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47th Report of Session 2005–06

The EU Strategy on Biofuels: from field to fuel

Volume II: Evidence

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TAKEN BEFORE THE SELECT COMMITTEE ON THE EUROPEAN UNION (SUB-COMMITTEE D)

WEDNESDAY 7 JUNE 2006

Present	Cameron of Dillington, L	Palmer, L
	Haskins, L	Renton of Mount Harry, L (Chairman)
	Livsey of Talgarth, L	Sewel, L

Memorandum by the Embassy of Sweden

BIOFUEL TARGETS

1. *Since the EU biofuels directive was adopted, what progress has Sweden made in meeting its target?*

Swedish National Target for 2005

The Swedish Parliament has, through its decision on the 2005 budget (prop.2004–05:1, utg.omr 21, report 2004–05:NU3, rskr. 2004–05:120) set the indicative target for the use of biofuels and other renewable fuels in Sweden.

As from 2005, these fuels must make up at least 3 per cent of total petrol and diesel consumption for transport operations, calculated on the basis of energy content.

The target for 2010 has been set to 5.75 per cent, in accordance with the reference value of the Biofuels Directive.

Outcome

There was an interest in biofuels in Sweden long before the Biofuels Directive.

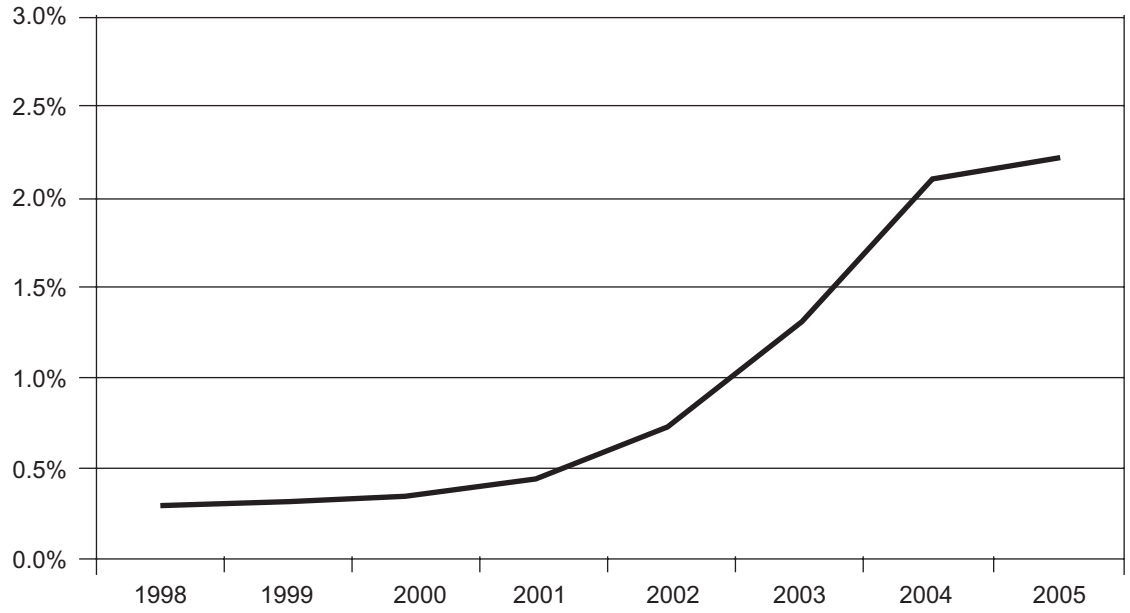
For instance, the Stockholm local transport company (SL) started introducing an ethanol bus fleet in the late 1980s.

In 1998, the share of biofuels, calculated on the basis of energy content, was already about 0.3 per cent.

In 2003, the share was about 1.3 per cent.

The Swedish national indicative target for 2005 was 3 per cent. This was not reached, mainly due to the limitations of blending ethanol into petrol of the EU Directive on the Quality of Petrol and Diesel. The share of biofuels for 2005 was 2.3 per cent, and thus higher than the EU reference value of 2 per cent.

The introduction of biofuels since 1998 can be seen in the diagram below.



2. *Has the EU biofuels directive proven to be an effective policy tool in stimulating consumption of biofuel?*

The Biofuels Directive itself has not provided any instruments or measures to introduce biofuels other than the reference values.

The national policies and measures, mainly the Tax strategy for alternative fuels, have played an important part, but many of these instruments were already underway due to domestic political initiatives.

3. *Has the rate of biofuel consumption increased more substantially since the adoption of the EU biofuels directive?*

See diagram above. The trend of increasing use seems to have started earlier than the adoption of the directive, but has continued with significant increases in 2004 and 2005.

