

**Question 3.1: How should second-generation biofuels be defined? Should the definition be based on:**

- a) the type of raw materials from which biofuels are made (for example, “biofuel from cellulosic material”)?
- b) the type of technology used to produce the biofuel (for example, “biofuels produced using a production technique that is capable of handling cellulosic material”)?
- c) Other criteria (please give details)?

The term “second-generation” biofuel was created by the automobile industry, because the new and more sophisticated production process (Fischer-Tropsch) made it possible to “design” new forms of (bio-)fuels. But it is not only the Fischer-Tropsch-Synthesis, that can transform whole plants to biofuel: combined with a methane separation the anaerobic fermentation can produce biomethane from cellulose as well; the pressureless catalytic depolymerisation can produce pyro-oil from all types of hydrocarbons which can be distilled to diesel; the enzymatic treatment of straw has ethanol as the final product.

Whatever definition is being used, it should be wide enough to cover all production technologies and all types of biomass. All four technologies have in common, that they can make use of the whole plant respectively the non-food portion of renewable feedstocks such as cereal straws and corn stover. In addition pressureless catalytic depolymerisation can also make use of oily leftovers of rape seed pressing and other hydrocarbons. As pressureless catalytic depolymerisation should be part of the promoted technologies a limitation to pure cellulosic material is not appropriate.

The energy effectiveness per ton raw material might be regarded as important, but the question of energy effectiveness is also a question of cost effectiveness. The market, its players and their ability to make production plants profitable will answer this question without saying. However, it is my opinion, that Fischer-Tropsch is likely to achieve a small market share only since it will have a lower energy effectiveness than all of the competing second-generation technologies. Measures therefore should not focus on Fischer-Tropsch but cover all technologies being able to improve energy effectiveness. The more fuel is being produced from a given amount of biomass the better for the (European) economy.

In this regard (bio-)ethanol made from straw is a second-generation fuel, so is (bio-)methane made from all kinds of biomass as well as synthetic diesel made from straw and/or wood and/or rape seed pressings and biomethanol made from biomethane and DME made from biomethanol. The examples show that the expression “second-generation fuel” is misleading. “Biofuels with high energy effectiveness made from biomass” fit better. In this respect energy effectiveness should be measured by ton and not by hectare because otherwise the left over “straw” would be in a severe disadvantage.

**Question 4.1: Should the legislation include measures to ensure that diesel containing 10% biodiesel (by volume) can be placed on the market, and is in fact placed on the market?**

Direct blending of biofuels with ordinary fuel can only be the first step of a transition phase. In the end there will no fossil fuels be left and 100% of the fuels have to be generated from renewable resources.

Low blends will show quick results but low blends will not be the only segments. In Germany fuels from renewable sources reached 3,8% by end of 2005 and 4,7% by end of 2006. It looks like that in Germany the European target of 5,75% can be reached by end of 2007 and thus 3 years earlier than aimed at. This was achieved by a bundle of measures including low blends (biodiesel, ethanol) as well as the sale of high blends (E85) and pure biofuels (biodiesel). So the whole thing is not a whether or not- but an as well as-question. With a growth rate of 1,10%-point per year Germany can reach a biofuel share of 20% by 2020 – and not only 10%. And this should be the target, 10% are not enough. We do not have that much time . . . .

The Commission should amend the fuel quality directive to increase the maximum blending of ethanol in petrol and the maximum blending of biodiesel in diesel to 10% by volume. But other means have to be added like the use of high blends and pure biofuels.

**Question 4.2: Should the legislation include measures to encourage the use of ethanol and biodiesel in high blends? If so, what?**

Yes, high blends are already on the (German) market (E85, Biodiesel) and currently represent substantial and growing segments. A concentration on low blends would kill these achievements. Yes, high blends need specialised vehicles and distribution systems – so what?

The measures should provide high blends with a medium to long term price advantage at consumer level. Petroleum tax should be reduced to nil and V.A.T. cut by half. Conversion of engines, if necessary, should be promoted by subsidies and/or cuts of motor vehicle taxation and/or cuts of road taxes. Consumers must have a total system price advantage when they decide to use biofuels: for them the purchase of new motor technology plus biofuel cost have to be lower than the purchase of a conventional motor which uses conventional fossil fuels.

