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**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN
PARLIAMENT, THE COUNCIL, THE ECONOMIC AND SOCIAL COMMITTEE
AND THE COMMITTEE OF THE REGIONS**

**on alternative fuels for road transportation
and on a set of measures to promote the use of biofuels**

Proposal for a

DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

on the promotion of the use of biofuels for transport

Proposal for a

COUNCIL DIRECTIVE

**amending Directive 92/81/EEC with regard to the possibility of applying a reduced rate
of excise duty on certain mineral oils containing biofuels and on biofuels**

(presented by the Commission)

**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN
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1. INTRODUCTION

Oil production in the EU has been on the increase over the last decade, due to the success of exploration in the North Sea. At the same time oil consumption has remained almost unchanged, primarily due to the phasing-out of oil as an energy source for non-transportation uses, thus compensating for strong growth in transportation oil consumption. In the coming twenty to thirty years EU production is expected to decline, whereas consumption will increase as substitution possibilities will be exhausted and transport demand is likely to continue to grow.

During the coming decades of increased import dependency world oil demand is also expected to show strong growth and the global distribution of known oil reserves leaves the Middle East OPEC members as the only possible suppliers to this increased demand.

In addition, this scenario is out of step with the recognised necessity of reducing global greenhouse gas emissions and particularly with the Kyoto commitments for industrialised countries to initiate their reduction programmes over the coming decade.

This is the backdrop against which the Commission's Green Paper: Towards an European Strategy for the Security of Energy Supply introduces the objective of 20% substitution by alternative fuels in the road transport sector by the year 2020 with the dual purpose of improving security of supply and reducing greenhouse gas emissions.

This objective poses a challenge well beyond what has been asked from the car and oil industry in the past such as drastic reduction of emissions of conventional air pollutants, virtual elimination of lead and sulphur from automotive fuels or significant improvement of fuel efficiency against developments that would otherwise have led to increased fuel consumption.

Any radical changes in fuel supply or engine technology for road transport faces a number of problems. The population at large has got used to having at their disposal a car that has over the years become very cheap as has the fuel (particularly when compared to disposable income). Refuelling is necessary only for every 4-600 km (or more) available everywhere and done in a few minutes. The car serves purposes from short distance shopping by one person in the local supermarket to taking the family on the annual (or semi-annual) holiday to the other end of Europe. In addition virtually no safety restrictions exist for parking or otherwise placing the car in spite of it carrying a large amount of highly flammable liquid. Few people would be ready to compromise much on any of the advantages offered by today's car.

Freight transport has different criteria. As an economic sector subject to strong internal competition, cost and reliability are key factors. Any alternative fuel or engine technology will have to be made competitive in order to penetrate the market. On the other hand, long

distance road transport is a single functional activity and refuelling points need not to be as close together as for passenger transport. However, their geographical coverage (throughout Europe) is essential.

The penetration potential for any alternative fuel for the future has to be evaluated against these criteria. Different alternatives will require different types and levels of investment in infrastructure and equipment. Replacing a few percent of diesel or gasoline with biodiesel or ethanol is the simplest, establishing plants to produce such alternative fuels being the only “long term” investment. Fuel cells fuelled by hydrogen are the most complicated alternative, requiring alternative engine technology, as well as large investment in plants to produce the hydrogen and a totally new distribution system. Shifting to a hydrogen-based transport system is a major decision, which will only make sense as part of a large-scale, long-term strategy, in principle extending even beyond the EU.

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 greenhouse gas emissions, compared to the most fuel-efficient vehicles running on conventional fuel. In addition, it must be required that such alternatives permit a continued reduction in emission of “conventional” air pollutants from the vehicles.

The combined requirement of comfort and performance of the car, security of supply of the fuel, low environmental impact and high level of safety and continued low overall cost of driving can in no way be fully met at any time. Future policy development will have to give higher priority to security of energy supply and fuel efficiency (lower greenhouse gas emission). An economic growth rate of 2-3% annually allows sufficient margin for transport cost to increase moderately for those who are not prepared to accept a reduction in car size or performance. This is particularly important in a transition period allowing for a change to a more sustainable transport sector. Penetration of any new transport technology is fundamentally dependent on broad availability of the fuel. Establishing an area covering fuel supply systems is very expensive and only justified if there is a sufficiently high demand, i.e. penetration. This “chicken and egg” situation makes any take-off difficult and implies that only on a sufficiently large level such as the EU-wide level is it realistic to imagine the introduction of alternative fuels with significant market shares.

On the basis of the consideration mentioned above 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. These alternative fuels and technology are described below, along with other alternatives that do not look quite so promising yet, but might offer more limited contributions.

The present communication does not set out to deliver the definitive answers to the challenges outlined above. It does, however, try to identify an approach to be followed during the coming

years necessary to allow the EU to achieve the medium-term goals of 20% substitution of conventional automotive fuel by 2020 and to do it in a way that sets the direction for the development of road transport systems in the decades following 2020.

2. THE OPTIONS

2.1 Motor vehicle fuel efficiency

Whereas fuel efficiency as such is not the scope of this communication it must be stressed that any cost-effective strategy to reduce oil dependency and CO₂ emissions from the transport sector will have fuel efficiency as its top priority. This has been officially recognised as part of the EU Strategy to reduce emissions and improve fuel economy since the Council's adoption in 1996 of a CO₂ emission target of 120g CO₂/km for new cars by 2005 and 2010 at the latest¹, corresponding to an average 35% reduction in fuel consumption of new cars compared to the 1995 level. This strategy has since been mainly implemented through the commitment of the European (ACEA) and Japanese (JAMA) and Korean (KAMA) Car Manufacturers to achieve a maximum 140 g CO₂/km by 2008 (2009 for JAMA and KAMA), a commitment corresponding to a fuel efficiency of about 5.8 litre/100 km for gasoline and about 5.3 litre/100 km for diesel. The target of 140 g CO₂/km has to be achieved mainly by technological developments and market changes linked to these developments. It should be mentioned that within the monitoring of the commitment only the direct CO₂ emissions of the vehicle are taken into account. The share of biofuels used has therefore no direct repercussion on the commitment.

There is reason to believe that applying and further developing existing technology will allow higher fuel efficiency to be achieved in a cost-effective overall strategy. The ACEA commitment will be reviewed in 2003 when the Commission will also seek commitments from the car industry covering the years beyond 2008 in addition to the planned monitoring of progress versus the 2008 target.

In addition, the Commission has initiated talks with the car industry on how to ensure improved fuel efficiency of the categories of cars not covered by existing agreements. Particularly, light commercial vehicles including "sport utility vehicles" not covered by the existing agreement are addressed in this connection.

If evaluated against a certain percentage of substitution with alternative fuels, fuel efficiency improvements offer an advantage beyond what is offered by the measures in their own right. It reduces the overall amount of fuel to be substituted, and since alternative fuels are more costly, this will help to keep the overall cost down. That said, probably much more important in the global picture is the effect world-wide of a strong European drive in car fuel efficiency. European car manufacturers are actively involved in car production in several important emerging markets (China, Latin America) which nationally have strong reason to limit their future dependence on imported oil. The benefit for all economies depending on imported oil, including the EU, of easing pressure on the global oil market becomes an important priority in a period of expected increased dependency on imported oil. This issue will be taken up by the Commission as a priority in the Trans-Atlantic Dialogue.

¹ Environment Council of 25.6.1996

2.2 Biofuels

Ever since the first oil crisis in 1973, biomass has been considered – and in some cases promoted – as an alternative to fossil fuel as a source of energy. Particular attention has been given to the potential of using biomass as the basis for production of alternative motor vehicle fuel (diesel or gasoline) because of the transport sector's almost exclusive dependence on oil.

Biological material can be used as fuel for road transport in several ways:

- Plant oils (colza, soybean, sunflower, etc.) can be converted into a diesel substitute which can either be used in a mixture with conventional diesel or burnt as pure biodiesel.
- Sugar beets, cereals and other crops can be fermented to produce alcohol (bio-ethanol) which can either be used as a component in gasoline, as motor fuel in pure form, or as a gasoline component after being converted to ETBE through reaction with isobutene (a refining by-product). There is reason to believe that future developments will also make it possible to produce economically competitive bio-ethanol from wood or straw material.
- Organic waste material can be converted into energy which can be used as automotive fuel: waste oil (cooking oil) into biodiesel, animal manure and organic household waste into bio-gas and plant waste products into bio-ethanol. Quantities are limited in most cases, but raw materials are free and waste management problems (+cost) will be reduced.
- Technological progress indicates that in the medium term, other liquid and gaseous biofuels produced by thermochemical processing of biomass such as biodimethylether, biomethanol, biooils (pyrolysis oils) and hydrogen could become competitive.

In principle biofuels offer an ideal alternative since, when based on EU grown crops, they are practically 100% indigenous and CO₂ neutral since their carbon content is captured from the atmosphere.

On the other hand, biofuels are expensive (300€ or more in additional cost per 1000 litre conventional fuel replaced) and the direct and indirect energy consumption during growing the crops and producing the fuels means that up to half, or more than half, of the CO₂ benefit is offset in the production process for biodiesel and bio-ethanol respectively. This disadvantage can be reduced by fuelling the production process with waste material from the crops (straw), but this will tend to increase the additional cost.

The 300€/1000 litre additional cost is based on present oil price levels (approx. 30€/barrel). It would take an oil price around 70€/barrel to make biofuels break even with conventional petroleum-derived diesel and gasoline.

The maximum road transportation fuel substitution through biomass is usually considered around 8% of present gasoline and diesel consumption if production of biofuels were 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. In addition

these crops deliver protein rich feedstuff as a by-product. Currently the EU is importing around 30 Mio tons of oilseeds p.a. mainly for animal feedstuffs.

Creating an EU market for biofuels will also offer an opportunity for the Candidate Countries. On average they have more agricultural land and less diesel and gasoline consumption per capita than present EU Member States. Growing crops for biofuels will facilitate the absorption of the agricultural sector of the new Member States in the Common Agricultural Policy.

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 gasoline consumption, mainly in captive fleets that operate on pure biofuels, and supported through different tax exemption schemes.

A significant increase in the use of biofuels will require action at EU level in view of the significant additional cost of biofuels, which are not so high at present levels of substitution but which will amount to more than 5 billion € annually with substitution moving above 5%.

Promoting biofuel can be done through different ways of overcoming the higher cost of biofuels:

- (a) Supporting the non-food agriculture sector.
- (b) Tax differentiation in favour of biofuels to make it competitive in the market.
- (c) Specifying a certain amount of biofuel in transport fuels sold

Agriculture policy

The Commission sees little scope for large scale biofuel production under the existing system of set-aside land, in that the current agreement with the US (Blair House Agreement) implies various limitations for support of rapeseed, soybean and sunflower . Furthermore, public opinion will not be supportive of a biofuel campaign that would be seen as additional agricultural subsidies (whether justified or not). Finally, the Berlin ceilings on the budget simply would not allow additional support for agricultural products.

Taxation measures

Tax incentives could provide an effective way of promoting the development of biofuels by helping, through suitable tax schemes, to reduce the differences in production costs with fossil fuels. That said, the potential for different tax schemes presented by the current legislation² is still held in check to some extent by the

² For the member States to implement measures to reduce or exempt excise duty on my own fuels directive 92/81/EEC provides for two possibilities:

- one, Article 8(2)(d) provides that "Without prejudice to other Community provisions, Member States may apply total or partial exemptions or reductions in the rate of duty to mineral oils used under fiscal control: in the field of pilot projects for the technological development of more environmentally-friendly products and in particular in relation to fuels from renewable resources"

objectives of the smooth functioning of the internal market, controlling distortion of competition, legal certainty for operators and the Member States and faster development of sectors.