4. *The Swedish Government has set a target of 5.75 per cent for 2010 biofuels consumption, will further policy measures be necessary to meet this target?*

Further measures will be necessary. The main barrier for easy and quick achievement of the 5.75 per cent target is the limitation of a maximum of 5 per cent per volume of ethanol in petrol. This corresponds to only about 3.3 per cent per energy content.

To achieve a higher energy share of the petrol type of fuels, the increase of this limit to 10 per cent would be the easiest. This is the subject of a current review by the European Commission. If this limit cannot be increased, the introduction of 5.75 per cent bioenergy into the petrol stream would depend on either pure biofuel vehicles, like so called FFV cars, or the further processing of biofuels into ETBE etc.

The introduction of FFVs is rapid in Sweden and a lot of interest is shown for the Ford Focus FFV, the SAAB 9-5 Biopower and the Volvo S4/V50 FFV models. However, even though the sales of these models are increasing rapidly, it will take a long time to make an impact on the composition of the total car fleet, and the rate of introduction of E85 is slower than the introduction of low-level blend petrol.

The break in trend can be clearly seen in the diagram above. The limit of 5 per cent ethanol in all petrol was reached between 2004 and 2005.

The diesel stream has seen less increase of biofuels. FAME-type biodiesel fuels have not yet made a large impact in Sweden. The domestic potential for producing RME is rather limited. Relevant government agencies like the Swedish Energy Agency, the National Road Administration and the Swedish EPA, also tend to view the well to wheel properties of RME as somewhat less than optimal.

Even so, even if 5 per cent RME were to be blended in all diesel, and 5 per cent ethanol in all petrol, this would fall significantly short of the 5.75 per cent target, and require an exceptionally fast market introduction of FFVs and other dedicated vehicles.

5. *What financial instruments or incentives have proven to be most effective in meeting Sweden's national targets for biofuel market share?*

The main financial instrument to promote the use of biofuels in Sweden is the tax strategy for alternative fuels that was introduced in the Governments budget bill for the year 2002. The strategy was adjusted in accordance with the budget bill for 2004 so that CO_2-neutral fuels are exempt from both CO_2 tax and energy tax with effect from 2004 as part of a five-year programme.

The tax strategy was recently notified with the Commission.

Recently, legislation has been introduced that require large filling stations to provide a biofuel alternative, and this has been enacted. Coupled to this legislation, an investment subsidy for those that choose to provide biogas has been introduced. The motivation is that the infrastructure of providing a gaseous fuel is much more expensive than the liquid options, ie E85 or RME.

A number of other incentives have also been introduced; see the appended reports from Sweden to the Commission on the Biofuels directive.

Biofuel Obligations

6. *To what extent has the imposition of biofuel obligations by the Swedish Government reduced the domestic biofuel industry's need for fiscal support?*

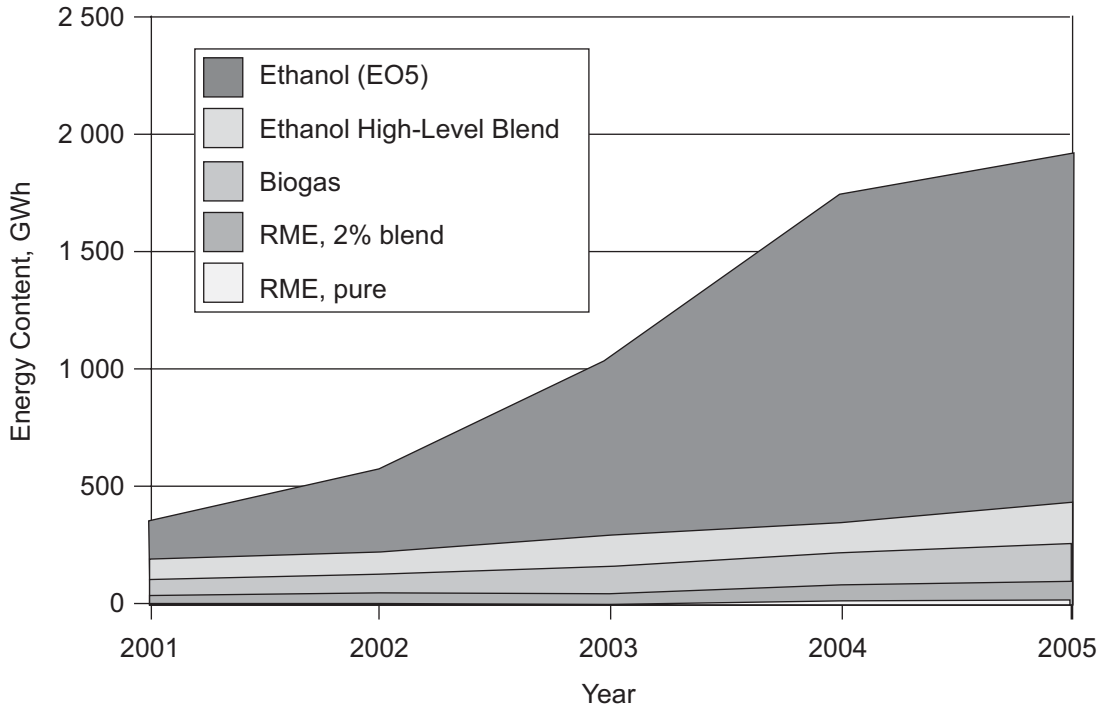
Biofuel obligations or quotas have not been introduced in Sweden, although an official inquiry has been carried out on the possibilities of using so called tradeable green certificates to promote biofuels. Such a scheme of tradeable certificates is currently in use for the promotion of new renewable electricity. The results so far are encouraging.

