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**FOURTH 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**

**2006**

**GERMANY**

## **Preliminary remarks**

The fourth report under Article 4(1) of Directive 2003/30/EC of 8 May 2003 on the promotion of the use of biofuels or other renewable fuels for transport must be submitted to the Commission by 1 July 2007.

**In 2006, Germany had already achieved well in excess of the 2010 target increase in the proportion of biofuels to 5.75% of total fuel consumption**, with biofuels accounting for 6.3% of total fuel consumption in relation to energy content (see Section 3).

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

#### **1.1 Biofuel Quota Act (*Biokraftstoffquotengesetz*)**

The Energy Tax Act (*Energiesteuergesetz*) entered into force on 1 August 2006. This introduced a partial tax on biodiesel of 9 cents per litre for pure biodiesel and 15 cents per litre for added biodiesel. These rates took account of the overcompensation detected in comparison with fossil fuels.

The Biofuel Quota Act (*Biokraftstoffquotengesetz*) entered into force on 1 January 2007. It replaced the exemption from petroleum tax for biofuels with a regulatory provision laid down in an Act containing the required amendments to the Tax Law (*Steuerrecht*) and Immission Control Act (*Immissionsschutzrecht*).

The key points are as follows:

- firms which market fuels will, from 2007, be obliged to market a legally-prescribed minimum percentage (quota) in the form of biofuels. Compliance with this quota requirement may be delegated to third parties;
- the quota is fixed in relation to energy content from 2007 at 4.4% for diesel and 1.2% for petrol. The quota for petrol will be raised to 2.0% in 2008, 2.8% in 2009 and 3.6% in 2010;
- from 2009, moreover, a combined quota of 6.25% will be introduced for both fuels; this will gradually be raised to 8% in 2015. The minimum rates for petrol and diesel will continue to apply;
- a degressive tax incentive will be retained for a transitional period until the end of 2011 for pure vegetable oil and pure biodiesel outside the quota. (Before the Energy Tax Act entered into force on 1 August 2006, tax relief on pure fuels was limited to the end of 2009);
- Second-generation biofuels, biogas and pure bioethanol (E85) are granted a degressive tax incentive until 2015, having regard to the overcompensation arrangement. No tax is currently levied on such fuels.

The following table gives the rounded tax rates for biodiesel and vegetable oil in cents per litre:

	Up to July 2006	Aug.- Dec. 2006	2007	2008	2009	2010	2011	From 2012
Pure biodiesel (from 1 January 2007 only for biodiesel outside the quota)	0	9	9	15.1	21.1	27.1	33.0	45.0
Vegetable oil (from 1 January 2007 only for biodiesel outside the quota)	0	0	2	10.0	18.0	26.0	33.0	45.0
Added biodiesel	0	5	47.4	47.4	47.4	47.4	47.4	47.4

With the entry into force of the Biofuel Quota Act, support for biofuels was coupled with compliance with fuel standards:

- fatty acid methyl esters (FAME, biodiesel) are considered to be biofuels only if they meet at least the requirements of DIN EN 14214 (as at: November 2003);
- bioethanol is considered to be biofuel only if it meets at least the requirements of draft DIN EN 15376 (as at: May 2006);
- vegetable oil is considered to be biofuel only if it meets at least the requirements of preliminary standard DIN EN 51605 (as at: July 2006).

Biofuels produced wholly or partially from or animal oil or fat will, moreover, no longer be taken into account from 2012 for the purposes of meeting the quota requirement.

The Federal Government intends, moreover, to use the authorisations provided in the Biofuel Quota Act, whereby biofuels are taken into account for the purposes of meeting the quota requirement, or supported through tax measures, only if it can be demonstrated that the biomass used was produced in compliance with the sustainable management of agricultural areas or certain requirements for the conservation of natural habitats, or if the energy product demonstrates greenhouse gas reduction potential. This includes rules on cultivation standards, and rules designed to avoid a situation whereby natural habitats which need protecting are destroyed or damaged by biomass cultivation.

## 1.2 Research and development activities

For vegetable oil, particular priorities included quality assurance in decentralised production, and adapting engine concepts to running on vegetable oil. For biodiesel, project promotion involved assessing emissions from combustion in diesel engines including modern exhaust aftertreatment systems. With increasing demand and uptake, bioethanol and biomethane projects are also being drawn up. Biomass-to-Liquid (BTL) fuels are liquid synthetic bioenergy sources which can be obtained from agricultural and forestry biomass through thermo-chemical gasification. This converts biomass produced by complex organic compounds into hydrocarbons which can be put through customary refinery processes to produce fuels in conformity with standards. This manufacturing process also has the advantage that BTL fuels can be adapted to the changing requirements of engine technology more easily than fossil fuels. A broad range of biomass may be used for thermo-chemical gasification. This process can theoretically generate a much greater biomass potential than from other biofuels, such as vegetable oils and

derivates thereof. BTL fuels are of key importance to the future fuel market. This is reflected in the Federal Government's national fuels strategy. BTL fuels are in the public spotlight, and Germany can currently be viewed as a world leader in the development of BTL technologies.

