

REPORT OF THE FINNISH MINISTRY OF TRADE AND INDUSTRY PURSUANT TO DIRECTIVE 2003/30/EC ON THE PROMOTION OF THE USE OF BIOFUELS OR OTHER RENEWABLE FUELS FOR TRANSPORT IN FINLAND

Introduction

In compliance with Article 4(1) of Directive 2003/30/EC of the European Parliament and of the Council on the promotion of the use of biofuels or other renewable fuels for transport, Finland has prepared this report on

- the measures taken to promote the use of biofuels or other renewable fuels to replace diesel or petrol for transport purposes,
- the national resources allocated to the production of biomass for energy uses other than transport,
- the total sales of transport fuel and the share of biofuels and other renewable fuels placed on the market for the preceding year, and
- Finland's national indicative target for the minimum proportion of biofuels and other renewable fuels in 2005.

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

Taxation

Under the Fuel Tax Directive (92/81/EEC), Finland has granted partial relief from excise duty for biofuels intended for research and testing. Two projects are currently under way where the duty on bioethanol in a fuel blend of petrol and bioethanol has been reduced by € 0.30 per litre. The deadline for these projects is 31 December 2004. The parties involved have not applied for an extension of the projects. So far no tax reductions have been granted pursuant to the Energy Tax Directive (2003/96/EC), which came into force on 1 January 2004.

According to Article 15 of the Energy Tax Directive, natural gas and LPG can be exempted from tax when used as motor fuel. This Article is also deemed to cover biogas consisting of methane. Biogas used as motor fuel is exempted from excise duty in Finland.

Research, development and marketing

The principal source of funding for technology development in Finland is the Technology Development Centre (Tekes). It finances projects through Technology Programmes and selective project financing. A great deal of research into the possibilities of crop production and the production and use of biofuels has been conducted in research institutes and universities as well as by companies during the past decades. Tekes' R&D funding is also available for projects which aim to develop more economical non-crop-based biofuel

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solutions. The raw material for these fuels consists mainly of harvesting residues, urban waste and biomass-based industrial residues.

The Ministry of Trade and Industry has granted investment aid (energy aid) for demonstration projects whereby the aim has been to produce liquid biofuels for use as both motor fuel and heating.

2. National resources allocated to the production of biomass for energy uses other than transport

Bioenergy is the most important renewable energy source in Finland, with abundant domestic raw material. The most important bioenergy sources are effluents produced by the wood industry, industrial timber residues such as sawdust and bark as well as forest chips and recycled fuels. Bioenergy is used for heat and power production for industry and society in general. Its use has increased by over 70% since the early 1990s and currently covers around 20% of total energy needs and around 10% of total electricity consumption. Bioenergy consumption in Finland in 2003 was approximately 287 PJ. There are currently around 400 plants using solid biofuels in Finland ranging in size from less than 1 MW to nearly 600 MW. The government has played an important role in promoting investments for these plants.

Finland aims to further promote the use of renewable energy sources. The growth targets are presented in the National Climate Strategy and its policy on the promotion of renewable sources of energy. The global target rate for increasing the use of renewable energy by 2010 has been set at 30% compared with 2001. In the long term, the aim is to increase the use of renewable sources of energy by two thirds of its current rate by 2025. Bioenergy, mainly wood, accounts for approximately 90% of this global target.

Measures taken and resources used to promote the use of bioenergy include the following:

Research and development

Tekes' major Technology Programmes in the field of bioenergy and other renewable energy sources are *Streams – Recycling Technologies and Waste Management 2001–2004*, *Wood Energy 1999–2003* and its sub-programme *Small-Scale Production and Use of Wood Fuels 2002–2004*, *DENSY – Distributed energy systems technology programme 2003–2007* and *ClimBus – Business Opportunities in the Mitigation of Climate Change 2004–2008*. In addition, bioenergy-related Technology Programmes have received selective project financing.

Tekes funded research on renewable energy sources in 2003 to the tune of €12 million, of which bioenergy accounted for €7.3 million.