Production of Biofuel

The current use of different biofuels are shown in the diagram below.

The production of biogas and RME is domestic, while the majority of the bioethanol is imported, from Brazil and from the EU.

Currently, domestic production of bioethanol is only about 20 per cent of the total bioethanol used in the various forms.



7. *What is the comparative cost of producing (a) biodiesel and (b) bioethanol in Sweden and which has the greatest potential for increased production?*

(a) Biodiesel

The production of RME is mainly domestic. The costs are probably slightly higher than the European average due to the somewhat colder climate.

The domestic production of Biodiesel I set to increase shortly, since there are plans for investments in new plants. The overall potential for domestic production of RME is however somewhat limited.

An official government inquiry presented its report in December 2004, entitled "The Introduction of Renewable Transport Fuels" (SOU 2004:133). In this, the potential for the domestic production of various biofuels were listed. The estimates were based on data from the stakeholders concerned.

The potential for the production of RME is given as about 1 TWh by 2010, and was not expected to increase in 2020 or 2030. An energy content of 1 TWh corresponds roughly to 1.25 per cent of the energy currently used for transport in the form of diesel and petrol.

(b) Bioethanol

The production cost of bioethanol from grain is likewise estimated to be slightly higher than the European average. In the background documents for the notification of the Swedish tax strategy , the cost for domestic production of bioethanol for use in 5 per cent blend in petrol (E05) was given as 5.25 SEK per litre. That correspond to about 55 Eurocents per litre.

The domestic production of bioethanol is set to increase substantially, as several large investments are considered.

Still, the potential for the traditional production of ethanol from grain is fairly limited. The report SOU 2004:133 gives the potential in 2010 as 1.2 TWh, and the long term potential as 2.1 TWh.

There are, however, expectations of a substantial potential of production of bioethanol from cellulosic raw materials (forestry residues etc) through second generation processes.

This potential is estimated to make limited contributions in 2010, but in 2020 and 2030, it is expected to be possible to produce about 8 and 14 TWh of bioethanol in this way.

(c) Biogas

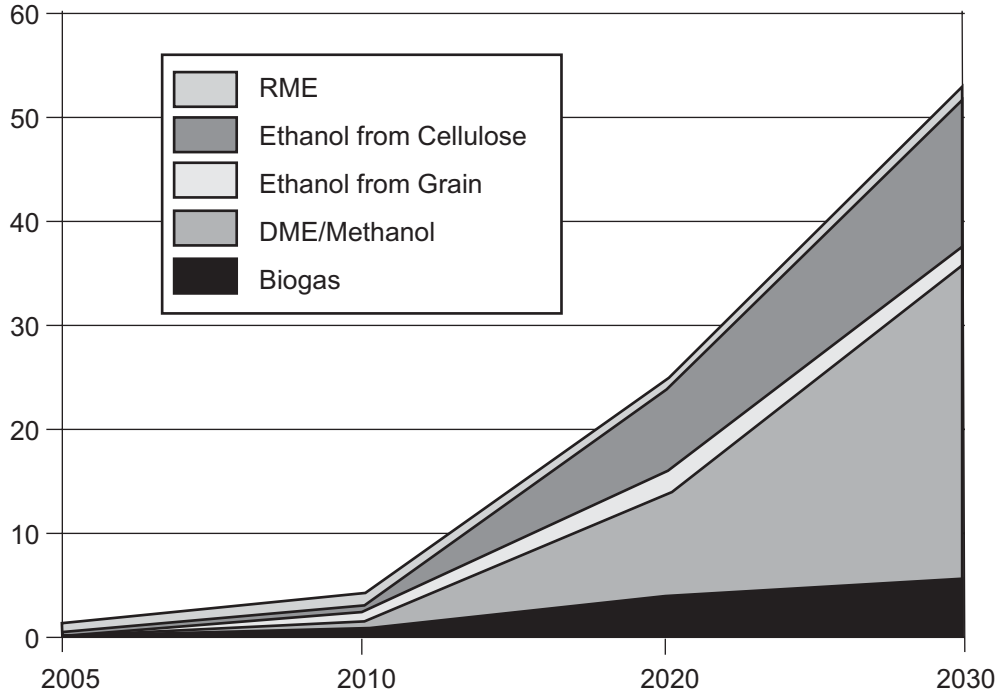
The third biofuel used currently in Sweden is biogas, upgraded to natural gas quality and used as transport fuel.