In Brasil consumers can decide at the service station, which blend they want to put into the tank of their car. Filling stations have the infrastructure and car producers deliver the cars (FlexiFuel) with automatically adapting motors. Why should this not work in Europe as well? And it already is: Volvo recently presented a motor that uses E85 only. As soon as it is cheaper to tank E85 than normal gasoline or Super, the market will decide on its own.

**Question 4.3: Should the legislation include measures to encourage the use of biomethane, methanol and DME in transport? If so, what?**

Definitely yes for the simple reason that no type of biofuel should be privileged. However, if it should be necessary to treat the different types of biofuel individually the tax advantage of the individual biofuels should take the energy effectiveness of the transformation (process) into account as well as the ecological balance sheet. The higher the effectiveness and the better the balance sheet the higher the tax advantage.

Biomethane is a substitute for natural gas which already is used in vehicles, especially in Sweden and Italy and with a slowly growing share also in Germany. It is made from whole plants and for this reason represents the first form of second-generation fuel. Measures should include a cut of all kinds of taxation because biomethane has to compete with relatively cheap natural gas (in terms of Cent per kWh<sub>therm</sub>) and operators of gas pipelines and gas networks should be obligated to accept biomethane on a preferred basis and either to pay a certain minimal feed in-price for a period of 20 years (see biomass part of German EEG) or to make the use of pipelines available free of charge. Decentralised biogas plants could then feed in their biomethane at one place and gas stations could take an energy equivalent out at another place. Costs of filling in and virtual transportation could be allocated among pipeline / network operators on a yearly basis (see German EEG). So without too many investments into distribution systems biomethane gets to the customers (drivers of gas propelled vehicles).

Methanol made from biomass should be renamed "biomethanol". Methanol can be made not only from biomass-based synthesis gas but also from biomethane containing biogas. Since methanol made from natural gas is already being used to boost the octane number of super gasoline from 92 – 94 octane to 100 octane (then it is called Super plus) it should not be a problem at all to also blend biomethanol with super gasoline. This can be done on a low to medium blending level. Existing infrastructure can be used, vehicle motors do not need an adaption. But again, taxation should be zero for as long as possible and petroleum companies should be obligated to accept biomethane on a preferred basis and to pay a certain minimal price for a period of 20 years (see biomass part of German EEG). Procurement cost could be allocated among pipeline / network operators on a yearly basis (see German EEG).

Methanol is also already in usage in high blends and in pure forms (for example in stock car racing). However, since methanol is somewhat aggressive motors and tanks need some adaptations. But in the long run methanol has the brightest future of all biofuels hydrogen included: it will get the biggest market share as it combines four key advantages: firstly to make methanol from biomethane is more effective than to produce hydrogen with electrical current, secondly existing distribution systems need small adaptations only whereas hydrogen needs its own distribution system, thirdly methanol motors are a quantum leap cheaper than hydrogen fuel cells and fourthly methanol tanks are a lot lighter and smaller than tanks for liquid hydrogen. For this reason the methanol economy will come into being a lot quicker than the hydrogen economy and once being there it will represent an immense hurdle for the development of hydrogen systems.

Currently the technologies for this methanol economy are under construction. The first biomethanol can be on the market within 3 years if the Commission helps to provide the necessary framework now: tax exemption for at least 15 years, virtual usage of existing gas networks free of charge and obligation of petroleum companies to accept biomethane on a preferred basis and to pay a certain minimal price for a period of 15 to 20 years.

In some respect DME is the pure version of (bio-)methanol. The conversion of biomethanol to DME results in a further reduction of energy efficiency. So DME might be a substitute for normal gasoline,

but this disadvantage makes it more expensive than (bio-)methanol and biomethane. However, just to give it a chance, it should be treated equally to all other biofuels – if made from biomethanol.

**Question 4.5: Should the legislation ask the Commission to review, by a given date, whether it is possible to be confident that the 10% target can be achieved through rules a) to c) ? If so, what should the date be? If the review were to conclude that the target is unlikely to be met, what action should the Commission take?**

This question is somewhat artificial. As said above, the target of 10% can only be a first step. It is feasible to get close to 20% by 2020 but only if legislation gets rid of its self-restriction to a minimum number of measures. If legislation is already in the beginning of this process doubting that the target can be achieved, why not doing it right from the beginning? Create a full bundle of measures, including low blends, high blends and pure versions of biofuels. The motor industry is flexible as Volvo recently proved. Who will be punished if the measures result in an overshooting of the 10% target?