The Commission and the Council therefore have to adopt a plain and transparent framework in order to reduce excise duty on biofuels under fiscal control. This need was already recognised in 1992 in the "Scrivener"³ proposal for a directive on biofuels of agricultural origin, and then again in 1997 in the proposal for a Council directive on the restructuring of the Community framework for the taxation of energy products,⁴ Article 14(1)(b) and (c) (biomass and waste) of which gives Member States the option of reducing and/or exempting excise duty on biofuels. The Scrivener proposal was not unfortunately adopted by the Council⁵ and the 1997 proposal has been before the Council since it was tabled.

Taxation as a tool is often made more effective where tax relief measures form part of a coherent system of technical, regulatory and economic measures. This will happen when two proposals for directives are established jointly, one to make the sale of a certain percentage of biofuels obligatory in the Member States, the other giving Member States a flexible economic instrument for implementing the first proposal, and even going beyond its objectives.

Biofuel Requirement in Marketed Transport Fuel

A requirement for a certain minimum percentage biofuel of all fuel sold throughout the EU can be implemented without technical complications and the (modest) costs of such a measure will be shared by all users. As a first step to a long-term biofuel strategy a minimum biofuel share up to 2% will not have significant implications for vehicle technology or other environmental aspects than CO₂ reduction. However, it would create a stable market, require expanding 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. The Commission believes that the simplest way of promoting large-scale biofuel penetration in the long term would be through obligatory blending of a certain percentage of biofuels into gasoline and diesel marketed throughout Europe. This solution requires no modification of existing vehicles and it takes advantage of the existing distribution system with practically no additional cost. Such an approach, however, would not recognise the existing differences in agriculture production of raw materials that in some parts of Europe would favour more the diesel substitutes and in other parts alcohol-based components. Moreover, many existing schemes have been based on the pure and/or mixed biofuels in captive fleets, often through local agreements between producers and municipalities or regions.

Therefore, in order to allow large-scale introduction of biofuels in the most cost-effective way while at the same time maintaining the momentum given through the

- two, Article 8(4) lays down that "The Council, acting unanimously on a proposal from the Commission, may authorise any Member State to introduce further exemptions or reductions for specific policy considerations".

³ Proposal of 19.02.1992 (COM(1992) 36, as published in JO C/92/73, p. 6), as amended on 01.07.994 (COM(1994) 147.

⁴ COM (1997) 30, 12.03.1997.

⁵ Proposal withdrawn by the Commission in 1999.

visibility of local, pure biofuels schemes, the Commission believes that the following approach offers the desired solution:

In a first phase there should be a general overall commitment for Member States to ensure that a certain percentage – increasing with time – of the transportation fuel sold on their territory will be biofuel. Such a measure will achieve the double objective of ensuring a certain quantity of fuel substitution and allowing the necessary flexibility to continue existing and planned projects at local or regional level. In a second phase, as dedicated uses of biofuels will only be able to absorb a limited quantity, further substitution above 5% will necessarily take the form of a required blended amount of biofuels in each type of fuel marketed.

2.3 Natural Gas

Natural gas consists primarily of methane (CH₄) and can be used as a motor fuel in a conventional gasoline engine. However, it requires special storage and injection equipment and large-scale use of natural gas as a motor fuel would have to be based on cars specially built for natural gas rather than on retrofitting existing gasoline vehicles.

Natural gas as a motor vehicle fuel will have to be kept either under high pressure (200 bars) or in liquefied form at -162°C in order to allow vehicles to carry fuel for a sufficient range (+ 400 km) between refuelling. The high-pressure solution is most likely to be the technically preferred option.

The technology is fully developed and proven. In Italy 300 000 vehicles run on natural gas provided through a network of 300 refuelling points. In addition 50 000 more vehicles throughout Europe operate on natural gas. These vehicles normally operate in a limited geographical area and refuel at one or a few dedicated points.

Natural gas has great potential in principle as a motor fuel. It is a cheap alternative fuel, has a high octane number, is clean and has no problem in meeting existing and future emission standards. It offers potential for a 20-25% lower CO₂-emission than the energy equivalent amount of gasoline, although no significant CO₂ advantage over the more efficient diesel engine. When used in buses, natural gas offers a most welcome noise reduction in cities.

Since gasoline and natural gas will both be imported to a large extent in the future, there is no overall security of supply advantage from natural gas. Increased use of natural gas would, however, move the dependency away from the oil market, normally seen as an advantage. By and large natural gas resources are more evenly distributed world-wide than oil resources, but making them available is more difficult. Any decision on a large-scale move to natural gas as a transportation fuel would have to include a serious analysis of the security of supply aspects. An initial move to 5 or 10% of transport fuel being covered by natural gas appears to be of minor concern from a security of supply view.

Methane is a powerful greenhouse gas. The theoretical CO₂ advantage over gasoline would disappear with just a few percentage point losses of methane during distribution, storage or refuelling. Experience from existing fleets indicates that the real CO₂ advantage is 15-20% rather than the theoretical 20-25%. Extended use of natural gas must include measures to minimise losses. It should furthermore be noted that if natural gas replaces diesel, the advantage is smaller due to the higher efficiency of the diesel engine. The energy used for compressing the natural gas to 200 bars represents an additional 4% energy loss.

Carrying compressed natural gas necessitates appropriate safety measures. The fact that natural gas is lighter than air and has a narrow flammability range and a high auto-ignition temperature makes it less dangerous than gasoline and LPG, and it appears possible to let natural gas vehicles to access anywhere where gasoline vehicles are allowed. Establishing a sufficient infrastructure for areas covering natural gas supply for motor vehicles will be moderately costly, benefiting from the existing natural gas distribution system throughout the EU. A recent study proposes an additional 1450 refuelling stations in order to create a proper EU refuelling network at a total investment cost of around €800m.

2.4 Hydrogen

Hydrogen has been the subject of intensive research as a potential fuel for motor vehicles during recent years. This is mainly due to the requirements of US legislation for car manufacturers to start introducing “Zero Emission Vehicles” onto the market. Hydrogen used in fuel cells, where the only “combustion product” is water, offers such a possibility.

Use of Hydrogen as a motor fuel is not restricted to fuel cells. Hydrogen is a perfect fuel for a conventional gasoline engine. Due to the much lower cost of the combustion engine relative to the fuel cell this would seem to be the preferred option until future development has reduced significantly the cost of fuel cells and/or improved their energy conversion efficiency. Used in combustion engines, hydrogen gives rise to the formation of NO_x which, however, since it is the only pollution formed, can be almost totally decomposed without too much of a problem. Several large car manufacturers are already investing heavily in hydrogen/fuel cell technology and provided that projected development brings the production cost down by a factor of 10 or more for the fuel cell systems, one can expect series production lines of hydrogen-powered passenger cars in 3-4 years.

It must be stressed, however, that hydrogen is not an energy source but an energy carrier. Whereas it is regularly stated that hydrogen can be derived from water, correctly in a purely chemical sense, this is totally irrelevant. Any generation of hydrogen requires sources of energy, in exactly the way as the other major energy carrier, electricity.

Like for electricity, the advantage of using hydrogen as a fuel, as far as security of supply or greenhouse gas emission is concerned, depends on how the hydrogen is produced. If produced with coal as an energy source, it adds to security of supply but gives rise to higher CO₂ emissions. If produced by non-fossil fuel (nuclear or renewable), it adds to security of supply and reduced CO₂ emissions, but only in so far as the non-fossil fuel source is additional to what would otherwise be used in electricity production. This means that any assessment of the virtues of switching to hydrogen as a transportation fuel involves a number of assumptions on long-term future energy policy developments, which are for the time being quite uncertain.

Hydrogen as a future large-scale energy carrier has the advantage (like electricity) of allowing generation from any imaginable source of energy and (unlike electricity) of allowing storage over time. It will however have to compete with future electricity generation from the low-carbon (natural gas) or no-carbon (nuclear, renewable) energy sources, and thus only offer an advantage if the production of hydrogen is based on additional non-carbon energy resources and/or on additional natural gas supplies. In the latter case, it still remains to be shown whether direct use of natural gas as transport fuel or conversion to hydrogen and subsequent use in a fuel cell offers the biggest overall advantage.

Large-scale production of hydrogen from natural gas or from electricity via electrolysis are fully developed industrial processes with little scope for significant technological

breakthroughs or cost reductions. The full advantage of hydrogen as an energy carrier is that it offers a flexible link with buffering capacity to a decentralised non-fossil fuel-based energy market. Pipeline distribution of hydrogen is also a well-proven technology. The establishment of a broad distribution network is only dependent on a sufficiently large customer base. Until such point in time distribution via tanks to filling stations seems a more likely alternative.

Storage of sufficient quantities of fuel in the car is another problem that has not yet found a satisfactory solution. Because hydrogen only has 30% of the energy content of natural gas on a volumetric basis, the gas container(s) needed to store a sufficient quantity becomes very large and heavy. Different techniques are being researched on board storage of hydrogen but so far none have seriously challenged high-pressure (up to 350 bars) containers.

In conclusion, it is obvious that the potential advantages of hydrogen as a motor fuel will only be achieved after further successful technological development of hydrogen storage and fuel cell technology and after costly investment in hydrogen production and distribution facilities. Whereas other alternative fuels can be applied on the basis of one or several of either existing vehicles (bio-fuels), available fuels (natural gas), or available distribution infrastructure (biofuels and partly natural gas), hydrogen/fuel cell technology requires everything to be developed or established from scratch. Beyond discussion, this is the most challenging alternative to the conventional gasoline or diesel powered car and it is widely assumed that hydrogen as a motor fuel will still take a number of years to take off on a full commercial scale.

Further progress in hydrogen and fuel cell related technologies could emerge from the hundreds of millions of € invested by the car industry and supported through the EU framework programmes on RTD. Accelerated market introduction will gradually become more extensive. The Commission is for the time being co-financing a large demonstration project with 30 hydrogen-powered buses in 10 cities throughout Europe in order to help gain practical experience in this new technology. Broad commitment from EU governments to assist financially in the introduction of hydrogen-powered vehicles would provide much needed support for the further development of this technology.

2.5 Other fuels and/or technologies

- a. **Electric cars** have been commercially available for a number of years but have not managed to attract much consumer interest. The size and cost of the batteries, relative to the energy carried, seem prohibitive for producing a car of sufficient size, power and range between recharging at a price that the buyer would be willing to pay. In addition, the slow recharging of batteries, normal over night, is considered to be a disadvantage by potential buyers.

Expectations of a breakthrough development in battery technology, necessary to make the electric car appealing to a larger segment of buyers, seem to have declined during recent years. Electric cars may still have a niche market for short-distance transport purposes, where no noise and no emissions are essential. Unless a breakthrough in battery technology changes the scenario, the Commission sees little prospect in maintaining the electric car on the list of candidates for high-volume marketable alternative vehicles.

- b. **Hybrid cars**

Although not representing an alternative fuel, hybrid cars seem to be one of the possible alternative technologies for the near future.

The hybrid car is designed to take advantage of the best elements of the gasoline (or diesel) engine and of the electric car, while at the same time avoiding their disadvantages.

A hybrid car has two “engines”, a combustion engine and an electric motor. Depending on driving circumstances (load factor, acceleration) the car automatically switches to the most efficient mode.

Because of the semi-continuous loading of the batteries during driving, these can be much smaller (and cheaper) than in an electric car. The two engine systems, and other technical sophistication, such as regenerative braking, however, increase the cost (and weight) of the car. Until now the relatively few hybrid cars on the market have been heavily subsidised. It is difficult to say whether high-volume production would bring the price down to or in the neighbourhood of levels where the fuel savings would justify the extra cost. Fuel savings obviously depend on the circumstances under which the car is used. A 30% reduction in fuel consumption is often quoted by the manufacturers of hybrid cars, a reduction level which is only achievable in urban traffic with frequent braking and acceleration and the engine operating at low load for much of the time. Constant driving at high speed in a hybrid car offers no advantage compared to a traditional car.

- c. **Methanol and Dimethylether (DME)** are both potential alternative fuels, derived normally from natural gas. Methanol can be used in a gasoline engine, DME as a substitute for diesel.