Given the potential importance of BTL fuels, project activities in this field have increasingly been supported over the past four years. In the field covered by the Specialist Agency for Renewable Resources (*Fachagentur Nachwachsende Rohstoffe e.V., FNR*), seven BTL fuel projects were supported in the biogenic fuels sector in 2006 to the tune of EUR 4.51 million. Other support measures (*Verbände EVA, BioLog*) relevant to BTL fuels involved selection, cultivation, harvest, supply and logistics of energy crops, with an overall budget of around EUR 7.1 million. As well as the environmental and economic assessment of BTL processes, support focuses on the implementation of different BTL production processes. Well-known firms from the plant engineering, energy and car industries are supporting the development of a BTL process centred around the High Temperature Winkler (HTW) carburettor at the *Technischen Universität Bergakademie Freiberg* and the Karlsruhe Research Centre (*Forschungszentrum Karlsruhe*)'s BioLiq process, which allows an additional level of decentralisation through production of a biomass slurry. These promotion measures focus on the production of methanol as a by-product of the so-called "Methanol-to-Synfuel" route and not, as in other developments, on the Fischer-Tropsch (FT) synthesis. The German Energy Agency (dena) presented a feasibility study for an industrial-scale BTL plant in December 2006 with funding from the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV), Federal Ministry of Transport, Building and Urban Affairs (BMVBS), Federal Environment Ministry (BMU) and industry. This covers questions of biomass availability, comparison of different BTL technologies, biomass logistics and possible financing tools.

The certification of biofuels or bioenergy and of the raw materials used for production is generally regarded as a key option in avoiding the use of non-sustainable biofuels and promoting the use of particularly sustainable biofuels. Various research projects are being promoted by the BMU and BMELV to this end.

## **2. Use of resources for generating biomass for uses outside the transport sector**

Around 70% percent of the renewable energies generated in 2006 are derived from biomass. Of the total amount of bioenergy produced in 2006 65% went into heat recovery, 13% into power generation and 21% into fuels. For heat and power generation from solid biomass, the main source of energy so far has been wood. Power generation has been largely based on the use of waste wood. In Germany there are currently some 3 300 biogas installations operating, mainly for power generation. The raw materials for this are mainly slurry and other animal byproducts, as well as biogenic residues and waste from the food and catering industries. Increasing use is being made of energy crops. It should, however, be noted that greater use of biomass to generate energy – alongside the existing use of biomass in the food or paper and wood processing industries, for instance – may lead to rising biomass prices.

In Germany there is no direct additional promotion of biomass production beyond the measures applicable in the framework of the common agricultural policy. Indirectly, the production of biomass for energy generation is stimulated by the following instruments.

## 2.1 Renewable Energy Act

In Germany the Renewable Energy Act (*Erneuerbare-Energien-Gesetz, EEG*) is one of the central instruments for increased development of renewable energy. The Act entered into force on 1 April 2000 and replaced the Electricity Feed-in Act (*Stromeinspeisegesetz*) which had been in force since 1991. The Act was overhauled in 2004. One of the legislative purposes of the revision is to raise the proportion of renewable energy in Germany's electricity supply to at least 12.5% by 2010 and to at least 20% by 2020. Germany's target for this increase for 2010 in the EEG is based on the indicative target set for Germany in Directive 2001/77/EC.

The Act has proved itself in Germany as an instrument for bringing onto the market electricity from renewable sources such as biomass. The revision of the Act in 2004 also created the conditions for continuing, at an intensified level, the development of power generation from renewable energy sources. The revision considerably improved the funding conditions and context for the legally guaranteed feeding in of electricity from biomass. This is especially true for electricity generation from agricultural biomass, since the EEG previously gave incentives for electricity production from relatively cheap non-agricultural and non-forestry biomass (e.g. waste wood, biogenic residues from the food industry).

For electricity generation from biomass, the revision brought in particular the following major improvements: a bonus was introduced for electricity generation from agricultural and forestry biomass such as energy crops or slurry. This is 6 cents per kilowatt-hour (cts/kWh) for electricity from installations of up to 500 kilowatts (kW) electrical capacity and 4 cts/kWh for electricity from 5 megawatt (MW) capacity plants. This provision of a bonus generated a powerful incentive effect especially for the biogas sector. For electricity production from timber from forestry the bonus is likewise 6 cts/kWh up to 500 kW and 2.5 cts/kWh above 500 kW. In addition, for electricity from biomass combined heat and power plants there is to be a bonus of 2 cts/kWh, creating incentives to use biomass for energy production. Together with the bonus mentioned above, this has made electricity generation from biomass more attractive. A bonus is also to be provided for electricity produced from particularly innovative electricity generation technologies with simultaneous combined heat and power generation. This bonus too is intended to contribute to improving efficiency in electricity generation from biomass. The period for which payments are made for biomass electricity fed into the grid remains 20 years.