Taxation

Fiscal incentives are built into the energy tax system to promote electricity production based on renewable energy sources. These subsidies apply to electricity produced from wind

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power, in hydroelectric power plants with a maximum nominal capacity of 1 MVA, and to electricity produced from wood and wood-based fuels, recovered fuel, biogas and wood chips. The basic subsidy is 0.42 c/kWh. To secure and improve the competitiveness of electricity produced from wind power and wood chips, it is subsidised at a higher rate of 0.69 c/kWh. The subsidy for electricity produced with recovered fuel is 0.25 c/kWh.

In 2003, the estimated subsidies for electricity production were as follows: electricity produced from wind power €0.8 million, electricity produced in small hydroelectric power plants €0.4 million and electricity produced from wood €28.4 million, of which wood chips accounted for €2.4 million. The estimated subsidies for electricity produced from biogas and recovered fuel were €0.1 million and €0.3 million respectively in 2003.

Aid for investments and other financing

The Ministry of Trade and Industry may grant energy aid to businesses and the non-corporate sector with the aim of promoting the use of renewable energy sources such as bioenergy as well as energy conservation and related projects promoting the marketing of new technology. In 2003, a total of €31.2 million was earmarked for energy aid, and the level of aid remains the same for 2004. In recent years the main beneficiaries have been projects promoting the use of wood as an energy source, followed by wind power.

Table 1 shows the details of the energy aid granted by the Ministry of Trade and Industry in 2003. The amounts include approximately €1.3 million from the European Regional Development Fund (ERDF).

	€ million	%
Use of wood for energy production		
Energy production	17.7	54.5
Production of wood based fuels	2.8	8.5
Wind energy	4.9	15.1
Other renewable energy sources		
Biogas	1.9	5.9
Production of fuels, recovered fuel	0.2	0.6
Small-scale hydroelectric power	0.3	0.9
Solar energy / heat pumps	0.1	0.3
Energy conservation and efficiency	2.9	8.9
Studies	1.7	5.3
Total	32.5	100.0

Aid for logging and chipping of fuel wood

The Ministry of Agriculture and Forestry financially supports the logging and extraction of wood sold for fuel from young forests managed according to the Act on the Financing of Sustainable Forestry. The aid for harvesting fuel wood is €7 per solid cubic metre. Chipping of fuel wood is also eligible for financial aid. In 2003, logging aid amounted to €3.24 million and chipping aid €0.61 million.

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3. Total sales of transport fuel and the share of biofuels, pure or blended, and other renewable fuels placed on the market

The total fuel consumption of the road transport sector has remained relatively stable since the early 1990s. During this time, the share of diesel oil has slightly increased and the share of petrol has correspondingly decreased.

The use of biofuels is not widespread and it has mainly been based on fixed-term pilot projects. The volume of bioethanol placed on the market in connection with these pilot projects totals approximately 9.5 million litres, of which 1.6 million litres in 2002 and 7.9 million litres in 2003. Bioethanol has been used in blends of 5% by volume with petrol. There have also been small-scale trials in Finland on the production of biodiesel and biogas for use as transport fuel, but the use of these biofuels is negligible in practice (only a few vehicles). In 2003 biofuels accounted for approximately 0.1 % of the total sales of transport fuels.

Table 2 below shows the consumption of transport fuels in 2000–2003, including the share of biofuels.

	Total fuel used in road transport vehicles (including non-road mobile machinery) PJ	Petrol PJ	Diesel oil PJ	Biofuels	
				PJ	%
2000	153.2	76.7	76.5	-	-
2001	155.9	77.8	78.1	-	-
2002	159.0	79.2	79.8	0.033	0.02
2003	161.5	79.6	81.9	0.165	0.1

Source: Statistics Finland

The transport sector accounted for approximately 20 % of Finland's carbon dioxide emissions in 2002. They amounted to approximately 12.6 million tonnes and are expected to remain at this level until 2010.

4. Finland's national indicative target for 2005

The Directive on the promotion of the use of biofuels or other renewable fuels requires the Member States to set a national indicative target for the minimum proportion of these fuels of the total sales of transport fuel. The reference values for these targets are 2% in 2005 and 5.75% in 2010 calculated on the basis of the energy content. The national targets may differ from these reference values, and the differentiation could be based on the following elements:

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- objective factors such as the limited national potential for production of biofuels from biomass,
- the amount of resources allocated to the production of biomass for energy uses other than transport and the specific technical or climatic characteristics of the national market for transport fuels,
- national policies allocating comparable resources to the production of other transport fuels based on renewable energy sources and consistent with the objectives of the Directive.