Methanol offers few advantages over natural gas, apart from being a liquid and therefore easier to hold in the car. The energy loss in the conversion of methane to methanol results in lower overall efficiency and higher overall CO₂ emissions than natural gas when used directly as fuel. In addition, the high toxicity of methanol makes it less attractive as a motor fuel. DME has physical properties like LPG; it is a gas at ambient temperature but it liquefies under a pressure of a few atmospheres. Being a diesel fuel, it offers higher efficiency than fuels for gasoline engines, enough in fact to compensate for the energy loss in the conversion process from natural gas. For these reasons, DME burnt in a diesel engine is close to natural gas burnt in a gasoline engine as far as oil replacement and CO₂-emission advantages are concerned.

DME, because it is easily liquefied, offers the possibility of commercialising sources of natural gas that cannot justify investment in pipeline transportation because they are too small and/or too remote. An additional advantage of DME is that it burns cleaner than diesel and poses less of a problem for emissions control equipment. For this reason, it has attracted the interest of truck and bus manufacturers.

It would be difficult to justify large-scale Community support for methanol or DME, but the Commission will monitor the commercial development, both inside and outside the EU.

- d. **Diesel fuel produced from natural gas** via the so-called Fischer Tropsch synthesis appears to be a promising addition to conventional diesel. It is particularly attractive in places where there is no market for the natural gas close to the production site.

The conversion of natural gas into diesel goes via several conversion steps with significant energy consumption and corresponding CO₂ emissions. Consequently,

there is no CO₂ advantage linked to Fischer Tropsch Diesel. There is however a security of supply advantage since it broadens the range of supply possibilities for motor vehicle fuel and the diesel produced from natural gas has very good blending properties (cetane number), giving it a high value.

- e. **Liquefied Petroleum Gas** (LPG) has been used as an automotive fuel for decades. LPG originates from refining of oil and as “natural gas liquids”, a fraction separated from the methane during natural gas production. Quantities depend on crude oil type, the type and degree of refining and on the specificity of individual gas fields. It can be debated to what extent LPG should be considered a “real” alternative fuel.

LPG is cheap and traditionally seen as an environmentally friendly fuel. However, with gasoline and diesel becoming much cleaner than in the past, this advantage is rapidly diminishing.

Certain quantities of LPG are needed as a raw material in the chemical industry and for other specific purposes. Conventional gasoline also contains butane (an LPG component) in quantities as high as vapour pressure limitations permit. Deliberate production of LPG from heavier petroleum fractions makes no sense, neither from a security of supply nor environmental perspective. The challenge therefore is to make sure that “naturally” available LPG will be used as a motor vehicle fuel rather than as refinery fuel or other low-value energy source.

There is reason to believe that more sophisticated refinery processing and increased production of natural gas will increase the availability of LPG in the future. This may allow a limited increase in LPG used as motor fuel. The Commission will monitor the situation and take appropriate steps where potential quantities of LPG are ignored by the car industry or consumers

3. CONCLUSIONS

Out of numerous possible alternative fuels and engine technologies the following three options would appear to have high volume potential (each more than 5% of total transport fuel consumption) over the next 20 years:

- biofuels
- natural gas
- hydrogen/fuel cells

Concerning the alternative fuels, an “optimistic development scenario” at this stage might look like the following (not excluding other possibilities such as DME):

Year	Biofuel	Natural gas, %	Hydrogen, %	Total, %
2005	2			2
2010	6	2		8
2015	(7)	5	2	14
2020	(8)	10	5	(23)

As regards the above figures for biofuel it should be pointed out that the 2% in 2005 results from the assumption that the current situation in the Member State that are most advanced in this field can be extrapolated to the other Member States. The 6% in 2010 presumes an active policy in promoting biofuels and is based on the available potential in agriculture and waste treatment. For the application of natural gas a new distribution infrastructure must be established and a change of vehicles will be necessary. As it is unlikely that existing vehicles will be adapted at a large scale this means that the gradual introduction of this alternative fuel depends on the sale of new adapted vehicles. Therefore 2% in 2010 and 5% in 2015 seems an optimistic scenario based on active policy. For the introduction of hydrogen an additional issue is the production capacity, which makes it unlikely that a substantial market penetration will take place before 2015. In addition the production method is crucial for the environmental implications. It is obvious from the previous chapters that these figures represent no more than a rough guideline that will have to be adjusted in line with experience gained over the years to come. It allows some of the alternatives to be less promising while still achieving the 20% substitution target by 2020. As underlined in the text, any alternative fuel strategy has to be continuously monitored against developments in motor fuel efficiency. Successful implementation of a strong fuel efficiency regime makes high substitution percentages less necessary and may offer the most cost-effective CO₂ emission reduction and improved security of supply for quite a long part of the way.

In order to promote the development described above, the Commission will act according to the following plan of action:

1. Two Commission proposals are attached to this Communication. The first proposal concerns a Directive requiring an increasing proportion of all diesel and gasoline sold in the Member States to be biofuel, announcing, for a second phase, an obligation of a certain percentage of biofuels to be blended into all gasoline and diesel. The second proposal creates a European-wide framework allowing Member States to apply differentiated tax rates in favour of biofuels. It should be pointed out that the implications of a gradual introduction of biofuels are well-known and contrary to the introduction of natural gas or hydrogen there are no objective reasons for further delay. Biofuels are for the short and medium term the only option, therefore launching the appropriate policy instruments to promote the introduction of biofuels will give a clear signal that the Community is serious about developing alternatives to petroleum products in transportation.
2. The establishment of a formalised contact group to give advice on the further introduction of alternative fuels, particularly natural gas and hydrogen over the next 20 years.

For natural gas the group will recommend which types of vehicles would be foreseen (buses, trucks, taxis, all types of cars), which geographical areas (dependent on availability of natural gas and car intensity), how to establish refuelling stations and the necessary incentives, including questions related to fuel and vehicle taxation.

For hydrogen/fuel cells the group would analyse the feasibility of different concepts and suggest a strategy to clarify uncertainties while considering different scenarios for the energy mix to produce the hydrogen and their environmental implications. The steps necessary to allow at least 5% substitution by hydrogen by 2020 should be part of the strategy.

In addition, the contact group will advise on other potential alternative fuels as it sees relevant.

The contact group will be chaired by the Commission and include important stakeholders such as the car industry, the gas industry, the electricity industry and NGOs in its makeup. It will deliver its first report by the end of 2002 and regularly (e.g. every 2 years) thereafter. In accordance with this, the Commission will report regularly to the Council and Parliament, by mid 2003 for the first time.

3. Alternative fuels or technologies not directly covered by the action plan outlined above (LPG, DME, electric cars) will continuously be monitored by the Commission as part of its overall commitments on security of energy supply and sustainable development. Any new developments that might call for a review of the assessment given in this Communication will be communicated to the Council and Parliament.

4. Consumers will be kept properly informed by public information and by information from car manufacturers about the possibilities of using biofuels.

As part of the implementation of Strategy to reduce emissions and improve fuel economy, inter alia the following actions will be included in the Commission activities :

- (a) the Commission will put forward - as a third pillar of the Strategy to reduce emissions and improve fuel economy - a communication on options for establishing a reference framework for fiscal measures in order to close the gap of 20 g CO₂/km between the Community objective and the commitment of the car manufacturers' associations.
- (b) in addition, support for the accelerated introduction of advanced, high efficiency cars should be considered. A commitment by governments to buy a significant number of such cars for public services would offer a most useful contribution to test whether the additional cost can be brought down through large-scale production and could offer a significant contribution to bridging the gap on fuel efficiency between the Community target of 120 g CO₂/km and the industries' commitment.
- (c) in connection with the 2003/4 review of the CO₂ commitments the Commission and the car industry will also address post-2008 fuel efficiency targets.
- (d) the Commission will continue the discussions with the car industry to take appropriate measures in order to reduce the CO₂ emissions from light duty vehicles.

Although these measures and activities are not strictly related to the introduction of alternative fuels, they are closely linked to CO₂ emission reduction from road transport and to dependency on energy imports and have therefore to be considered together with any alternative fuels strategy.

The Commission invites the European Parliament and the Council to endorse the above action plan and to adopt the two legislative proposals for a European Parliament and Council Directive on the promotion of the use of biofuels for transport and the legislative proposal for a Council Directive amending Council Directive 92/81/EC contained in this Communication, which is a coherent package for a significant enhancement of the use of biofuels in the EU under transparent and stable conditions.

EXPLANATORY MEMORANDUM

1. INTRODUCTION

In its Green Paper "Towards a European Strategy for Energy Supply"⁶ the Commission highlighted the critical role of the transport sector, with respect to both security of supply and climate change :

- The transport sector is practically 100% dependent on oil, the energy source of greatest concern from a security of supply viewpoint.
- CO₂ emissions from transport are expected to keep rising, contrary to agreed objectives to reduce them. This make it more difficult for the Union to respond to the challenge of climate change and to meet its commitments under the Kyoto Protocol. Moreover, the commitments made in Kyoto Protocol must be regarded as a first step.

The Green Paper therefore proposed an ambitious programme for that sector to promote biofuels and other substitute fuels, including hydrogen, the aim being for these fuels to account for 20% of total fuel consumption by 2020.

With the Common Agriculture Policy (CAP) being refocused towards more emphasis on rural economy, the production of raw materials for biofuels would help to create new sources of income and to maintain employment in rural areas. This will have a general beneficial impact and also tie in better with enlargement.

Consequently, several Member States have already taken measures at national level, mainly in the field of taxation, to promote the production and use of biofuels. However, without co-ordinated decisions on fiscal, energy and environmental policies in this field and without clear prospects for the agricultural production and processing industry, it is doubtful whether biofuels will ever reach a substantial share of the total fuel consumption in the EU.

Actions at Community level in the field of biofuels, including taxation, are therefore needed in order to create the basis for the investment required to promote sufficient quantities of biofuels.

2. OBJECTIVE AND SCOPE OF THE PROPOSED DIRECTIVE

The fundamental objective underlying the draft Directive is to provide for a Community framework that would foster the use of biofuels for transport within the EU. This proposal lays down an obligation on Member States to introduce legislation and take the necessary measures to ensure that as from 2005 a minimum share of transport fuel sold on their territory is occupied by biofuels, while leaving it to the Member States to decide how best to meet this aim.

The minimum percentage of biofuels of all fuels for transportation sold on the individual markets of the Member States, will be introduced on the basis of an agreed schedule. These minimum percentages and schedules should be adapted by committee procedure on the basis of experience, environmental evaluation, new technical developments and in conformity with

⁶ COM(2000) 769 of 29 November 2000

other energy and environmental objectives undertaken at national as well as Community level.

The measures taken to reach the annual targets will be set out in an annual report to be submitted to the Commission by the Member States. On the basis of these reports, the Commission will then assess the action taken by Member States to meet their quotas for biofuels and, if appropriate, make proposals for amending the annex to the Directive.

To allow time to establish the necessary production facilities, a quantitative commitment should not be applied before 2005 when 2% biofuel substitution would appear to be a realistic target. Increasing the substitution by 0.75% per year will bring substitution to 5% in 2009.

Before the end of 2006 the Commission will examine the need for mandatory blending of biofuel into petrol and diesel in order to meet the targets for biofuel in the transport sector and will bring forward a proposal, amending Directive 98/70/EC as appropriate.

3. CURRENT DISTRIBUTION OF DIFFERENT TYPES OF FUELS IN THE EU AND POTENTIAL FOR BIOFUELS

3.1 Different types of fuels

Biofuels for transport could be marketed in the form of "pure" biofuels for dedicated vehicles or in the form of "blend" fuels in such a proportion that it does not affect the performance of motor vehicles engines. These biofuels are mainly biodiesel, bioethanol and ETBE (ethyl-tertio-butyl-ether) produced from bio-ethanol. Other possible biofuels are biogas, biomethanol, biodimethylether and biooils. Technically they can be used in conventional gasoline or diesel engines, but special containers may be needed for carrying these fuels.

Bioethanol can be used as automotive fuel by itself or it can be mixed with conventional engine fuels. Most vehicles registered in the EU can technically run on a blend of fuel of up to 15% bioethanol.

