoffen* (10th Federal Emission Control Regulation – *BImSchV*) of 8 December 2010.

1.2 Research and development activities

In addition to the tax and regulatory environment to promote biofuels, a large number of biofuel research and development projects were funded by the Federal Government – in particular the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) and the Federal Ministry of the Environment, Nature Conservation and Reactor Safety (BMU).

Via its project promoter, the Renewable Resources Agency (*FNR – Fachagentur Nachwachsende Rohstoffe e.V.*), the BMELV funds, among other things, projects on the development of new biofuel technologies the further development of existing biofuel technologies. These relate to raw material supply (breeding, cultivation and logistics), biomass conversion, quality assurance and use in vehicles. In addition to technological developments, research funding also covers sustainability and environmental and economic aspects.

Under the BMELV's 'Renewable resources' aid scheme, a total of 85 biofuel R&D projects received funding totalling approx. €34 million between the launch of the scheme and the end of the reporting period (30 April 2011). In addition, there were 55 plant breeding and raw material supply projects, so that BMELV funding for biofuel research totalled approx. €60 million.

In 2010, R&D support focused more closely on BTL fuels. Yet growing market relevance and the sustainability requirements also led to increased funding of R&D projects on other biofuels introduced on

the market. A total of 70 projects in the field of biofuels (including raw material supply) received funding in the 2010 financial year totalling around €38 million.

For vegetable oil, which due to its characteristics is likely to remain a niche fuel, priorities include quality assurance and improvement and adapting engine design to running on vegetable oil. Given the further tightening up of exhaust legislation, the use of rapeseed oil fuel in the latest tractor engines is a new challenge. Therefore R&D funding in the coming reporting period will focus more closely on combustion engines.

Biodiesel projects receiving support were aimed at evaluating the performance of diesel and biodiesel mixtures. Other projects covered the development of on-board analysis and testing methods to precisely identify the key figures for diesel and biodiesel fuel mixtures. The impact of biodiesel on exhaust treatment systems is also being studied. Under the Federal Government's Energy and Climate Fund, funding will in future be targeted at projects on increasing the efficiency of biodiesel production.

As regards bioethanol, the focus of project funding has been on regional programmes for its production and use as a fuel, with particular emphasis on boosting the efficiency of bioethanol production in distilleries. On the application side, funding was provided for studies to identify the key figures for ethanol-containing fuels and the impact of bioethanol on fuel vapour retention systems in vehicles.

Under the project 'Emissions from the engine combustion of biofuels and fuel mixtures' all marketable biofuels and fuel mixtures were examined for their impact on the environment through combustion in motor vehicles. Based on the results, a joint project aimed at standardising sampling has been launched. The performance of various fuel mixtures is currently being examined under the 'GObio' joint project. The overall aim of these projects is to contribute to increasing the biogenic component of sustainable biofuels.

With regard to liquid energy sources, project support focused on biofuels which have not yet been introduced on the market (e.g. BTL) but are considered a promising option due to their broad raw materials base and chemical composition. BTL (biomass-to-liquid) fuels are liquid synthetic bioenergy sources which can be obtained from agricultural and forestry biomass through thermo-chemical gasification. In the 2010 financial year, aid totalling €22 million was granted mainly to two BTL projects, focusing on the planning, construction and setting up of stages 3 and 4 of the 'bioliq process'.

In the 2010 financial year the BMELV also supported the implementation of the certification system International Sustainability and Carbon Certification (ISCC) for sustainable biofuels and liquid biomass used in electricity generation. ISCC is now an established certification system making a major contribution to the supply of sustainable biofuels. Work under the project focused on developing a database and identifying eligible areas at international level. The BMELV also supports a project run by

WWF Deutschland entitled ‘Biomass sustainability – feasibility study and pilot tests’. The project seeks to identify processes which, taking into account national and international sustainability criteria, will be needed to effectively extend the sustainability requirements to all biomass production and achieve high uptake. Further research is needed, especially into suitable methods of recording and where possible minimising the impact on food security of the cultivation of biomass for biofuels, in particular in developing countries, and on global biodiversity, especially in highly biodiverse areas such as tropical rainforests or species-rich grassland.

The FNR published two funding priorities for biofuels in the reporting period. Under the ‘Renewable Raw Materials’ programme, groups of young researchers are to be funded for studying the use of biomass as a raw material and for generating energy – this scheme will focus on application-oriented research by a limited number of young researchers in groups of a maximum of four scientists and one technical assistant in the right scientific environment. The idea is to give young, qualified scientists the opportunity to put their own ideas into practice in the group.

The ‘Biofuels’ priority was published to promote research under the Federal Government’s Energy and Climate Fund. The ‘Biofuels’ initiative focuses on innovative production methods for biogenic fuels already on the market. The aim is to develop processes that go way beyond the requirements of the statutory sustainability rules (the Renewable Energy Directive, the Fuel Quality Directive and the Biofuel Sustainability Regulation). The funding priorities under the project are:

1. Innovative approaches to increasing efficiency and reducing greenhouse gas emissions in old biofuel facilities,
2. Demonstration projects for innovative production methods.