With its still unused potential exploitation capacity, comparatively close to the agricultural and forestry markets, bioenergy can make a growing contribution to achieving national and EU targets in the electricity sector. This can be seen as well from the growth rates of biomass electricity fed into the grid under the EEG. In 2006 the proportion of renewable energy in electricity consumed was 11.8%, the share of biomass in that being about 25%. Germany's target increase of 12.5% in the electricity sector by 2010 was already achieved by June 2007.

## **2.2 Market incentives programme for renewable energies**

The market incentives programme to promote measures for exploiting renewable energies, imposed in conjunction with the Environmental Tax Reform, primarily serves the expansion of heat production from biomass, solar and geothermal energy. Around EUR 180 million were set aside for this in 2006. Since the start of the programme funding had been provided for over 523 600 solar collector installations and over 95 300 small biomass boilers by the end of 2006. The Reconstruction Loan Corporation [*Kreditanstalt für Wiederaufbau*, KfW) additionally granted promotion loans in the case of biogas plants, larger solid biomass combustion plants and plants for the exploitation of deep geothermal energy. Between 2000 and 2006, 3 095 loans were granted for a total of over EUR 887 million. All in all, since it started the market investments programme has funded more than 623 900 investment projects for renewable energy exploitation. The EUR 887 million in aid handed out has generated a total investment volume of almost EUR 6.5 billion since the programme started in 2000, including some EUR 3.9 billion for solar collectors and EUR 1.5 billion for small biomass plants. The funding rates for the market incentives programme were last changed in January 2007.

## **3. Sales of biofuels and other renewable fuels in Germany in 2006**

In 2006 the proportion of biofuels in total fuel consumption in Germany accounted for around 6.3%, relating to energy content. Hence Germany had already achieved well in excess of its goal of increasing the proportion of biofuels to 5.75% of total fuel consumption by 2010.

By type of biofuel, biodiesel once again achieved by far the greatest market potential in 2006, while use of bioethanol and vegetable oil also climbed steadily. The exact quantities are shown by fuel type in the following table.

Note that in the period from January to July 2006 vegetable oil and biodiesel were not recorded separately in statistics given the identical tax rates. Hence the biodiesel quantity quoted for 2006 also contains a certain amount of vegetable oil. Approximate biodiesel consumption minus this – estimated – vegetable oil share was hence around 2.5 million tonnes in 2006 and vegetable oil consumption around 1.08 million tonnes.

The figures for biofuels sold in 2006 were taken from the petroleum and energy tax statistics (the Federal Statistical Office will probably submit revised figures in summer 2007). This data corresponds to the quantities for which in 2006 an application was made for tax relief.

### **Table:**

Fuel use in the transport sector in Germany in 2006 (sources: Petroleum tax statistics January - July 2006 [vegetable oil sold in this period is included in the statistics as a result of joint recording under biodiesel], petroleum tax statistics additional notifications [submitted from August to December 2006], energy tax statistics August-December 2006. Added biofuels have been subtracted from fossil fuels and are shown separately together with biofuels.)

	Quantity (1 000 t)	Quantity (1 000 t <sup>3</sup> )	Energy content (MJ/l)	Energy content (TJ)	% of energy content
<b>Fuel consumption</b>	<b>51 385</b>	<b>62 953</b>		<b>2 303.3</b>	
Petrol	22 191	29 588	32.487	961.0	41.72
Diesel fuel	29 194	33 365	35.87	1 196.8	51.96
<b>Biofuels</b>	<b>4 029</b>	<b>4 625</b>		<b>145.5</b>	<b>6.32</b>
These include:					
Biodiesel*	2 481*	3 246	32.65	106.0	4.6
vegetable oil*	7 11*	773	34.59	26.7	1.16
Bioethanol*	4 78	605	21.06	12.8	0.55

In the case of the 2.8 million tonnes of biodiesel recorded for 2006, it should be noted that until August 2006 this also included vegetable oil. The Union for the Promotion of Oil and Protein Crops (*Union zur Förderung von Öl- und Proteinpflanzen e.V., UFOP*) and the Association for the Quality Management of Biodiesel (*Arbeitsgemeinschaft Qualitätsmanagement Biodiesel e.V., AGQM*) show **biodiesel consumption of 2.5 million tonnes** in 2006. The difference and the vegetable oil quantities recorded from August to December 2006 (711 000 tonnes) give **1.08 million tonnes vegetable oil consumption** in 2006.