Biogas is expected to have a potential of about 1 TWh in 2010, and 3.6 TWh in 2020.

(d) Other fuels

The main potential for domestic production of biofuels are to be found in the second generation processes, mainly through the gasification of biomass, waste of black liquor, and the production of DME, Fisher-Tropsch fuels, methanol of renewable synthetic natural gas (methane).

The total potentials of the different fuels as estimated in the report SOU 2004:133 are given in the diagram below.



According to these estimates, domestic production could conceivably be as high as 50 TWh by 2030; corresponding to more than 60 per cent of the current use of diesel and petrol. To this should be added the imported fuels.

On the other hand, these estimates are for the potential, and are not predictions for the future. In order to be realised, a number of conditions must be fulfilled, ie the successful outcome of RD&D projects, the availability of capital for investments, stable long term conditions for the introduction of biofuels, etc.

The cost of these alternatives are very difficult to estimate. They may be expected to be high in the beginning, as many of the early plants will have to be of pilot and demonstration character.

As experience is gained, however, the costs of the second generation fuels are expected to become lower than the current processes. How long a time such a process might take is of course very uncertain.

8. *What steps has Sweden taken in research and development to reduce the production costs of biofuels?*

Sweden has for sometime invested considerable resources in RD&D to develop so called second generation biofuels.

A main focus has been the development of processes to produce ethanol from cellulosic raw material like forestry residues. A pilot plan was inaugurated in Örnsköldsvik in 2004. Industrial stakeholders currently consider plans for investments in full scale production plants.

Another main focus is RD&D on gasification of biomass and waste to produce a number of different biofuels from the resulting synthesis gas.

A major R&D effort is centred on the former biomass IGCC plant in Värnamo. The research at this Växjö Värnamo Biomass Gasification Centre (VVBGC) is supported by both national funding and by the EU Framework Programme 6. The project is called CHRISGAS—Clean Hydrogen RIch Synthesis Gas.

Another effort is focused on the gasification of black liquor from paper production. A demonstration plant, the DP-1, for black liquor gasification was inaugurated in Piteå in northern Sweden on 23 February 2005.

A further line of study concerns the production of biogas and the subsequent upgrading to natural gas quality. Upgraded biogas is available as a transport fuel already today, and can be used in the same type of cars and vehicles that are made for running on natural gas.

Biofuels studied include SNG (synthetic renewable methane) and biogas, ethanol from cellulose, methanol, DiMethylEther (DME) and Fischer-Tropsch diesel of petrol.

Biorefineries or multigeneration production plants are generally envisaged.

Trade in Biofuel

9. *From which EU Member States does Sweden import the greatest volume of biofuel and why?*

The import has mainly been from Brazil in the past. Due to a recent change in the customs payable for imports from Brazil, however, the interest in European ethanol has increased.

In 2004, imports of bioethanol were mainly from Brazil, but also from France, Spain and Italy.

The reason is a high demand and limited domestic production, as well as the lower price of the Brazilian bioethanol compared to domestic and European supply. Also, the well-to-wheel properties of tropical sugar cane based bioethanol are very good compared to average European production.

10. *What impact has imported biofuel had on domestic Swedish production?*

During the notification of the Swedish tax strategy for alternative fuels, it was noted that a general tax exemption for all biofuels would lead to a significant over-subsidisation of Brazilian imports.

This situation would have made it very hard for domestic and European production to compete. To avoid this, a requirement was introduced in November 2005 so that ethanol from outside the EU, in order to qualify for the tax exemptions when used as a transport fuel, must have been imported as undenaturated ethanol, paying a customs duty of 0.192 euro. With this duty on the imports, the cost is more on par with that of the domestic production, and interest in building new capacity increased. The change was also crucial for the EU decision to approve the tax strategy.

11. *To what extent has the rising price of crude oil influenced the Swedish government's decision to invest in biofuels?*

The volatile and high crude oil prices has been an important reason for the Swedish Governments new target of breaking Sweden's dependence of oil and other fossil fuels by 2020.

Technical Barriers

12. *Are there climatic conditions particular to Sweden that have acted as barriers to the introduction of biofuel into national fuel markets? If so, how have they been overcome?*

The cold climate may be a barrier to the use of biofuels due to problems of starting in very low temperatures. Some owners of FFV cars may tend to use more petrol in wintertime to make sure the car starts. So far, such barriers have not been seen as particularly important.