Since 2008, when the DBFZ (*Deutsche BiomasseForschungszentrum* – the German Biomass Research Centre in Leipzig) was set up, research funding has been intensified considerably in order to compress multidisciplinary application-oriented research, technology assessment and policy advice. Thus the DBFZ is the central German institution for bioenergy research. Institutional research into biomass energy use receives funding of around €5 million each year. One of the main areas of research is biofuels.

As part of the National Climate Protection Initiative and the programme ‘Research and development to optimise biomass energy use’, the BMU funds projects on the market-ready development of future-oriented and competitive technologies, system-flexible facility design and products for sustainable, efficient generation of electricity, heat and fuels from biomass and biogenic residual materials and waste. The funding covered studies and pilot and demonstration projects in seven subject areas, including the following, which also cover biofuels:

1. Bioenergy supply including, among other things, biofuel production on the basis of residual materials and waste, is a particularly advantageous option for biomass use because it does not conflict with land use in the farming sector. Unlike other sectors of energy generation, so far

these material flows have hardly been used for biofuel production and they are as yet inefficient. There is also potential for further optimisation in other, already established sectors of energy generation from biogenic materials such as electricity generation from biogas from the fermentation of biowaste. This is precisely where subject area 1 comes in: funding is provided for improving and further developing the conditions and technologies for the efficient supply and use of biogenic residual materials and waste.

2. Subject area 2 is intended to fund system studies and international cooperation projects for the supply of sustainable biomass and bioenergy sources. Germany imports not only fossil energy sources, but also biomass for generating energy. Eastern Europe and Russia are the main suppliers. To ensure that the existing potential is used to the full and the available biomass is used efficiently, the BMU is also funding the development of networks of excellence between the German bodies with the necessary experience and their eastern European and Russian partners.
3. The main focus of subject area 5 is improving the data basis for validating and further developing the fuel strategy, identifying optimisation potential and developing innovative methods and areas of application. Funding is to be provided for, among other things, studies into improving the data basis for current and future fuel use paths, including support for compliance with European specifications for ensuring sustainability in the use of biofuels and bioenergy sources.
4. As a result of the decentral raw material availability and the wide range of conversion possibilities, bioenergy supply is highly regional. If biomass use can be geared to regional raw materials and the regional energy consumption and use structures, the climate protection effects will increase significantly. Therefore subject area 6 is designed to support projects on the adaptation and optimisation of biomass use systems in regions with a predominantly renewable supply. The eligible projects range from studies into the technical, economic and social barriers to the implementation of regional bioenergy projects to model projects and application-oriented research projects.
5. Subject area 7 focuses on the development and scientific monitoring of a viable, sustainable biomass strategy. The idea is to collate and evaluate the research results obtained under subject areas 1 to 6 and use them as the basis for drawing up a balanced, efficient and viable biomass strategy. Current multidisciplinary issues affecting agricultural, environmental and energy policy must also be addressed.

2. Use of resources to generate biomass for uses outside the transport sector

2.1. The Renewable Energy Act *(Erneuerbare-Energien-Gesetz – EEG)*

Under the scope of the Renewable Energy Act, biomass is used for electricity generation in solid, liquid and gaseous form.

Unlike the way in which biofuels are promoted in the transport sector, the EEG is not based on a quota model but on a system of feed-in payments for electricity generated from biomass and other renewables. The EEG has therefore led to a considerable increase in the use of renewable energy sources in the electricity sector and in 2010 alone generated investment in renewable energy sources of €26.6 billion. In total 101.7 terawatt-hours of electricity were generated (33.5 TWh from biomass) and around 58 million tonnes of greenhouse gas emissions prevented. In principle, therefore, so far (under the 'EEG 2009' and previous acts) the basic rate for biomass electricity is unrelated to the physical form of the biomass used. However, some bonus schemes are linked to electricity generation from gaseous biomass (e.g. a technology bonus for gas treatment, increased bonus for electricity from renewable resources (the 'NawaRo bonus'), the 'manure bonus', the 'landscape maintenance bonus') or solid biomass (e.g. a reduced 'NawaRo bonus' in the case of wood combustion). For electricity generated from liquid biomass the 'NawaRo bonus' is granted, as an exception, only to plants with a rating of up to 150 kW.

However, the amendment of the EEG which is to enter into force on 1 January 2012 provides that funding for electricity generation from liquid biomass via the statutory feed-in payments system is to be terminated for new installations coming into service from 2012 onwards. According to the changes scheduled to be introduced from 2012 onwards, entitlement to the statutory feed-in payment under the EEG will only exist for that part of the electricity from liquid biomass required for start-up, ignition and back-up firing of the installation. By contrast, in future there will no longer be any entitlement to the statutory feed-in payment under the EEG for electricity from other liquid biomass used in new installations from 2012 onwards.
Electricity generation from waste wood will also no longer be funded via the statutory feed-in payment under the EEG in new installations from 2012 onwards.