National potential for production of biofuels from biomass

Finland produces moderate quantities of ETBE from bioethanol for blending with petrol. Monthly production currently amounts to around 9 million litres. It is based on imported raw material and is subsequently exported. The aforementioned pilot projects were also based on raw material sourced from other European countries or further afield.

The production costs of arable crops in Finland are among the highest in Europe. Ethanol produced from Finnish raw material (usually barley) cannot compete with the high volume production of ethanol sold on the world market. The entire domestic production of turnip rape is used by the food industry. The current turnip rape acreage only supplies a part of the food industry's needs, and large quantities are imported. The widespread use of turnip rape for the production of biodiesel might endanger the food industry's supply. Production volumes are also limited by certain restrictions imposed by cultivation techniques such as crop rotation. The estimated potential for crop-based production of ethanol and biodiesel derived from domestic raw material is, in practice, almost negligible.

Among the different arable crops, reed canary grass has proved to be the most usable and most productive energy material in Finland. The technologies for its production and use already exist and could be employed for large-scale heat and power production and contract farming in areas adjacent to power plants. The acreage of reed canary grass is on the increase.

The supply of wood and waste-based raw materials in Finland is, in principle, sufficient for the energy market to produce biofuels at the target rate set for 2010. However, this new potential wood fuel supply is likely to be destined mainly for the purposes of combined heat and power production for the growing needs of industry and society in general. Furthermore, the production of liquid fuels from wood is still very much at the development stage, so by 2010 only a few pioneering demonstration plants might be in operation.

Amount of national resources allocated to the production of biomass for energy uses other than transport

The use of biomass as liquid transport fuel is less cost-effective than its use for other energy production because processing for transport use requires energy. With a view to reducing greenhouse gas emissions, the most cost-effective way to exploit bioenergy in Finland is combined heat and power production (CHP). The estimated cost of reducing carbon dioxide emissions by one tonne is €10-20/t CO₂ for CHP, whereas for biofuels derived from arable

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crops it is over €200/t CO₂. Using bioenergy to heat buildings is a slightly more expensive option than combined production, but still clearly more advantageous than using it as transport fuel.

The use of bioenergy for heat and power production in Finland is presented in point 2 above alongside the measures and national resources allocated for its promotion. Because the supply of biomaterial available at reasonable cost does not meet the potential demand, choices must be made as regards its use for the growing needs of the various types of bioenergy solutions or as a raw material for the forest industry. It is still more advantageous and cost-effective for Finland to increase the use and proportional share of biofuels specifically for heat and power production and to reduce emissions of greenhouse gases by these means. Increasing the use of biomass for the production of electricity is also indispensable in order to reach the target set for Finland in the Directive (2001/77/EC) on the promotion of electricity produced from renewable energy sources in the internal electricity market.

Finland's target for 2005

Given the low starting point of the use of biofuels for transport, the limited possibilities of producing biofuels from biomass and the drive to increase the use of bioenergy for heat and power production, Finland's national indicative target for the minimum proportion of biofuels in 2005 is set at 0.1 %.

Nevertheless, the importance of biofuels for transport may increase in the long term. New production technologies are being developed in many countries. Technological advances may make it possible to use new raw materials such as wood or waste-based raw materials for the use of biofuels and thereby to lower production costs. The trends in prices of crude oil in the coming years will also affect the profitability of transport biofuels.

A study on the scope for the production and use of biofuels for transport in Finland concludes that, according to optimistic estimates, the maximum proportion of transport biofuels (deriving from domestic raw material) in Finland could be around two per cent by 2010. This would require intensive government support for technological development, investment aid for production facilities and lower taxes and duties on fuel. However, setting a national target for the minimum proportion of biofuels for transport purposes in Finland for 2010 would hardly serve any purpose at this point. Long-term strategies and investments as regards the promotion of renewable energies and especially the different bioenergy options should be seen as a whole. It is currently being considered in the ongoing review of the Finnish national climate and energy strategy.