Biodiesel is currently used in pure form or blended with conventional diesel. Currently, Germany, Austria and Sweden use 100% pure biodiesel in adapted vehicles. In France biodiesel is blended at 30% in captive fleets and also used in blends of 5% in normal diesel fuel. In Italy it is blended at 5% in normal diesel fuel.

ETBE (ethyl-tertio-butyl-ether) is etherised bioethanol and can be used as a blending component in gasoline at a rate of up to 15 %.

Biogas produced by the anaerobic fermentation of biomass and/or the biodegradable fraction of waste can be purified to natural gas quality and used in gas engines for transportation.

Biomethanol produced from biomass and/or the biodegradable fraction of waste is equivalent to fossil methanol and can be used in the same conditions as fuel for transportation.

Biodimethylether is a diesel quality fuel produced from biomass and/or the biodegradable fraction of waste, for use as biofuel.

Biooil is a pyrolysis oil fuel produced from biomass and can be used as a normal diesel fuel.

3.2 The current situation in Europe

The situation regarding biofuels varies enormously throughout Europe. Austria and France, for example, are the most active countries. A remarkable increase of 93% was recorded between the production of biofuels in 1997 and production in 1999. Only six Member States make any real contribution to the total European biofuel production.

The **French** oil and protein plants sector endeavoured to find new markets for rapeseed oils that were under-used in the fuel sector in Europe. In 1991, a major programme was developed to involve the main sectors concerned in biodiesel production: oilseeds manufacturers, oil producers, engine manufacturers, ADEME⁷ and public authorities. As a result of this programme and the existing tax relief on pilot projects on rapeseeds and sunflowers esters, a 5% biodiesel was blended into diesel fuel by one oil company on a general basis. Total biofuels contribution in 1999 amounted to 0.7% of total oil products consumption, with approximately one third bioethanol and two thirds biodiesel.

Austria was one of the first countries to establish a bio-energy programme. In 1991, one of the world's first industrial biodiesel production plants started operation at Aschach (Province of Upper Austria).

An important part of the success of the Bioenergy programme in Austria is the integration of an energy policy in the diversification, reorientation and innovation of agriculture. In 1999, Austrian production of biodiesel was 18 kT. This production increased to 30 kT in 2000.

Germany is currently the second biggest biodiesel producer. Eurostat official statistics gave 130 kT produced in 1999, which amounts to 15% of total EU biofuel consumption. In 2001, production is expected to be 250 kT, rising to 500 kT by 2002.

Over the next 20-40 years, the **Swedish** scenario is to replace 25-50% of today's fuel use based on forest and agricultural residues. The Swedish National Energy Administration believes it is possible to attain a 10% market share for biofuel in ten years time.

Production of biofuels in Sweden in the year 2000 was about 50 kT. The available surplus of wheat in Sweden could in the future produce – with current yields – 500 000 m³ of bioethanol, meaning some 5.6 % of the total annual consumption of gasoline and diesel oil in that country. There are around 300 ethanol fuel buses, most of them in the area of Stockholm, and approximately 600 biogas-fuelled cars and 100 heavy-duty vehicles. Wood chips and other ligno-cellulosic sources such as straw may be a raw material of the future, but for the time being conversion of cellulose into bioethanol is not yet competitive. The Swedish government supports

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Agence de l'Environnement et de la Maîtrise de l'Energie

research and development of ethanol from wood biomass, with the objective of making bioethanol from wood competitive in 2004.

Production in **Italy** was 96 kT in 1999. The national plan for the use of agricultural and forestry biomass anticipates production of bioethanol, biodiesel and ETBE of around 1000 ktoe over the next decade.

Production in **Spain** was around 50 kT in the year 2000. Liquid biofuels are included in the national plan,⁸ with a recognised value for rural development and job creation. Approximately 500 ktoe is anticipated in the year 2010 in the context of fiscal measures.

The following table shows the relative share of only biodiesel in the EU Member States:

Country	All petroleum products consumption in transport (ktoe) 1998-Eurostat	Gasoline consumption in transport (ktoe) 1998-Eurostat data	Diesel consumption in transport (ktoe) 1998-Eurostat	Biofuel production (kT) in 1998	Biofuel production (kT) in 1999
Austria	5 923	2 130	3 224	16	30*
Belgium	9 228	2 514	4 852	/	/
Denmark	4 574	2 016	1 711	/	/
Finland	4 129	1 846	1 776	/	/
France	47 237	14 554	26 603	319	344
Germany	61 351	30 080	24 834	100	130
Greece	7 085	3 106	2 245	/	/
Ireland	3 200	1 307	1 429	/	/
Italy	38 647	17 880	16 138	96	96
Luxembourg	1 503	541	685	/	/
Netherlands	13 079	4 112	5 067	/	/
Portugal	5 523	2 030	2 863	/	/
Spain	29 401	9 018	16 215	/	50*
Sweden	7 288	4 021	2 374	/	50*
UK	47 791	21 882	16 597	/	/
Total	285 959	117 037	126 613	531	570 700*

Conversion factor for biodiesel is 0.812 ktoe/kT (Eurostat source) and 0.6 ktoe/kT for bioethanol (extrapolation).

* production in the year 2000

3.3 The potential for biofuel in Europe

The following factors will influence the potential breakthrough of biofuels:

- the primary biomass produced and process efficiency (there exist variations from 1 toe of biodiesel produced per hectare in the case of rapeseed to 5.6 toe of biofuel produced per hectare in the case of sugar beet);

⁸ Plan de Fomento de las energías renovables en España, December 1999.

- the economics of the main process and the production of by-products (secondary biomass);
- technology developments (e.g. the case of ligno-cellulosic crops).

To give some kind of magnitude, the total arable crop area under the CAP which can be used for the production of cereals, oilseeds, protein crops is limited to about 54 mill ha. for EU-15. The obligatory set-aside for 2001/2002 amounts to about 4 mill ha in addition to voluntary set-aside of 1.6 mill ha i.e. in total 5.6 mill ha. Given this surface of set-aside and considering only primary biomass as a function of the crop grown, between 4 and 15 Mtoe of biofuels would be supplied for transport uses, making for between 1.2 and 5% of total European petroleum products consumption. But the extent to which producers may choose to make use of set-aside for such production will depend upon price signals and, in any case, be limited by the Blair House Agreement's constraint on the use of by-products of non-food production on set-aside - namely 1 mio T soya meal equivalent. Moreover, the Blair House Agreement also constrains oilseed production supported by a crop-specific aid to a maximum of some 5 mio ha. Thus the decision, taken within the context of Agenda 2000, to align the oilseed aid upon the cereals aid - and so end the crop-specific aid for oil-seeds - created the basic condition for EU oilseed production to be able to respond significantly to such demand outside the context of set-aside since the possibility within set-aside is extremely limited. Other sources of production for biofuels such as cereals including maize, sugarbeet, or woody biomass are not covered by the Blair House Agreement and so are simply subject to normal rules of competition.

From the predictions of the Green Paper on security of supply,⁹ the transport sector would grow some 2% per annum over the coming decade. If no energy saving measures are applied, diesel and gasoline consumption for transport would be approximately 304 Mtoe in 2010 in the EU as a whole. The contribution of biofuels predicted in this proposal for 2010 should then be around 17.5 Mtoe.

Finally, it should be mentioned that biofuel production is not directly linked with agriculture surface area. In addition to the potential based on primary biomass, secondary biomass and residues or organic waste should be considered as an important, environmental-friendly, complementary resource for biofuels production. Examples of the potential of secondary biomass are waste vegetable oils and fats. Total consumption of oils and fats in the EU is about 17 Mt (with a rate of increase of 2% per year), three-quarters of which is vegetable oil. As part of its recycling policy, Austria estimates that 18.5% of the total amount of oil/fat is collectible. Extrapolation of this figure to the rest of EU would give a market size of up to 3 Mt of fats and vegetable oils. The use of these fats and oils would eliminate the need for dumping and its attendant environmental hazards. Recovery of oils also avoids the cost of drainage and landfill disposal.

⁹ COM(2000) 769final. Green Paper : "Towards a European strategy for the security of energy supply".

4. ECONOMIC CONSIDERATIONS

4.1. Extra production costs of biofuels

Against the backdrop of security of supply, reduced CO₂ emissions and rural economy, biofuels would look to have a great future. The dramatic fall in oil prices in the early/mid 1980s and their persistently low level since then (even today's ± 30 \$/barrel is less than half the price it was in 1980-82 in real terms) means, however, that biofuels are not competitive.

Biodiesel – currently the most used biofuel - has a production cost of approx. 500€/1000-litre, against 200-250€/1000-litre for traditional petroleum-based diesel including the refinery cost. The production cost of biodiesel depends on a number of factors, particularly the price of the raw material (usually rapeseed oil), the size and type of production plant, the yield and the value of by-products (protein, glycerol). The estimate of 500€/1000-litre is based on average raw material cost, low production cost of large production plant and glycerine by-product price of 50€/1000-litre biodiesel produced. In view of the fact that it takes 1100 litre of biodiesel to replace 1000 litre of petroleum-based product, the economic calculation shows an additional cost of at least 300€/1000-litre of diesel replaced by biodiesel. This additional cost is highly dependent on the crude oil price and the volatility of market prices of petroleum products.

Crude oil price	"Extra cost"- 100% biodiesel
20 \$/barrel	~ 350€/1000-litre
25 \$/barrel	~ 300€/1000-litre
30 \$/barrel	~ 250€/1000-litre
35 \$/barrel	~ 200€/1000-litre

It should be mentioned that the production of biodiesel from used fried oils gives a more positive picture, as the raw material is more or less free of costs and it forms part of a sound waste management policy. However, the quantity of biodiesel produced from that source is of course limited.

Bioethanol can be produced from different crops, normally sugar beets or cereals (wheat, barley). In the US, corn (maize) is the main raw material, and agricultural waste products can be used in some cases. The same considerations apply to bioethanol as to biodiesel. The production cost per 1000 litres may be lower. On the other hand, it takes 1500 litres of ethanol to replace 1000 litres of gasoline.

How can the extra cost for the medium term production of biofuels be justified and which instruments can best offset this extra cost? Paragraphs 4.2 and 4.3 address the benefits that are most readily quantifiable while paragraph 5 looks at the qualitative impact on other policies.

4.2. The benefits of CO₂ avoidance

Avoidance of CO₂ emissions from biofuel depends on the way it is produced. CO₂ emission from fossil diesel is around 3.2 tonnes CO₂/1000-litre (including CO₂ emissions from production, transport, etc.) used. However, even though CO₂ emission from biofuels is neutral in principle, actual CO₂ avoidance is less than the 3.2 tonnes because of the emissions produced in the process of growing the crops and the conversion of raw material into biofuels. Realistic CO₂ saving for biodiesel is around 2 to 2.5 tonnes CO₂/1000-litre. Replacement of gasoline by ethanol is put by ADEME at 2 tonnes CO₂ /1000-litre. If there were no other benefits, such as, for instance, in the agriculture sector and in the security of supply, this would mean that at current oil prices and biofuel production costs the cost of CO₂ avoidance would be in the range of 100 to 150 €/tonne CO₂, which is above the range for cost-effective measures to meet the EU's commitments during the first Kyoto commitment period. However, though the use of biofuels at this moment cannot yet be justified by the benefits alone of CO₂ avoidance, it should certainly be considered as a strategic choice for future climate change policy.

4.3 The benefits of oil substitution for the security of supply

The strength of the oil substitution argument is difficult to quantify but nevertheless significant. It is clear that a vast number of energy policy measures (energy saving, oil substitution) in oil consuming countries put an end to the rising oil prices in the early 1980s.

It is difficult to predict the effect of a single marginal reduction of oil demand on world oil prices. However, for example, replacing 2% of EU diesel consumption with biofuel at an additional cost of 250€/1000 litre would “cost” around 1000 M€/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 billions 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 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.