In 2010 electricity generated from bioenergy covered, in relation to final energy consumption, 5.5 % of total electricity consumption (as against roughly 5.2 % in 2009). Total electricity generation in 2010 from all biogenic energy sources combined – solid and liquid biomass, biogas, landfill and sewage treatment plant gas and the biogenic component of waste – was 33.5 TWh, an increase of about 10 % on 2009. Out of this total, solid biomass (in particular wood, including biogenic waste) accounted for around 16.9 TWh, electricity generated from biogas around 12.8 TWh and electricity generated from liquid biomass only about 2.0 TWh. Such sustainable electricity is produced mainly in efficient cogeneration plants.

2.2 Renewable Energy Heat Act (*EEWärmeG*)

The major part by far of total heat generation from renewables is provided by biomass with a share of around 92 %. In 2010 heat supply from biomass totalled around 127.0 billion kWh (as against 114.1 billion kWh in 2009). While firewood represents the major part of the biomass used, there has also been an increase in heat supply from wood pellets and biogas. In 2010 heat generated from solid biomass

(including biogenic waste) accounted for around 113.4 TWh, heat generated from biogenic gaseous fuels around 9.1 TWh and heat generated from liquid biomass around 4.6 TWh of the total.

2.3 Market incentives programme for renewables

To promote and speed up the entry into the market of renewable-energy heating technologies, the Federal Government provides support in particular to plants for the exploitation of solar energy, biomass and geothermal energy under the Renewable Energy Heat Act and the 'Guidelines on support for measures relating to the use of renewables in the heat market' (a 'market incentives programme' or MAP). The programme is split into two parts: The Federal Office of Economics and Export Control (*Bundesamt für Wirtschaft und Ausfuhrkontrolle, BAFA)* provides grants towards the investment costs of solar thermal plants, solid biomass combustion plants and efficient heat pumps. Under the 'Renewable energy (premium)' programme run by the Reconstruction Loan Corporation (*Kreditanstalt für Wiederaufbau – KfW*), soft loans with repayment grants are provided for large installations such as solar thermal plants of 40 square metres upwards, solid biomass combustion/gasification plants from 100 kW upwards, heat pumps of 100 kW upwards, plants for processing biogas to natural gas grade, deep geothermal energy plants, local heat networks generating heat from renewables and large heat storage systems for heat generated from renewables.

In 2010 the market incentives programme provided funding totalling €346 million, triggering an investment volume of around €2.15 billion. Under the BAFA part of the market incentives programme, biomass plants received investment grants of approx. €61 million in 2010, generating an investment volume of around €451 million. Under the KfW renewable energy (premium) programme, in 2010 around 500 loans were granted for investments totalling more than € 58 million in biomass plants for heat generation and cogeneration (CHP).

Under the market incentives programme, from 2000 until the end of 2010, a total of approx. 1.34 million investment projects promoting the use of renewables received support, triggering an investment volume of round €15 billion. Biomass accounts for roughly 260 000 of these projects, with an overall investment volume of around €4 billion.

3. Sales of biofuels and other renewables in Germany in 2010

The proportion of total fuel consumption in Germany (in terms of energy content) **accounted for by biofuels** rose from around 5.5 % in 2009 to around 5.8 % in 2010.

By type of biofuel, **biodiesel** continued to achieve by far the greatest market potential. At roughly 2.6 million t, biodiesel sales were about 65 000 t up on the previous year. While blending with conventional

diesel rose by 0.5 %, there was an increase of around 20 % in the use of pure biodiesel (B100) from about 241 000 t in 2009 to about 293 000 t in 2010. Consumption of **vegetable oil fuel** was again down on the previous year**,** falling to around 61 000 t.

As regards petrol, sales of **bioethanol** rose from around 900 000 t in 2009 to around 1.16 million t in 2010. With the exception of the around 13 000 t of ethanol used in the form of E85, the bioethanol sold in Germany was blended with petrol.

The exact quantities by fuel type are shown in the table below. The figures for biofuel sales in 2010 are taken from the official mineral oil data of the Federal Office of Economics and Export Control.

Table:
Fuel use in the transport sector in Germany in 2010 (source: Official mineral oil data of the Federal Office of Economics and Export Control)

	Quantity (1 000 t)	Energy content (PJ)	Percentage of energy content
Fuel consumption	**52 126**	**2 211**	**100**
Fossil petrol	18 486	812	36.49
Fossil diesel	29 839	1 270	57.74
Biofuels	3 801	129	5.77
Biofuels, of which:			
Biodiesel	2 582	95	4.29
Vegetable oil	61	2	0.10
Bioethanol	1 158	31	1.38