

## Measure 63: Promotion of biofuels in road transport

### First page:

*Policy package:*

**1D:** Road Safety, quality and environment

*Measure 63:*

Gradual introduction in each Member State of a minimum percentage of compulsory biofuel consumption: a 2% rate will be proposed as a first stage, of almost 6% by 2010 in a second stage.

*What is the problem being addressed ?*

Promotion of biofuels as well as of other renewable fuels will contribute to the objective introduced by the Commission's Green Paper: Towards and European Strategy for the Security of Energy Supply, fixing a target of 20% substitution by alternative fuels in the road transport sector by the year 2020 with the dual purpose of improving the security of supply and reducing greenhouse gas emissions. Indeed, the driving force behind long-term substitution of conventional diesel and gasoline is the need partly to improve the security of energy supply, partly to reduce the environmental impact, especially climate change, from the transport sector. Any long-term solution will, as a minimum, have to offer a reduction in oil dependency and a reduction in greenhouses gas emissions, compared to the most fuel-efficient vehicles running on conventional fuels. In addition, it must be required that such alternatives permit a continued reduction in emission of air pollutants from the vehicles. On the basis of these criteria, the Commission sees three main potential alternative ranges of fuels that could each be developed up to the level of 5% or more of the total automotive fuel market by 2020:

- Biofuels
- Natural gas
- Hydrogen

In addition, the technology of hybrid cars, combining combustion and electric drives, offers a degree of fuel saving comparable to what alternative fuels may offer. Measure 63 focuses first on biofuels, because this seems to be the most easy and effective alternative, which may manifest positive effects in the short-medium term. In principle biofuels offer an ideal alternative since, when based on EU grown crops, they are practically 100% indigenous and CO<sub>2</sub> neutral since their carbon content is captured from the atmosphere.

*Measure's costs and/or benefits:*

Although biofuels are presently the simplest alternative (e.g. if compared to hydrogen and natural gas) because they do not require large investment in new distribution systems and require only establishing plants to produce biofuels as the only "long-term" investment, they are on the other hand still expensive if compared to conventional fuels. Biodiesel – currently the most used biofuels – has a production cost of approximately EUR 500/1000 litres, against EUR 200-250/1000 litres for traditional petroleum based diesel including the refinery cost. In view of the fact that it takes 1100 litres of biofuels to replace 1000 litres of petroleum-based product, the economic calculation shows an additional cost of at least 300/1000 litres of diesel replaced by biodiesel. The additional cost is highly dependent on the crude oil price and the volatility of the market prices on petroleum products, as it is illustrated in the following table (source COM/2001/547 final – Explanatory Memorandum):

Crude oil price	"Extra cost" – 100% biodiesel
USD 20/barrel	EUR 350/1000-litre
USD 25/barrel	EUR 300/1000-litre
USD 30/barrel	EUR 250/1000-litre
USD 35/barrel	EUR 200/1000-litre

A significant increase in the use of biofuels will require action at EU level in view of these significant additional cost of biofuels, which are not so high at present levels of substitution but which will amount to more than EUR 5 billion annually with substitution moving above 5% (according to the same source: COM/2001/547 final).

*Legislative implementation at EU level:*

The minimum percentage of compulsory biofuel consumption has been implemented with the adoption of Directive 2003/30/EC of the European Parliament and of the Council of 8 May 2003 on the promotion of

the use of biofuels or other renewable fuels for transport. Member States will have to comply with this Directive by 31 December 2004. German, Sweden, Spain and Poland have complied with in the early months of 2004. Member States will report before 1<sup>st</sup> July each year on compliance with it. The possibility for Member States of introducing tax exemptions for biofuels have been implemented instead with the Council Directive 2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity (Article 16).

*What are the objectives ?*

Biofuels for transport could be marketed in the form of “pure” biofuels for dedicated vehicles or in the form of “blend” fuels in such proportion that it does not affect the performance of motor vehicles engines. Adopting both these modalities, the maximum road transportation fuel substitution through biomass is usually considered around 8% of present gasoline and diesel consumption if production of biofuels is restricted to 10% of agricultural land. It is difficult to assess today the availability of land for energy crops or biofuels by the year 2020 or beyond, and it should be borne in mind that several crops (rape, wheat, etc.) have a higher energy content than what is used for the biofuel and thus offers a broader renewable energy perspective than motor fuel substitute. However, whereas biofuels will hardly be seen as a long-term high volume substitute for motor fuels because of the limitation of available land, they deserve to be exploited in the short to medium term because they can be used in the existing vehicles and distribution system and thus do not require expensive infrastructure investment. Present consumption of biofuels is still below 0.5 % of overall diesel and petrol consumption, mainly in captive fleets that operate on pure biofuels, and supported through different tax exemption schemes. In this situation, promoting biofuels can be done through:

- Tax differentiation in favour of biofuels to make it competitive in the market
- Specifying a certain amount of biofuel in transport fuels sold

These were the specific objectives of Measure 63, although the first has been at the end implemented in the context of the Energy products Directive (see Measure 62). Tax incentives are an effective way of promoting the development of biofuels by helping, through suitable tax schemes, to reduce differences in production costs with fossil fuels. Taxation is made more effective by coupling it with the requirement for a minimum percentage biofuel of all fuel sold throughout the EU. As a first step to a long-term biofuel strategy the minimum biofuel share up to 2% will not have significant implications for vehicle technology or other environmental aspects than CO<sub>2</sub> reduction. However, it is expected to create a stable market, requiring to expand the existing biofuel production capacity by a factor 5 in Europe and allow for experience to be gathered before next steps on further expansion become effective.