Looking Ahead

13. *Should the European Union take further action to promote biofuel production; and, if so, what action is required?*

The Communication from the Commission [SEC(2006) 142] "An EU Strategy for Biofuels" outlines a number of possibilities that should be considered.

Sweden has stressed the importance of a long term strategy for the introduction of biofuels. Among the more important would be promotion of new and better production processes and second generation biofuels, and policies and measures to promote specifically those biofuel options that are cost and resource efficient and give optimal reduction in GHG emissions.

5 June 2006

Examination of Witness

Witness: MR MARTIN RAHM, First Secretary, Economic and European Affairs—Embassy of Sweden, examined.

Q1 ***Chairman:*** Good morning, Mr Rahm. We are very pleased to see you. We have a note that Miss Louise Bonbeck is also coming. Is Miss Bonbeck with you?
Mr Rahm: Unfortunately, she is not able to come. I am replacing her.

Q2 ***Chairman:*** Thank you very much for coming. As you know, we have just started on the inquiry into EU targets for biofuels and we are very pleased that you have come to talk to us today. I should advise you that what we are saying will be on our website, so it will be available to the public. We will send you draft minutes at the end and, if there is anything that you wish to correct, you have an opportunity to do so. May I begin by apologising because I know that you very kindly sent us a paper, but we have only just received it and I for one have not had time to read it. I do apologise for that. Therefore, if some of our questions have already been answered in your written paper, you must forgive us. Is there anything that you would like to say by way of a statement before we begin the questions?
Mr Rahm: Thank you very much for inviting me here. I am particularly glad to be here before 20 June when England and Sweden meet in the World Cup! It is really a privilege to be here and we are also very glad in Sweden that the UK Government and Parliament take such an interest in the biofuels issue. As you know, it is a key priority for the Swedish Government and it is part of the Swedish Government's ultimate goal of trying to decrease our dependency on fossil fuels. That is very important for us. I am of course happy to answer any of your questions. I did not have time to send a few notes about myself but I should mention that I am First Secretary at the Embassy and I deal with EU issues and economic matters. However, I am not a specialist on biofuels and, if there are any questions that I am unable to answer, I would be happy to check them out and come back to you. We are very open to providing you with all the information that you want.

Q3 ***Chairman:*** That is extremely kind of you and we fully understand the comment about not being an expert in biofuels. A number of other people in the room today will feel the same, I think. You set yourselves a 2005 target of three per cent for total petrol and diesel consumption biofuel based on energy content. What progress has been made so far in reaching that target?
Mr Rahm: You rightly point out the three per cent target that we had; it was actually in our 2005 Budget Statement. We have not quite reached the target. The figure I have for 2005 is 2.3 per cent, which is still higher than the reference value that is in the directive but it is not quite at three per cent. The main reason for that at the moment is that there are limitations on how much ethanol you can blend into petrol and that relates to another EU Directive called the Directive on the Quality of Petrol and Diesel. That is the main reason as we see it for not having reached the target.

Q4 ***Chairman:*** Do you think that the EU Biofuels Directive has had much influence on you or would you have done what you have done in any case? Has it had any influence on stimulating the consumption of biofuels in your country?
Mr Rahm: It is a little hard to tell. The directive itself has not really provided any new instruments, or measures for that matter. We have the reference value of two per cent, which gives you an indication of where we are heading. Apart from that, it has mainly been national policies that we have pursued, in particular the tax strategy that we have in Sweden for promoting alternative fuels. That is all I can say about that.
Chairman: We will come back to the question of tax strategy in a moment.

Q5 ***Lord Palmer:*** Has the rate of biofuel consumption increased more substantially since the adoption of the EU Biofuel Directive?
Mr Rahm: There is an increasing trend of use. The increase appears to have started earlier than the adoption of the directive, but it has continued also in significant increases in 2004 and 2005.

Q6 ***Lord Palmer:*** Looking at your target in 2010 of 5.75 per cent, do you think that further policy measures are necessary in order to meet this target or are you quite confident that by then you will be on target?
Mr Rahm: No. I think that there definitely need to be further measures. I come back here to what I said before about the limitation of a maximum of five per cent of ethanol in petrol, the way you blend petrol with ethanol. We are of the opinion that this limit needs to be increased to, say, 10 per cent. That would be really helpful to reach the target, which is, as you rightly mentioned, quite ambitious: 5.75 per cent for 2010. This is currently under review by the European Commission. If that is not possible, we would have to look at other measures, but that would be the main measure as I understand it.