5. IMPACT ON OTHER POLICIES

5.1 Agriculture

Rural development is an increasingly important part of the Common Agriculture Policy. An essential facet of the European agricultural model, which aims to put in place a consistent and lasting framework for guaranteeing the future of the rural community, is the creation of employment.

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.

Agricultural policy should encourage sustainable farming and afforestation and the avoidance of negative environmental impact. 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 problematical waste production into a sustainable product.

The present proposal is compatible with the Common Agricultural Policy management and should not give rise to distortions.

5.2 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 Institute¹⁰ 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 (source: IDAE).

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. Most of these jobs would be located in rural areas.

The employment impact can be calculated in different ways with different results. For example, the 2000 M€ production cost of 4 million m³ of just biodiesel will generate some 50 000 man-years in direct and indirect employment. Employment engendered by refining of the same amount of conventional diesel is around 2% of that figure.

5.3 Fiscal policy

The fragmentation of fuel tax systems in Europe, with different countries adopting specific tax exemptions on different fuel specifications, creates a barrier to the development of the sector and of European trade. A new legislative instrument in favour of tax differentiation is proposed as a package with this proposal in order to give stability to the market through greater European approximation. Therefore, in parallel to the present proposal, a Commission proposal for a Council Directive amending Council Directive 92/81/EC is presented.

5.4 Environmental considerations

As regards the environmental impact of the production of biofuels, a number of studies on the energy and environmental efficiency of alternative fuels have been carried out since the beginning of the 1980s. Most of these studies gave rise to animated discussions among advocates and opponents, both experts and the general public alike. An analysis of the most important studies shows that the results only differ slightly. The studies confirm a positive energy balance, stating that with one unit of fossil fuel energy, two to three units of renewable fuel can be produced. The

¹⁰ Volkswirtschaftliche Aspekte einer Herstellung von Biodiesel in Deutschland. IFO-Institut für Wirtschaftsforschung – 2nd EU Motor Biofuels Forum/ Sept 1996.

reduction of greenhouse gas emissions is also confirmed. The differences in the CO₂ reduction depend on farming practices and the chain of production. Apart from the impact on CO₂ emissions, the production of crops for biofuels, conversion of the raw materials and subsequent use of biofuels have a number of effects on the environment that could be relevant to the attractiveness of replacing conventional motor vehicle fuels with biofuels.

When assessing these effects it is important to be aware that in principle what matters is the difference between the overall impact of fossil fuel production, refining and use versus biofuel production, conversion and use rather than the impact as such of the biofuel life cycle.

5.4.1 Vehicle exhaust emissions

It has been claimed that biofuels are attractive because they generate fewer “conventional” car emissions (CO, NO_x, VOC, and particulate). 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. For this reason it is important that any future mandatory blending of biofuels into petrol and diesel should be considered within the framework of Directive 98/70/EC, EN 228 & EN 590 and Community type-approval legislation. Directive 98/70/EC is based upon Article 100a (new 95) of the Treaty and establishes harmonised environmental specifications for all petrol and diesel marketed in the Community. Moreover, Article 5 of this Directive prevents any Member State from preventing the placing onto the market of petrol and diesel fuel which comply with the specifications contained in the Directive.

5.4.2 Groundwater contamination

The use of biofuel components such as ETBE could lead to the occurrence of groundwater contamination as has been observed in some Member States by MTBE due to the leaking of petrol from underground storage tanks at service stations. ETBE has very similar physical and chemical properties as MTBE and therefore could create the same risk for groundwater contamination. After a thorough risk assessment for MTBE, undertaken within the framework of the Existing Substances Regulation (793/93), it has been concluded that Member States should apply widely best available techniques for the construction and operation of underground storage tanks at service stations. These measures will work on ETBE as well.

5.4.3 Land use agricultural practice

It is clear that the three crops (colza, cereals and sugar beet) are normally grown by relatively intensive farming, but at the same time relevant EU legislation on pesticides, biodiversity and nitrate leakage require Member States to install safeguards against any unacceptable negative impact. Should bio-diversity be an important factor, growing sugar-beet would be a good option since the area required for the production of a given quantity of biofuel is less than half the area required for cereals. On the other hand, cereals produce big amounts of additional biomass in straw, which makes for a better CO₂ balance if used for energy generation.

Colza or other oil seed crops require even bigger areas for a given quantity of biofuel, but in this case the value of the protein from the crops is important in addition to the potential energy value of the plant residues.

The potential to produce biofuels from either ligno-cellulosic or thermo-chemical conversion of biomass in the medium term can only be achieved if traditional forestry, short rotation forestry and/or other ligno-cellulosic crops (such as miscanthus) provide the bulk of the raw material. Such crops have a significantly lesser impact on the environment as they are not based on intensive farming and therefore hardly need any fertilisers, pesticides, weed-killers or irrigation.

Environmental advantages from growing crops for biofuels should be promoted through sustainable farming and afforestation.

Conversion of crops into biofuels is not subject to EU environmental legislation, unlike oil refining. Nevertheless, some Member States, generally believed to apply strict environmental legislation, have recently authorised plants for the production of both bioethanol and biodiesel. This is a strong indicator that it is perfectly possible to convert crops into biofuels in environmentally acceptable production plants.

In the case of the use of secondary biomass and waste products for the production of biofuels the environmental impact is positive.

Apart from the obvious CO₂ reduction advantage, any other environmental effects would appear to be insignificant, either positive or negative providing a proper implementation in the Member States and compliance with other Community legislation. The Commission will therefore monitor developments closely and take additional measures where necessary to ensure that future reviews of the Common Agricultural Policy increase sustainable practice in the production of biofuels. Technical progress in the production of biofuels from ligno-cellulosics could alleviate most of the negative environmental impact of crops.

5.5 Opportunities for Third and developing countries

Biofuel development and their use offer an opportunity for trade to promote sustainable development. The need for biofuels in the EU, and subsequently in other countries, could open a new market for innovative agriculture products. In particular, this new market could benefit developing countries strongly dependent on agriculture.

Furthermore, the development and use of biofuels would create a spillover effect of new innovative technologies. For example, the leadership EU has had in the use of renewable energies for electricity production – and the innovations linked to it – has resulted in a set of technology transfers all over the world. A similar effect could arise from the biofuel initiative.

However, in short term, we expect that benefits arising from technology innovation and spill-out will be more important than market creation and imports in EU for agriculture products as dependency on oil on oil will continue to be is an universal situation. Even so, in some cases, countries like Ukraine with big cereal production could see rapid benefits arising from the new market.

Before the 1st of January 2007, the Commission shall report to European Parliament and to the Council, in order to assess the trade effects of the proposal and take into account the relevant international obligations taken by the Community, especially those under the WTO agreement on technical barriers to trade.

6 JUSTIFICATION FOR ACTION AT COMMUNITY LEVEL

6.1 Current political context

Art. 2 of the EC Treaty calls for sustainable development of the economy of the Community.

Art. 6 of the EC Treaty reinforces these objectives of sustainable development by integrating environment policy into other Community policies. The Cardiff European Council in 1998 reaffirmed the need for integration of the environment into energy policy. *Art. 175* set the framework for adopting measures with environmental objectives.

The EU strategy for sustainable development, recently presented by the Commission to the Gothenburg European Council of 15/16 June 2001, identifies as key priorities:

- Limiting climate change and increasing the use of clean energy
- Addressing threats to public health
- Managing natural resources more responsibly
- Improving the transport system and land use.

One of the main challenges in implementing the strategy will be the development of renewable energy sources, including for transportation. The present Directive intends to address some of these challenges by promoting the use of biofuels.

At international level the UN Framework Convention on Climate Change of 1992 requires the parties to adopt policies and to take measures to reduce and limit greenhouse gas emissions consistent with the objectives of the Convention. This commitment has been quantified by the Community by way of the 8% reduction commitment laid down in the Kyoto Protocol of 1997. Greater use of renewable energy sources can already substantially contribute to the Community efforts to meet the Kyoto target in the relatively few years left before 2012. Nevertheless, their role will be even more important in the period beyond 2012, where the Commission's proposal for a Sixth Environmental Action Programme foresees a 20-40 % reduction by the year 2020.

The expected increase in CO₂ emissions if no further measures are taken, and the difficulties that the majority of Member States may face in meeting their commitments under the EU burden sharing agreement, call for the reinforcement of policies and measures at EU level within the overall EU climate change strategy.

On 26.11.1997, the Commission adopted the Communication entitled "Energy for the future: Renewable Energy Sources".¹¹ This White Paper identified bioenergy and

¹¹ COM (97) 599 of 26.11.1997

transport as those fields where more targeted actions should be taken to help counter the above problems. A progress report on the White Paper adopted by the Commission,¹² concluded that, firstly, the rather low contribution of 452 ktoe of biofuels registered in 1997 was due to the fact that only four Member States had by that time taken specific measures and, secondly, that the production of energy crops should be given more encouragement and energy taxation revised to favour biofuels.

In response to this White Paper, the European Parliament and the Council adopted two resolutions on 17 June 1998¹³ and 8 June 1998¹⁴ respectively, whereby the Commission was invited to undertake initiatives, notably in the biofuels sector.

The Council noted that Member States should choose the most appropriate means of promoting the use of renewable energy sources from, among other, fiscal measures. The Council also noted that, given the important role to be played by biomass, full account should be taken of renewables in the development of Community policies on agriculture and waste management, inviting the Commission to consider the need for proposals to remove obstacles to the greater use of renewables.

The European Parliament called on the Commission to include in the Action Plan the promotion of the use of biofuels, with the aim of increasing the market share to 2% over 5 years, either through financial aid for the processing industry or through an obligation on the oil companies to produce a minimum proportion of fuel from biomass. It also considered that there should be additional exemption from mineral oil taxes for mixed fuels to aid entry into the market.

At its meeting on 9 September 2000 the informal ECOFIN Council stressed the need for faster implementation of EU action plans in the field of energy-saving and diversification in order to reduce the oil dependency of our economies.

In its "Green Paper on the security of energy supply",¹⁵ the Commission outlines the prospective energy situation in the EU for 2010 and beyond. One of the essential observations in this Communication is that the EU will in the short and medium term have a limited possibility to influence the supply side of energy. However, as the EU is one of the main consumer areas it should do its utmost to reduce its heavy dependence on external suppliers.

6.2 Additional impact of action at Community level

There is no doubt that promotion of the use of biofuels in the EU is desired at political level for the reasons of sustainable development, CO₂ reduction, security of supply and the additional positive influence on rural development and agriculture policy. These are all issues of interest and responsibility at Community level, as borne out by the numerous statements and acts at political level highlighted under 6.1.

¹² COM(2001)69 final of 16.02.2001

¹³ Resolution of the European Parliament of 17 June 1998. (A4-0207/98)

¹⁴ Council Resolution of 8 June 1998 on renewable sources of energy, OJ C 198, 24.6.1998, p.1

¹⁵ Green Paper "Towards a European strategy for the security of energy supply", COM(2000) 769. *Op. Cit.*

The dramatic fall in oil prices in the early/mid 1980s and their persistently low level since then (even today's \pm 25\$/barrel is less than half the price in 1980-82 in real terms) mean that biofuels are not competitive. Bio-diesel – currently the most used biofuel - has a production cost of approx. 500€/1000 litres, as against 200-250 €/1000 litres for conventional petroleum-based diesel. This means that promotional measures involve costs such as reduced tax revenue, higher price at the pump, etc., and it is only fair that those costs should be borne to the same extent by all Member States.

However, chapter 3 highlights the substantial differences in performance between the Member States concerning the use of biofuels in transport. In addition, there is evidence that progress in some countries is mostly due to the impact of proactive measures, both fiscal and promotional, rather than specific circumstances or resource availability in those countries.

The Commission also considers that the current situation in the EU shows that the overall effort in terms of economics and research is provided by only a few Member States, whereas the benefits from promoting biofuels in terms of the environment, security of supply, emerging technologies and markets profit the Union as a whole.

Therefore, the proposal for a new legally binding instrument must be seen in the light of the common objective of increasing the use of biofuels for transport in **all** Member States in the European Union. The proposal also would lead to an increased demand for biofuels in the internal market, which will provide EU-wide market opportunities for companies.