*Interactions with other WP measures:*

Measure 63 is coupled with measure 62 - New rules on energy products, in so far as the latter has implemented one of the two specific objectives of the biofuels strategy, that is allowance for tax exemptions of biofuels. It can be linked also to measure 58 (Make the tax system more consistent by proposing uniform taxation for commercial road transport fuel by 2003 to round off the internal market), because tax exemption on biofuels as well as uniform taxation for commercial road transport should contribute to shift towards alternative fuels.

## Second page:

### *Output indicators:*

The key output indicators are:

- Production of biofuels in the Member States: currently only six Member States make any real contribution to the total European biofuel production (France, Germany, Austria, Italy, Spain, Sweden). A remarkable increase of 93% was recorded between the production of biofuels in 1997 and production in 1999, and the growth rates of individual countries for the last two years – 1998 and 1999 – are shown in the table below.

### **Biofuel production (kT):**

Country	1998	1999	Change
Austria	16	30 (2000)	+46.6%
France	319	344	+7.3%
Germany	100	130	+23%
Italy	96	96	=
Spain	0	50 (2000)	
Sweden	0	50 (2000)	

- Share of biofuels in total fuel consumption in the EU: this indicator will allow to monitor if the target of 2% uptake of biofuels in a first stage, and then of almost 6% by 2010, is being achieved.

### *Outcome indicators: intermediate impacts on transport markets*

The key market impacts will concern mainly the oil market and the agricultural sector:

- Oil substitution and crude oil prices: the strength of the oil substitution argument is difficult to quantify but nevertheless significant. By the same token, it is difficult to predict the effect of a single marginal reduction of oil demand on world oil prices. However, according to an estimate presented in COM (2001) 547, replacing 2% of EU diesel consumption with biofuel at an additional cost of EUR 250/1 000 litre would “cost” around EUR 1 000 million/year. The resulting 2% lower demand for OPEC oil would have a certain buffering effect on oil prices and the savings on the approximately 4 billion barrels of oil consumed annually in the EU could (partially) justify these additional costs. Moreover, the introduction of biofuels could be expected to have a modest effect in dampening the effect of changes in crude oil prices on prices paid by consumers. For example, if a EUR 10 rise in the price of a barrel of oil results in an increase in the price at the pump of 10 cents per litre, blending in 5% biofuels could be expected to limit this price rise to 9.5 cents, assuming that the prices of biofuels themselves were not significantly affected by the rise in crude oil prices.
- Agriculture production: increased production of raw materials for biofuels will contribute to the multi-functionality of agriculture and provide a stimulus to the rural economy through the creation of new sources of income and employment. Biomass can be directly processed from raw material or be the residue of another process (secondary biomass). The overall impact will depend on how the raw material is used and disposed of, and what the possible by-products and residues are. In many cases in the agri-food and forestry industry biofuels could turn problematic waste production into a sustainable product. Creating an EU market for biofuels will also offer an opportunity for the New Member States and Candidate Countries. On average they have more agricultural land and less diesel and gasoline consumption per capita than EU15 Member States.
- Employment: biofuels are relatively labour-intensive, especially in rural areas during the exploitation phase. Although precise numbers of job creation are difficult to evaluate, different studies agree on the scale. The German study performed by the Fraunhofer Institute (1996) showed the rate of economic impact to be 16 employees per ktoe/year. The Spanish national plan for biofuels puts the figure at 26 employees per ktoe/year of biofuels produced. Extrapolation of these results would lead to the conclusion that a biofuel contribution of around 1% to total EU fossil consumption would create

between 45000 and 75000 new jobs, mostly located in rural areas.

*Outcome indicators: final impacts on transport users and non users*

The main impacts of the measure will concern the environment:

- Transport CO<sub>2</sub> emissions: avoidance of CO<sub>2</sub> emissions from biofuels depends on the way it is produced. CO<sub>2</sub> emissions from fossil diesel is around 3,2 tonnes CO<sub>2</sub>/100-litre (including CO<sub>2</sub> emissions from production, transport etc.). However, even though CO<sub>2</sub> emissions from biofuels is neutral in principle, actual CO<sub>2</sub> avoidance is less than 3,2 tonnes because of the emissions produced in the process of growing the crops and the conversion of raw material into biofuels. For instance, realistic CO<sub>2</sub> saving for biodiesel is around 2 to 2,5 tonnes CO<sub>2</sub>/1000-litre. If there were no other benefits (e.g. in the agriculture sector and in the security of supply) this would mean that at oil prices around USD 25 /barrel and current biofuel production costs the cost of CO<sub>2</sub> avoidance would be in the range of EUR 100 to EUR 150/tonne CO<sub>2</sub>, which is above the range for cost-effective measures to meet the EU's commitments during the first Kyoto commitment period.
- Transport emissions of other air pollutants (CO, NO<sub>x</sub>, VOC and particulate): it has been claimed that biofuels are attractive because they generate fewer "conventional" car emissions. However, with conventional gasoline and diesel becoming virtually sulphur and lead-free and with emission norms being tightened to more than 90% reduction of most conventional emissions, biofuels will offer in theory little, if any, emission advantage over gasoline and diesel in the future.