Q7 ***Lord Haskins:*** Not surprisingly, Sweden has a formidable range of tax regulations in order to deal with these matters which are much more impressive and more widespread than in this country. What are the financial instruments or incentives which have proved most effective in encouraging enabling the country to meet its biofuel targets? Which are the ones that really matter?
Mr Rahm: As you rightly point out, we have some tax incentives. They are all in what we call a tax strategy for alternative fuels that was introduced in 2002 in which CO_2 neutral fuels are exempt from both CO_2 tax and energy tax. This took effect in 2004 and is a five-year programme and I presume that there will be an evaluation after that period. That is the main tax incentive. There has also been some legislation introduced which requires large petrol stations to provide a biofuel alternative. There are also investment subsidies for those who want to invest in such biofuel stations and the reason for that is that this kind of infrastructure is more expensive than the normal petrol one.

Q8 ***Lord Haskins:*** You say that 75 per cent of all vehicles purchased have to be environmentally friendly, but what does that mean? What is the definition of being environmentally friendly? Does that mean no four-by-fours?
Mr Rahm: I will probably have to come back to you on the definition of environmentally friendly. I guess that it is at least using either this blended petrol. It is the ideal solution to have vehicles that are purely run on biofuel although there is still probably a long way to go. I would say that that is the definition.

Q9 ***Lord Haskins:*** And then, intriguingly, they reduced insurance premiums. How does the State become involved in establishing reduced insurance premiums?
Mr Rahm: I would not know the details of that, I am afraid, but I would say that generally in Sweden it is a combined effort from the Government and the private sector.

Q10 ***Lord Haskins:*** I think that is the real issue. The private sector is much more pro-active in Sweden on these issues than it is here.
Mr Rahm: I would not like to comment on that but it is fair to say that the private sector in Sweden is on board, so to speak. They are very active in this field and, as you might know, I think it is also in the material here that the major car manufacturers are involved in trying to produce these flexible fuel vehicles, FFVs, which has been fairly successful. Obviously they see potential business opportunities here for the future, so I think that is why they are involved. It is a combined effort.

Q11 ***Lord Sewel:*** Could we have a look at the production costs and the comparative cost of producing biodiesel and bioethanol in Sweden and query which has the greater potential for increase in production when you look at the total cost structure and also the opportunities for physically producing.
Mr Rahm: That is of course a very important issue. If we start with biodiesel, the judgment at the moment seems to be that the overall potential for domestic production of biodiesel is somewhat limited. There is an estimate that maybe 1.25 per cent of the energy currently used for transport in the form of diesel and petrol could be replaced by biodiesel but that is quite far in the future.

Q12 ***Chairman:*** Do you have any idea—and I will understand if you say you do not—how that target is arrived at?
Mr Rahm: I think there have been some investigations into this and serious efforts made at trying to reach an estimate. There was an official Government inquiry in 2004 which contained a lot of data and estimates and I am sure that this information could be forwarded to you if it is not already in some of the documents that were sent. There has been a serious effort to do this estimate.
Chairman: On that basis, if it is not in this document, it would be very helpful for us to have an estimate of targets both on bioethanol and biodiesel.

Q13 ***Lord Sewel:*** My underlying concern here is the extent to which a policy based on targets is itself price sensitive. In deciding what level of target you ultimately wish to see, are you taking account of the cost implications of getting to that target or do you start from your original position of saying, "This is part of a policy of reducing our dependency on fossil fuels" and almost saying, "No matter what the price, no matter what the cost is, we are going to get our dependency down" or do you basically say, "If bioethanol and biodiesel are going to cost the earth and are not going to be price competitive, then we are going to have low targets"?
Mr Rahm: It is probably fair to say that we have set fairly ambitious targets but, in doing so and in particular when we implement it, we have absolutely considered the issues of costs. We have a big industry and also consumers that depend on fuel, so of course this is something that we have to take into account absolutely. I guess it is striking the balance, which the Government have tried to do but it is probably an ongoing process. If I just look at bioethanol, the production cost there is slightly higher in Sweden than the European average and corresponds to 55 euro cents per litre. This domestic production is set to increase substantially and there are also large investments in this area which are considered, but we are taking the costs and the

consequences for industry and consumers into account.

Q14 ***Lord Sewel:*** Are you trying to get the incentive right by using a tax regime?
Mr Rahm: Yes. There are some tax incentives, mainly the one I mentioned where fuels that area CO_2 neutral do get exempt from both the energy tax and other taxes.

Q15 ***Lord Sewel:*** Of course, if you are too successful, you decrease the amount of income coming in for public expenditure.
Mr Rahm: I do not have any details of that. It is a fair point but I think that it is taken into account.

Q16 ***Chairman:*** What is the current production availability domestically within Sweden of the bioethanol and biodiesel? I expect that is in your paper but I have not found it yet. What is the current production within Sweden?
Mr Rahm: We import quite a lot. The domestic production is only 20 per cent.

Q17 ***Chairman:*** Twenty per cent of what you are using?
Mr Rahm: Of the total bioethanol, yes. That is mainly on the bioethanol but that is the major source. It is imported from Brazil which is the main market, but also France, Italy and Spain.