Nevertheless, the proposal should at the same time safeguard the internal energy market by ensuring that promotional measures will not prohibit trade in fuels that meet the specifications on fuel quality of Directive 98/70/EC. The proposal therefore requires that as from 2005 a certain percentage of the fuel sold in each Member State is biofuel, although it does not impose any particular method of how to meet such an objective. This flexibility means that Member States can leave the choice to the companies concerned of how to meet their quotas, taking account of local circumstances. This could be done by blending diesel or petrol with biofuel products or by promotion of 100 % biofuel in captive fleets. It also means that there will be no legal barriers to the trade of pure fossil fuel in the internal market. However it is considered to be unlikely that a percentage of biofuels above 4 to 5 % can be reached in any Member State without a systematic blending into all ordinary transport fuels. Therefore the Commission will study this issue and if appropriate propose an amendment to Directive 98/70/EC to require a mandatory blending of a certain percentage biofuels in gasoline and diesel.

The percentages proposed for the total biofuel sold can be adapted to the situation in the Member States by a Committee procedure.

This Community approach will give a better guarantee of a level playing field for the agriculture and forestry sectors, consumers, fuel producers and distributors, and the car industry in the internal market.

7. RELEVANCE OF THE INITIATIVE TO ACCESSION COUNTRIES

Agricultural activity per capita in accession countries is double the level in EU-15. There is therefore potential for sustainable farming of biofuels in these countries. Biofuel production could contribute to agricultural diversification, help to meet the environmental challenge and form part of job creation policy.

Examples of a developing biofuel industry are in the Czech Republic and in Slovakia. The Czech Republic has already completed a programme for establishing 16 biodiesel plants and is the world leader in the number of plants per country. It already has some 70 000 t production capacity, the biggest single plant, with 30 000 t capacity, being located in Olomouc. There is also full tax relief for biodiesel granted for environmental reasons. Additionally, the level of VAT on biodiesel is reduced to only 5 %.

8. CONTENTS OF THE PROPOSAL

Article 1 defines the purpose and scope of the proposal.

Article 2 concerns biofuel definitions.

Article 3 obliges Member States to establish a minimum percentage by volume of biofuels to be sold in their respective markets.

Article 4 concerns reporting by the Member States and the Commission. **Articles 5 and 6** concern the committee procedure for adapting the annex of the proposed Directive to technical progress.

Articles 7, 8 and 9 concern the administrative provisions of the proposal.

The Annex to the proposal contains a list of liquid fuels that are considered to be biofuels and the schedule for the share of biofuels in the total fuel market.

Proposal for a

DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
on the promotion of the use of biofuels for transport

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 175 thereof,

Having regard to the proposal from the Commission,¹⁶

Having regard to the opinion of the Economic and Social Committee,¹⁷

Having regard to the opinion of the Committee of the Regions,¹⁸

Acting in accordance with the procedure laid down in Article 251 of the Treaty,¹⁹

Whereas:

- (1) In accordance with Article 2 of the Treaty the Gothenburg Council of 15/16 June 2001 adopted a Community sustainable strategy consisting in a set of measures, which include the development of biofuels.
- (2) Natural resources, and their prudent and rational utilisation as referred to in Article 174 of the Treaty, include oil, natural gas and solid fuels, which are essential sources of energy but also the leading sources of carbon dioxide emissions.
- (3) The transport sector accounts for more than 30 % of final energy consumption in the Community and is expanding, a trend which is bound to increase, along with carbon dioxide emissions.
- (4) Greater use of biofuels for transport forms a part of the package of measures needed to comply with the Kyoto Protocol, and of any policy package to meet further commitments.
- (5) Increased use of biofuels for transport is a tool for the Community to influence the global fuel market for transport and hence the security of energy supply in the medium and long term.

¹⁶ OJ C , , p. .

¹⁷ OJ C , , p. .

¹⁸ OJ C , , p. .

¹⁹ OJ C , , p. .

- (6) Promoting the use of biofuels respecting good farming practices will create new opportunities for rural sustainable development in a more market-orientated Common Agriculture Policy.
- (7) In its resolutions of 8 June 1998²⁰ and of 5 December 2000 the Council endorsed the Commission's Strategy and Action Plan for Renewable Energy Sources and requested specific measures in the biofuels sector.
- (8) In its resolution of 17 June 1998 the European Parliament called for an increase in the market share of biofuels to 2% over 5 years through a package of measures, including tax exemption and the establishment of a compulsory rate of biofuels for oil companies.
- (9) The optimum method for increasing the share of biofuels in the national markets depends on the availability of resources and raw materials, on national policies to promote biofuels and on tax arrangements and should therefore be left as far as possible to the policies of the oil companies and other parties concerned.
- (10) National policies to promote the use of biofuels should not lead to prohibition of the free movement of fuels that meet the harmonised environmental specifications as laid down in Community legislation.
- (11) However, it will be difficult to increase the proportion of biofuel sold above a certain level without measures to blend it in fossil fuel. Therefore, Member States should aim at a minimum blending of 1% of biofuel into the mineral oil marketed in the Community. This percentage will be adapted on the basis of the shares obtained by biofuels among the various fuels marketed in the Member States and based on further detailed studies.
- (12) In accordance with the principles of subsidiarity and proportionality as set out in Article 5 of the Treaty, general principles providing for a minimum share of biofuels to be marketed and distributed should be established at Community level, although with detailed implementation left to each Member State, thus allowing each Member State to choose the arrangement that best fits its particular situation. This Directive confines itself to the minimum required in order to achieve those objectives and does not go beyond what is necessary for that purpose.
- (13) Provision should be made for the possibility of rapidly adapting the schedule in the Annex to this Directive for introducing biofuels in the transport fuel market to technical progress and to the results of an environmental impact assessment of the first stage of introduction.
- (14) Since the measures necessary for the implementation of this Directive are measures of general scope within the meaning of Article 2 of Council Decision 1999/468/EC of 28 June 1999 laying down the procedures for the exercise of implementing powers conferred on the Commission,²¹ they should be adopted by use of the regulatory procedure provided for in Article 5 of that Decision.

²⁰ OJ C 198, 24.6.1998, p.1.

²¹ OJ L 184, 17.07.1999, p. 23.

HAVE ADOPTED THIS DIRECTIVE:

Article 1

This Directive sets a minimum percentage of biofuels to replace diesel or gasoline for transport purposes in each Member State.

Article 2

1. For the purpose of this Directive, the following definitions shall apply :

"biofuels" means liquid or gaseous fuel for transport produced from biomass.

"biomass" means the biodegradable fraction of products, waste and residues from agriculture (including vegetal and animal substances), forestry and related industries, as well as the biodegradable fraction of industrial and municipal waste.

"energy content" means the lower caloric value of a fuel.

2. The products listed in Part A of the Annex shall be considered biofuels.

Article 3

1. Member States shall ensure that the minimum proportion of biofuels sold on their markets is 2%, calculated on the basis of energy content, of all gasoline and diesel sold for transport on their markets by 31 December 2005 and that this share increases, aiming towards a minimum level of blending, in accordance with the schedule set out in Part B of the Annex.

2. Biofuels can be made available as:

(a) pure biofuels;

(b) biofuels blended in mineral oil derivatives taking into account the appropriate European norms describing the technical specifications for transport fuels (EN 228 and EN 590);

(c) liquids derived from biofuels, such as ETBE (ethyl-tertio-butyl-ether), where the percentage of biofuel is specified in the part A of the Annex.

Member States should monitor the effect of the use of biofuels in diesel blends above 5% by non adapted vehicles and, where appropriate, take measures to ensure compliance with the relevant Community legislation on emission standards

Article 4

Member States shall report to the Commission, before 1 July each year, on the total sales of transport fuel and the share of biofuels in such sales for the preceding year.

Before 1 January 2007 the Commission shall report to the European Parliament and to the Council on the progress made in the use of biofuels in the Member States, on the economical aspects and on the environmental impact of further increasing the share of biofuels. On the basis of this report, the Commission will propose, when appropriate, an adaptation of the system of targets as laid down in Article 3.

Article 5

Any amendments necessary in order to adapt the Annex to technical progress shall be adopted in accordance with the procedure referred to in Article 6(2).

The adaptation of the schedule of Part B of that Annex may be decided in accordance with the procedure referred to in Article 6(2), on the basis of technical development of biofuel technologies, market penetration and applications in means of transport.

Article 6

1. The Commission shall be assisted by the committee established by Article 4 of Council Decision 1999/21/EC²².
2. Where reference is made to this paragraph, the regulatory procedure laid down in Article 5 of Decision 1999/468/EC shall apply, in compliance with Article 7 and Article 8 thereof.
3. The period provided for in Article 5(6) of Decision 1999/468/EC shall be three months.

Article 7

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 31 December 2004 at the latest. They shall forthwith inform the Commission thereof.

When Member States adopt those provisions, they shall contain a reference to this Directive or be accompanied by such reference on the occasion of their official publication. Member States shall determine how such reference is to be made.

2. Member States shall communicate to the Commission the provisions of national law which they adopt in the field covered by this Directive.

²² OJ L 7, 13.01.1990, p. 1.

Article 8

This Directive shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Communities*.

Article 9

This Directive is addressed to the Member States.

Done at Brussels,

For the European Parliament
The President

For the Council
The President

ANNEX

A. LIST OF BIOFUELS AND PERCENTAGE OF RENEWABLE CONTENTS

“*bioethanol*”: ethanol produced from biomass and/or the biodegradable fraction of waste, to be used as biofuel;

“*biodiesel*”: a diesel quality liquid fuel produced from biomass or used fried oils, to be used as biofuel;

“*biogas*”: a fuel gas produced by the anaerobic fermentation of biomass and/or the biodegradable fraction of waste that can be purified to natural gas quality, to be used as biofuel;

“*biomethanol*”: methanol produced from biomass and/or the biodegradable fraction of waste, to be used as biofuel;

“*biodimethylether*”: dimethylether produced from biomass and/or the biodegradable fraction of waste, to be used as biofuel;

“*biooil*”: a pyrolysis oil fuel produced from biomass, to be used as biofuel.

“*bioETBE (ethyl-tertio-butyl-ether)*”: ETBE produced on the basis of bioethanol.

The percentage of volume bioETBE that is calculated as biofuel is 45%.

B. MINIMUM AMOUNT OF SOLD BIOFUEL AS A PERCENTAGE OF SOLD GASOLINE AND DIESEL

Year	%	Of which as a minimum in the form of blending (%)
2005	2	-
2006	2.75	-
2007	3.5	-
2008	4.25	-
2009	5	1
2010	5.75	1.75

IMPACT ASSESSMENT FORM

THE IMPACT OF THE PROPOSAL ON BUSINESS WITH SPECIAL REFERENCE TO SMALL AND MEDIUM-SIZED ENTERPRISES(SMEs)

DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL ON THE PROMOTION OF THE USE OF BIOFUELS FOR TRANSPORT

DOCUMENT REFERENCE NUMBER

THE PROPOSAL

1. Main aims of the proposal is to promote an increased use of biofuels in transport in the European Union in order to contribute

- to security of supply of transport fuel;
- to a reduction of CO₂ emissions;
- to rural development and maintenance of employment in the rural community.

Community legislation is necessary to increase the use of biofuels and the investments in this sector in all Member States, as benefits of such an increased use are also for the Union as a whole.

THE IMPACT ON BUSINESS

2. Who will be affected by the proposal ?

- Oil companies;
- Biofuel producers;
- Farmers;
- Vehicle manufacturers;
- Consumers.

Next to Oil companies and vehicles manufacturers, mainly the small and medium-sized producers especially in rural areas of the Community will be affected.

3. Oil companies will have to ensure that a share of their total gasoline and diesel sold will be biofuels.

4. What economic effects is the proposal likely to have?

- on employment: positive
- on investment and the creation of new businesses: positive
- on the competitiveness of businesses: neutral

5. Does the proposal contain measures to take account of the specific situation of small and medium-sized firms (reduced or different requirements etc)? No

CONSULTATION

6. Organisations which have been consulted about the proposal:

- Oil companies;
- Car manufacturers;
- Biodiesel producers;
- Trade organisations.
- Agriculture organisations.