Now the basis has to be built for all versions of biofuels including the four options under c). Even if it might take longer for new biofuels to have a true impact on the market the year 2020 is not the end. The problem will not become smaller but bigger year by year. We need to do all we can now to overshoot the 10% target - not only those measures that just get us close to this goal which in my eyes is set much too low.

**Question 4.6: More generally, what role should taxation play in the promotion of biofuels (considering different situations such as low blends, high blends and second-generation biofuels).**

#### High blends of second-generation biofuels

High blends can directly be sold to the market by their producers with the possibility to bypass the sometimes very unwilling oligopol of petroleum companies.

The best promotion of (new) biofuels is if they can be offered at a relatively low market price (as compared with fossil fuels and in terms of cent per kWh<sub>therm</sub>). As soon as biofuels are cheaper than fossil fuels consumers and forwarders will rapidly select them as the preferred fuel and will boost this fuel segment. The market power of millions of consumers is stronger than anything else. In this respect taxation might play the key role in the governmental promotion schemes.

Second-generation biofuels have higher production costs than first-generation biofuels and much higher production costs than fossil fuels. This has to be made up for. At the same time margins of producers' of second-generation fuels have to be larger, not only to cover all costs involved but also to provide a reasonable risk premium for covering the risks involved with this new business and to generate profits for further expansion of production and distribution facilities. To get these players in this market need a true (tax?) advantage over fossil fuels.

Since this business is also very capital intensive investors' risks have to be limited. In this emerging industry lead times are 3 to 5 years and payback times of investments are 12 to 20 years. At least for this time banks and other providers of financial funds need a stable basis to calculate with, so for them the companies being able and willing to engage in this field do not present a too risky business.

#### Low blends of second-generation biofuels

Low blends means that the (second-generation) biofuels are produced by more or less decentralised plants and sold to the oligopol of fuel companies. No one else has the refinery infrastructure. For producers of (second-generation) biofuels it is very difficult to come to fair terms with this oligopol. Therefore these players have to be forced to buy (second-generation) biofuels at given prices.

The best example for a successful legislation is the German EEG: a reasonable minimal compensation for preferred (!) feeding in of electrical power made of biomass into existing infrastructure – granted for 20 years – reduced the risks for producers to biomass-conversion and biomass-procurement only. This business model convinced the capital market and this triggered the fast growth of rural biogas plants.

To achieve fast results with biofuels and/or second-generation biofuels producers and retailers need at least for the lead and payback time a stable economic foundation. One they really can rely on and trust in. They may not be surprised by sudden taxation changes. Already the chance, that this might happen, reduces the willingness of bankers to provide financial funds.

Taxation has to make sure, that biofuels have the chance, to be cheaper than fossil fuels. This means, European taxation guidelines may not contradict the attempts to promote biofuels - as happened in August 2006, when for reason of so called overcompensation German legislation was forced to tax biodiesel. In the end producers had to bear the tax burden – resulting in lower ex-plant prices and in many times a loss at the bottom line. This example of goal conflict already lead to insolvency of a number of producers of biodiesel and – consequently – in the destruction of overall production capacity. In parts we face a beginning down-turn of this market segment. At least the growth rate is not any longer as high as it could be.

Why not forcing the oligopol of fossil fuel providers/retailers to accepted biofuels on a preferred basis and at fixed (feed in) prices linking this legislation with a (virtual) cross compensation scheme among those producers/retailers (compare German EEG)?

From my point of view for the next 6-7 years for new production facilities the taxation should be irrespective of the blending grade: for a period of 15 to 20 years their output of second-generation biofuels have to be free of petroleum/fuel tax, no matter what distribution channel is used. This as well keeps administration at a low level. Also V.A.T. could be cut by half.

After this initialisation phase of 6-7 years the tax advantages could be cut by – say - 5% per year but only for then new plants which start their business after these 6-7 years. The early players should benefit from their early entry into this - in the eye of a banker - risky business.