Q18 ***Chairman:*** The Specialist Adviser, Mr Clery, has a question: was your 20 per cent total of biofuel or just of petrol?
Mr Rahm: The domestic production of bioethanol is only 20 per cent of the total bioethanol use, so that is focused only on bioethanol.

Q19 ***Lord Livsey of Talgarth:*** What steps have Sweden taken in research and development to reduce the production costs of biofuels? I have read your submission here. You talk about producing ethanol from cellulose raw material like forestry residues. Have you done an economic assessment of that or is that too early a question to ask?
Mr Rahm: There have been some estimates. We talk about the substantial potential of production of bioethanol from, for example, forestry residues and so on. It is through what we call second-generation processes. Some of these estimates point to saying that it would be conceivable for more than 60 per cent of the use of diesel and petrol to be done in this way with biofuels, but these are of course preliminary estimates, not predictions, and we would need to do much more of the kind of research and development that we are doing at the moment for example in Vaxjo where there is a biomass gasification sector. There is huge potential and of course, as a country, we are probably well suited given our forestry industry and all. This is something that we are looking into but it is still very preliminary.

Q20 ***Lord Livsey of Talgarth:*** So, you do not see ethanol yet competing with IKEA for forestry products?
Mr Rahm: No.

Q21 ***Lord Livsey of Talgarth:*** The production of biomass gasification looks very interesting and also clean hydrogen and synthesis gas. Do you happen to know if there is a very high percentage production of hydrogen from that process?
Mr Rahm: I would not know the details but I can certainly find out more. Are you referring to the CRIS gas?

Q22 ***Lord Livsey of Talgarth:*** Yes.
Mr Rahm: That is the centre in Vaxjo?

Q23 ***Lord Livsey of Talgarth:*** Yes.
Mr Rahm: I will certainly see if I can get more information about that.
Lord Livsey of Talgarth: If that is possible, it would certainly be useful to have that information.

Q24 ***Lord Palmer:*** How big is your conventional oil business in Sweden or do you really have to import everything?
Mr Rahm: We do not have any domestic oil production.

Q25 ***Lord Palmer:*** So, all oil is imported?
Mr Rahm: Yes, more or less. For electricity generation we have hydropower plants and nuclear plants.

Q26 ***Chairman:*** Perhaps that really takes us to the crude nub of the matter that with the rate of the rising price of crude oil, the more reason there is to invest in biofuels. Does the Swedish Government have a long-term policy about that in terms of saying, "If the oil price is going to be at $75 a barrel, that is a very great reason for us to increase our biofuels production"?
Mr Rahm: It is certainly right to say that the recent volatility in these markets is a reason for the Government to set up new targets and try to break Sweden's dependency on fossil fuels. Yes, absolutely so, but there is also a fairly recent commission that was appointed by the Prime Minister to really look into these issues. If I translate it directly from Swedish, it is called the Oil Commission.

Q27 ***Chairman:*** Has it reported yet?
Mr Rahm: Not as far as I am aware, no, but I could certainly find out a little more about that as it might be of interest.

Q28 ***Chairman:*** I think it would be very helpful if you could.
Mr Rahm: It deals with more than just the biofuels, it deals with the whole issue of energy.
Lord Haskins: It seems to me that Sweden has two things running for it that the UK does not have: (a) it is completely dependent on imports of oil and we are increasingly going in that direction; (b) in the hinterland, the potential for biomass which would be lacking in the UK. Therefore, you could argue that there are greater incentives for the Swedish Government to get on with this than the British Government.

Q29 ***Lord Cameron of Dillington:*** I am really going on from that and dealing with the technical barriers which I see from the written answer you have chosen to answer in terms of the consumer saying that sometimes the biofuel makes the cars harder to start in the morning in cold weather. I was much more interested in the production because we have not yet got to second-generation lignocellulose production of bioethanol which obviously would be extremely helpful in Sweden with your forest by-products. You said that, in terms of biodiesel, your production is going to be very small. In terms of bioethanol, at the moment you think you can produce 20 per cent. Do you have the potential to produce more or are you going to continue to rely on imports shipping all the way from Brazil using land that had jungle on it? There is an environmental balance that has to be achieved here.
Mr Rahm: No, absolutely. The goal is to increase the domestic production and to decrease the reliance on the imports.

Q30 ***Lord Cameron of Dillington:*** What is the crop that you might be growing that would help? Would it be wheat mostly?
Mr Rahm: I guess so but I am not 100 per cent sure on which crop, actually. As I mentioned earlier, we are putting a lot of effort into developing the production facilities and to also, in a way, break the dependency on imports. I would say that there are already some arrangements to do with Customs duties on when you import this raw material from Brazil, for example. It is now more in line with what domestic production would cost and also imports from other EU countries. Perhaps one could say that it is more of a level playing field and that should be of help as well. It is a process but we are also trying to improve the production facilities and we can see that there is huge potential there. I think I mentioned that there was 60 per cent—

Q31 ***Lord Cameron of Dillington:*** If you get the second generation.
Mr Rahm: Yes, it all depends on that. We are definitely not there yet.