EXPLANATORY MEMORANDUM

1. INTRODUCTION

In this explanatory memorandum, a 'biofuel' is a product obtained from certain renewable resources which is subject to excise duty under Directive 92/81/EEC.²³ A biofuel can therefore be used, in its pure or blended form, as a motor or heating fuel.

The Commission communication on alternative fuels for transportation and on a set of measures to promote the use of biofuels²⁴ identifies two possible courses of action for the latter purpose:²⁵

- applying different rate of excise duty in favour of biofuels to make them competitive in the market,
- specifying a minimum percentage of biofuel in motor fuels sold.

The attached proposal for a Council Directive therefore sets out a new framework of taxation for biofuels. A second proposal for a Directive of the European Parliament and of the Council will set a statutory minimum biofuel content for motor fuels sold after 2005²⁶.

2. BACKGROUND

Promoting biofuels

The Commission and the Council have been encouraging the development of renewable energies, and biofuels in particular, since 1985. The Directive relating to oil savings through the use of substitute fuel components²⁷ stresses the role biofuels can play in reducing Member States' dependence on oil imports and authorises the incorporation into petrol of up to 5% of ethanol by volume and up to 15% of ethyl-tertiary-butyl-ether (ETBE) by volume. The Council Decisions of 1993 and 1997 on promoting renewable energies in the Community (Altener²⁸ and Altener II programmes²⁹) are aimed at securing a market share for biofuels of 5% of total motor vehicle fuel consumption by 2005. The 1997 White Paper on renewable sources of energy³⁰ further recommended setting a production target of 18 million tonnes of liquid biofuels by 2010 as part of an overall goal of doubling the share of renewables in EU energy consumption by the same year. The communication on the implementation of the Community strategy and action plan on renewable energy sources (1998-2000)³¹ reinforces

²³ OJ L 316, 31.10.1992, p. 12, as last amended by Directive 94/74/EC (OJ L 365, 31.12.1994, p. 46).

²⁴ OJ C [...], [...], p. [...].

²⁵ Having rejected the possibility of subsidising raw material production under the common agricultural policy.

²⁶ OJ C [...], [...], p. [...].

²⁷ Council Directive 85/536/EEC of 5 December 1985 on crude-oil savings through the use of substitute fuel components in petrol. OJ L 334, 12.12.1985, p. 20.

²⁸ Council Decision 93/500/EEC of 13 September 1993 concerning the promotion of renewable energy sources in the Community (Altener programme); (OJ L 235, 18.9.1993, p. 41).

²⁹ Council Decision 98/352/EC of 18 May 1998 concerning a multiannual programme for the promotion of renewable energy sources in the Community (Altener II); (OJ L 159, 3.6.1998, p. 53).

³⁰ COM(1997) 599, 26.11.1997.

³¹ COM(2001) 69, 16.2.2001.

these guidelines. The communication entitled “A Sustainable Europe for a Better World: A European Union Strategy for Sustainable Development”,³² presented to the Gothenburg European Council of 15 and 16 June 2001, also highlights the important role of biofuels in tackling climate change and in the development of clean energies.

Recent work indicates that the development of biofuels would also have a positive impact in the agricultural sector and on employment.

Lastly, the Commission Green Paper “Towards a European strategy for the security of energy supply”³³ stresses the key role of tax instruments in achieving the objectives set in terms of volumes by reducing the price differential between biofuels and rival products.

Taxation framework

Energy products are basically taxed in three ways: excise duties, which are specific duties (proportional to the physical quantity of the product), dedicated taxes and duties and VAT, which is an ad valorem tax (proportional to the selling price of the product). At the current moment, there is no Community framework for energy products other than mineral oils nor for taxes other than excise duty and VAT.

In the excise field, the Member States decided unanimously in 1992 to introduce a Community system for the taxation of mineral oils based on two Directives, one on the harmonisation of the structures of excise duties (92/81/EEC), the other on the approximation of the rates of excise duties (92/82/EEC)³⁴ on mineral oils. The two Directives set a minimum rate of tax for each mineral oil according to its use (motor fuel, industrial and commercial use, heating). In practice, excise duty is often far in excess of the minimum Community rates, which have not been adjusted since 1992, and differs enormously from one Member State to another.

The Directives provide for a number of compulsory tax exemptions³⁵ and also allow Member States further specific excise duty exemptions or reductions either under fiscal control or subject to an application to the Commission and the unanimous approval of the Council, acting on a proposal from the Commission.

Such derogations are often introduced out of a fear of seeing certain sectors of the economy lose their competitiveness when ambitious fiscal reforms involving tax increases for environmental purposes are adopted at national level.

However, there are other reasons for the derogations too, in particular to facilitate the introduction of more environmentally friendly fuels. Differential excise rates, for example, help the market share of low sulphur fuels to develop more rapidly. By allowing products to be differentiated by environmental category, tax incentives are an effective method for steering economic operators (business and consumers) towards products which promote sustainable development.

³² COM(2001) 264, 15.5.2001.

³³ COM(2000) 769, 29.11.2000.

³⁴ OJ L 316, 31.10.1992, p. 19, as last amended by Directive 94/74/EC (OJ L 365, 31.12.1994, p. 46).

³⁵ e.g. on fuels used in commercial air transport.

Lastly, derogations are also aimed at the development of public transport, particularly in urban centres, by allowing tax exemptions or reductions on fuel used by local public passenger transport.

Tax treatment of biofuels

Pursuant to Directive 92/81/EEC, biofuels blended into motor or heating fuel are taxed according to end product and use. On being added to petrol, for example, ethanol, which is not a mineral oil within the meaning of Directive 92/81/EEC, becomes a motor fuel subject to the current rate of excise duty on petrol in the Member State concerned.

Member States are allowed two possibilities by Directive 92/81/EEC for implementing measures to reduce or exempt excise duties on biofuels.

Firstly, under Article 8(2)(d) of the Directive, “Without prejudice to other Community provisions, Member States may apply total or partial exemptions or reductions in the rate of duty to mineral oils used under fiscal control: ... in the field of pilot projects for the technological development of more environmentally-friendly products and in particular in relation to fuels from renewable resources”.

Secondly, according to Article 8(4) of Directive 92/81/EEC, “the Council, acting unanimously on a proposal from the Commission, may authorise any Member State to introduce further exemptions or reductions for specific policy considerations.”

In September 2000, the Court of First Instance³⁶ annulled the Commission decision of April 1997 which established the compatibility of the state aid scheme³⁷ in France involving the reduction of excise duty on ethyl-tertiary-butyl-ether (ETBE) on the grounds that the legal basis for the tax derogation, i.e. Article 8(2)(d) of Directive 92/81/EEC, was not relevant because the manufacture of ETBE in France had gone beyond the pilot project phase.

Prior to the CFI judgment, Member States allowing tax reductions or exemptions for biofuels had made use only of the option offered by Article 8(2)(d) of Directive 92/81/EEC. Subsequently, in accordance with Article 8(4) of Directive 92/81/EEC, the French, Italian and UK authorities have applied to the Commission for derogations allowing them to apply excise duty reductions on biofuels.

3. OBJECTIVE AND SCOPE OF THE PROPOSED DIRECTIVE

The development of renewable energies, in particular biofuels, is a clear political priority for the EU in the context of commitments on the reduction of greenhouse gases. Security of EU energy supply is also becoming of increasing importance.

Tax incentives are an effective tool of both environmental and energy policy. Taxes make up a significant proportion of the selling price of energy products, in particular motor and heating fuels.

Appropriate differentiation of excise rates would contribute to the development of the biofuel industry by offsetting the high cost of manufacturing biofuels compared to fossil fuels. At a

³⁶ CFI judgment of 27.9.2000, Case T-184/97, *BP Chemicals v Commission*.

³⁷ Decision of 9.4.1997, SG (97) D/3266.

crude oil price per barrel of between 25 and 30 dollars, the cost of producing pure biodiesel, unblended with fossil fuel, is currently EUR 0.25-0.30 more per litre than for fossil diesel oil.³⁸

The effectiveness of tax instruments is often enhanced if the tax (relief) measures form part of a coherent package of technical, regulatory and economic measures. This is the case here as two proposals for directives have been drawn up in conjunction, one on the compulsory incorporation of biofuel in fuels sold, the other providing Member States with a flexible economic instrument to help implement the first proposal or even go further than its objectives.

The need to adopt a simple and transparent legal framework for the implementation of reductions in the excise duty on biofuels was already acknowledged in 1992 in the proposed Directive on excise duties on motor fuels from agricultural sources³⁹ and again in 1997 in the proposal for a Council Directive restructuring the Community framework for the taxation of energy products,⁴⁰ Article 14(1)(b) and (c) (biomass and waste) which allows Member States to apply reductions and/or exemptions in excise duty on biofuels. Unfortunately, the 1992 proposal was not adopted by the Council⁴¹ and the 1997 proposal is still on the Council table.⁴²

The definition of biofuels in the 1997 proposal still applies today subject to the addition of water when used, for example, with certain fuels and additives (“aquazole”).

The burgeoning interest in the development of biofuel industries is clearly illustrated by the tax incentive programmes implemented by some countries to promote biofuels and a close inspection of recent Member State budgets and the ongoing debates in various national parliaments.

Despite variations in the types of product concerned, the projects generally include a tax-related component: a reduction in excise duties.

Faced with the prospect of an ever-increasing number of individual applications for excise reduction or exemption measures from Member States under Article 8(4) of Directive 92/81/EEC, the Commission considers it in the Community interest to establish a legislative framework on the basis of Article 93 of the Treaty to provide economic operators and Member States with the necessary legal certainty required to ensure the development of a genuine market in these products. A Community framework is conducive to better functioning of the internal market.

The attached proposal for a directive allows Member States to reduce excise duties, under fiscal control, in proportion to the percentage of biofuel incorporated in the fuel or end product. This proportional reduction in tax is consistent with the objective of the regulatory Directive as the higher the percentage of biofuel, the greater the value of the potential reduction in excise duty on the end product.

³⁸ OJ C [...], [...], p. [...].

³⁹ Proposal of 19.2.1992 (COM(1992) 36, published in OJ C 73/1992, p. 6), as amended on 1.7.1994 (COM(1994) 147). The proposal is often referred to as the “Scrivener” proposal.

⁴⁰ COM(1997) 30, 12.3.1997.

⁴¹ The proposal was withdrawn by the Commission in 1999.

⁴² The current proposal for a directive does not affect the 1997 proposal.

With a view in particular to mitigating the loss of Member State budget resources, however, the actual amount of tax on the end product may not be less than 50% of the normal rate of excise duty for the corresponding propellant. Transitory measures are foreseen in favour of products solely made up of biofuels, which have been totally exempted from excise duty on 1. January 2001. Furthermore, if required by specific circumstances at national level, additional exemptions or reductions may be authorised according to the procedure of Article 8 (4) of Directive 92/81/EEC.

In order to limit distortions of competition and maintain the incentive of a reduction in costs for producers and distributors of biofuels, the proposal calls on Member States to set up excise reduction mechanisms which take account of changes in raw material prices so that in the event of a sustained rise in crude oil prices, for example, the lower tax rates do not over-compensate for the extra cost of manufacturing biofuels.⁴³

The proposal also contains an additional optional reduction for biofuels used by local public passenger transport, including taxis, and by public authority-operated vehicles identified in the communication on alternative fuels for transportation as appropriate and setting a good example.

To take into account the principle of free movement of goods in the internal market, only some biofuels, intended for use as heating fuel or motor fuel, have to be integrated in the scope of Directive 92/12/EEC,⁴⁴ on the general arrangements for products subject to excise duty and on the holding, movement and monitoring of such products. Implementing measures are included in order to define what has to be understood by a product “intended for use as heating fuel or motor fuel”. Lastly, it is important to ensure monitoring of derogations, by limiting their duration.

4. CONCLUSION

The proposed Directive (amending Directive 92/81/EEC) will not only meet the current need to align national biofuel taxation schemes but will help Member States establish the necessary economic and legal conditions to achieve the targets to reduce emissions of greenhouse gases and to achieve security of EU energy supply which are stated in the proposed regulatory Directive setting the minimum percentage of biofuels in motor fuels sold after 2005.

The proposed tax Directive helps to provide flexible instruments which, in line with the subsidiarity principle, can be adapted to the budgetary constraints, local conditions (e.g. for crop growing) and technological choices of each Member State.

⁴³ E.g.: the price of pure biodiesel (i.e. of 100% agricultural origin) is approx. €0.35 per litre higher when a barrel of crude oil is at USD 20 and €0.20 when it is at USD 35.

⁴⁴ OJ L 76, 23.3.1992, p. 1.

Proposal for a

COUNCIL DIRECTIVE

amending Directive 92/81/EEC with regard to the possibility of applying a reduced rate of excise duty on certain mineral oils containing biofuels and on biofuels

THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Community, and in particular Article 93 thereof,

Having regard to the proposal of the Commission,⁴⁵

Having regard to the opinion of the European Parliament,⁴⁶

Having regard to the opinion of the Economic and Social Committee,⁴⁷

Whereas:

- (1) Article 6 of the Treaty states that environmental protection must be integrated into Community policies with a view to promoting sustainable development.
- (2) As a party to the United Nations Framework Convention on Climate Change, approved by Council Decision 94/69/EC,⁴⁸ the Community has undertaken to take the necessary steps to stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous interference with the climate system.
- (3) In its resolution of 8 June 1998,⁴⁹ the Council endorsed the Community strategy and action plan on renewable energy proposed by the Commission and called for specific measures on biofuels, i.e. fuels derived from renewable resources.
- (4) The communication entitled “A Sustainable Europe for a Better World: A European Union Strategy for Sustainable Development”,⁵⁰ highlights the important role of alternative fuels, including biofuels, in tackling climate change and in the development of clean energies.
- (5) Development of biofuels encourages diversity in the Community’s energy sources and thereby contributes to the medium and long-term security of its energy supply.

⁴⁵ OJ C [...], [...], p. [...].

⁴⁶ OJ C [...], [...], p. [...].

⁴⁷ OJ C [...], [...], p. [...].

⁴⁸ OJ L 33, 7.2.1994, p. 11.

⁴⁹ OJ C 198, 24.6.1998, p. 1.

⁵⁰ COM(2001) 264, 15.5.2001.

- (6) The relative prices of energy products are key factors in the Community's environmental protection, energy and transport policies. As biofuels are subject to taxation under Council Directive 92/81/EEC of 19 October 1992 on the harmonisation of the structures of excise duties on mineral oils,⁵¹ appropriate differentiation of excise rates would contribute to the development of the biofuel industry by offsetting the high cost of manufacturing biofuels compared to fossil fuels.
- (7) A Community framework for the reduction of excise duties on biofuels therefore needs to be established to contribute to the better functioning of the internal market and provide Member States and economic operators with proper legal certainty.
- (8) The above tax differentiation measures must form a coherent package of technical, regulatory and economic measures. Directive 2001/77/EC of the European Parliament and of the Council of 27 September 2001 on the promotion of the use of biofuels in transportation⁵² sets a compulsory minimum percentage of biofuels in all motor fuels sold.
- (9) Member States should be allowed the necessary flexibility to formulate and implement policies adapted to national circumstances.
- (10) Distortions of competition should be limited and the incentive of a reduction in costs for producers and distributors of biofuels maintained through the application by Member States of excise reduction mechanisms which take account of changes in raw material prices.
- (11) In some cases, reduced rates of excise duty which are lower than the minimum rates laid down by Council Directive 92/82/EEC of 19 October 1992 on the approximation of the rates of excise duties (92/82/EEC) on mineral oils⁵³ may be allowed.
- (12) Special measures are required for local public passenger transport, including taxis, and public authority-operated vehicles. Transitory measures should be foreseen in favour of products solely made up of biofuels, which have been totally exempted from excise duty on 1. January 2001.
- (13) Excise differentiation measures achieved under fiscal control may be complemented with additional exemptions or reductions according to the procedure of Article 8(4) of Directive 92/81/EEC. Before 1 January 2008 the Commission will report to the Council on these additional measures.
- (14) The duration of reductions in excise rates should be limited to enable their application to be monitored.
- (15) A multiannual programme of a maximum length of six years is sufficient for planning investment projects in the sectors concerned.
- (16) Certain biofuels, if intended for use as heating fuel or motor fuel, have to be assimilated to mineral oils in order to integrate them in the scope of Council Directive 92/12/EEC of 25 February 1992 on the general arrangements for products subject to

⁵¹ OJ L 316, 31.10.1992, p. 12, as last amended by Directive 94/74/EC (OJ L 365, 31.12.1994, p. 46).

⁵² OJ L [...], [...], p. [...].

⁵³ OJ L 316, 31.10.1982, p. 19, as last amended by Directive 94/74/EC (OJ L 365, 31.12.1994, p. 46).

excise duty and on the holding, movement and monitoring of such products⁵⁴. . Implementing measures define the construction to be placed at Community level upon products intended for use as heating fuel or motor fuel.

- (17) The provisions of this Directive shall be without prejudice to the application of Article 27(1)(a) and (b) of Council Directive 92/83/EEC of 19 October 1992 on the harmonisation of the structures of excise duties on alcohol and alcoholic beverages,⁵⁵ as regards the compulsory exemption of denatured alcohol and the arrangements for its distribution since the present tax arrangements must be applied solely to the specific case of denatured alcohol used as a fuel or fuel additive in accordance with Article 2(3) of Directive 92/81/EEC.
- (18) Since the measures necessary for the implementation of this Directive are measures of general scope within the meaning of Article 2 of Council Decision 1999/468/EC of 28 June 1999 laying down the procedures for the exercise of implementing powers conferred on the Commission,⁵⁶ they should be adopted by use of the regulatory procedure provided for in Article 5 of that Decision.
- (19) Member States should communicate to the Commission, for information purposes, the national tax measures which they adopt on biofuels. The obligation to communicate this information does not release Member States from the obligation of notification provided for in Article 88(3) of the Treaty. This directive does not prejudice the outcome of any future State aid procedure that may be undertaken in accordance with Articles 87 and 88 of the Treaty.
- (20) Directive 92/81/EEC must therefore be amended accordingly.

HAS ADOPTED THIS DIRECTIVE:

Article 1

Directive 92/81/EEC is hereby amended as follows:

1) In Article 2 (1), the following points shall be added :

- “(m) energy products falling within CN codes 1507 to 1518, if these are intended for use as heating fuel or motor fuel;
- (n) energy products falling within CN code 2905 11 00, which are not of synthetic origin, if these are intended for use as heating fuel or motor fuel.”

2) In Article 2a (1), the following points shall be added :

- “(f) energy products falling within CN codes 1507 to 1518, if these are intended for use as heating fuel or motor fuel;

⁵⁴ OJ L 76, 23.3.1992, p. 1, as last amended by Directive 96/99/EC of 30.12.1996 (OJ L 8, 11.1.1997, p. 12).

⁵⁵ OJ L 316, 31.10.1992, p. 21.

⁵⁶ OJ L 184, 17.7.1999, p. 23.

- (g) energy products falling within CN code 2905 11 00, which are not of synthetic origin, if these are intended for use as heating fuel or motor fuel.”

3) The following article shall be inserted:

“Article 2b:

For the purpose of articles 2 (1) (m) and (n) and 2a (1) (f) and (g), the construction to be placed upon products intended for use as heating fuel or motor fuel shall be defined in accordance with the procedure referred to in Article 9a (2).”

4) The following point IIa is to be inserted:

“IIa. Reductions for biofuels

Article 8b

From 1 January 2002 to 31 December 2010, Member States may, without prejudice to Article 8f, apply a reduced rate of excise duty under fiscal control on the taxable products referred to in Article 2 where such products are made up of or contain one or more of the following biofuels:

- (a) energy products falling within CN codes 1507 to 1518, 4401 and 4402;
- (b) energy products falling within CN codes 2207 20 00 and 2905 11 00, which are not of synthetic origin;
- (c) energy products produced from biomass;
- (d) water (CN codes 2201 and 2851 00 10).

"Biomass" shall mean the biodegradable fraction of products, waste and residues from agriculture (including vegetal and animal substances), forestry and related industries, as well as the biodegradable fraction of industrial and municipal waste⁵⁷.

Article 8c

1. The reduction in excise duty resulting from the application of the reduced rate laid down in Article 8b may not be greater than the amount of excise duty payable on the volume of biofuels present in the products eligible for the reduction.
2. The rates of taxation applied by Member States on the products made up of or which contain biofuels referred to in Article 8b may be lower than the minimum rates specified in Directive 92/82/EEC.

However, the level of taxation of these products, if intended for use, offered for sale or used as motor fuel, may not be lower than 50% of the normal rate of

⁵⁷ Directive 2001/77/EC of the European Parliament and of the Council of 27.9.2001 on the promotion of electricity produced from renewable energy sources in the internal electricity market (not published yet).

excise duty applied by the Member State on corresponding motor fuel.

“Level of taxation” shall mean the total amount of all indirect taxes (excluding VAT) charged, calculated directly or indirectly on the quantity of product consumed.

3. The Member States, which on 1 January 2001 totally exempted products solely made up of biofuels, may continue to totally exempt these until 31 December 2003.

Article 8d

1. Products made up of or which contain biofuels referred to in Article 8b, used by local public passenger transport, including taxis, and by public authority-operated vehicles may qualify, under fiscal control, for an additional reduction of a value equivalent to the reduction provided for Article 8b.
2. The limit laid down in the second subparagraph of Article 8c(2) shall not apply in the case provided for in paragraph 1.

Article 8e

The reduction in excise duty applied by Member States shall be adjusted to take account of changes in raw material prices to avoid over-compensating for the extra costs involved in the manufacture of biofuels in the event of a sustained rise in the price of crude oil.

Adjustments shall be made according to the variation in crude oil prices over the previous twelve months. The price variations shall be calculated using the ‘dated Brent’ monthly average oil price.

Article 8f

1. The reduction provided for in Article 8b may be granted under a multiannual programme by means of an authorisation issued by an administrative authority to an economic operator for more than one calendar year. The reduction authorised may not be applied for a period of more than six consecutive years. This period may be renewed.
2. In the case of a multiannual programme authorised by an administrative authority before 31 December 2010, Member States may apply the reduction provided for in Article 8b after 31 December 2010 until the conclusion of the multiannual programme but it may not be renewed.

Article 8g

Member States shall communicate to the Commission the schedule of excise duty reductions applied in accordance with point IIa by 1 January 2003 and every twelve months thereafter.

Article 8h

Before 1 January 2008, the Commission shall report to the Council on the tax, economic, agricultural, energy, industrial and environmental aspects of the reductions granted in accordance with point IIa. Additional exemptions or reductions granted in favour of biofuels

according to the procedure of Article 8(4) of Directive 92/81/EEC shall also be reviewed. The Commission shall put forward proposals, if necessary, for their abolition, amendment or extension.”

5) Point IV is hereby amended as follows:

(a) The title is replaced by the following words:

“General and final provisions”;

(b) The following Article 9a is added:

“Article 9a

1. The Commission shall be assisted by the Excise Committee set up by Directive 92/12/EEC.
2. Where reference is made to this paragraph, the regulatory procedure laid down in Article 5 of Decision 1999/468/EC shall apply, in compliance with Article 7 thereof.

The period provided for in Article 5(6) of Decision 1999/468/EC shall be three months.”

Article 2

This Directive shall enter into force on the twentieth day following that of its publication in the Official Journal of the European Communities.

Article 3

This Directive is addressed to the Member States.

Done at Brussels,

*For the Council
The President*