Q32 ***Lord Livsey of Talgarth:*** You have given an extremely interesting answer to question 10, which is a question I was allocated, as to the tax system as to how you actually discourage through Customs duty 0.192 euro on imports of undenatured ethanol which is apparently on a par with domestic production and you have an EU decision that actually approves of that. Are people happy in Sweden with that outcome and is it going to make a big difference to you?
Mr Rahm: Three was a lot of discussion in the relevant council committee dealing with this and of course it is a sensitive issue because there is mainly one big Swedish producer that imports a lot of this material from Brazil, but I think the solution that was reached was something they felt comfortable with. It could have actually become prohibitively expensive to import from Brazil and that would have more or less destroyed the business, but it did not go that far and I think what was arranged or agreed was something that they could live with and which, as you rightly point out in the text here, is deemed to be more in line with domestic and other EU production. However, it was a sensitive issue.

Q33 ***Lord Cameron of Dillington:*** I would like to ask a further question about the European Union and whether you think it should take further action to promote bioethanol production or should this be left to Member States and, if you think it should take further action, what action should it take?
Mr Rahm: I do not have our policy on that. I say only in general we of course encourage greater use of biofuels in the EU and I assume if you can get more of a production going that would be helpful. I would not like to say anything more on that.

Q34 ***Lord Cameron of Dillington:*** Your neighbouring country of Denmark has taken the view that biofuels are not necessarily particularly environmentally friendly in the long run and do not wish to have any influence in the EU saying they should grow or use more of them. Do you have a Swedish response to that approach?
Mr Rahm: They are entitled to have that view. In the EU, one of the most important issues for us at the moment seems to be this issue of being able to blend petrol more with ethanol and to be able to really have an impact and reach the target. As for biofuels or production of biofuels in the EU, I think

I mention in my paper that we have seen limited effect of the directive as such because it is actually down to national policies and this is not something that we have started doing now but it is something that we started doing at the end of the 1980s, so it is a long process. I can certainly find out a little more on where we stand on biofuels production in the EU.

Q35 ***Lord Livsey of Talgarth:*** I would like to ask a few general questions which I do not expect you to be able to fully answer but I think it would be very useful if the Committee can get hold of this information. Which crops are you growing for the production of biofuels? Which crops are you growing for the production of bioethanol? Roughly what area of land is allocated to that? How many bioethanol or biodiesel production plants are there in Sweden?
Mr Rahm: I will certainly look into that.

Q36 ***Chairman:*** Following on from what Lord Livsey was saying, it seems to me that you in Sweden are walking a quite understandable tightrope in that there is a huge potential capacity from Brazil and you really want the price not to be so low that the Brazilians will not sell it but equally, if it is so low, it would be very discouraging your own industry. So, you have to get the balance right with Brazil as a potential or there to help you along the road. Do you feel that your efforts to encourage the growth of new development either of biodiesel or bioethanol in Sweden itself are enough? Are you seeing any effect of that? Do you have any factories that are being built at the moment?
Mr Rahm: I will have to look into more of the details. There is a lot of investment and research and development going on. There is the centre in Vaxjo that I mentioned, there are also some efforts to try to gasify black liquor from paper production and there is a demonstration planned for that in Pite—in the north of Sweden, and there is also a plant or similar institution in other parts.
Chairman: It would be very helpful if there are further data. In many ways, you are in the same position as Britain. People are looking at whether it is right to invest in a new plant or not. It is very difficult for them.
Lord Haskins: I heard your former Prime Minister say three weeks ago here in London that there was no problem with the oil supplies, the world has plenty of oil around, and that, at these prices, people will go after it and, if they do go after it, then the world price may not be—and this is his argument, not mine—quite as high as some people are confidently expecting. That to an extent holds people back from being confident to invest.
Lord Livsey of Talgarth: That is not a universal view at all. There is an opposite view that oil will go to $100 a barrel.

Q37 ***Chairman:*** I would like to ask one final question which is your answer to question number six. You spoke about the possibility of using so-called tradable green certificates to promote biofuels and said that the results so far are encouraging. Can you tell us anymore about that because it sounds very interesting.
Mr Rahm: I wish I could. I will definitely look into it. It is a method that we have used for the promotion of renewable electricity.

Q38 ***Chairman:*** You really have?
Mr Rahm: Yes.

Q39 ***Chairman:*** And it is working?
Mr Rahm: It seems to be working. These mechanisms are tried out in some other areas, also in the EU of course with its trading scheme of emission rights. It is something that we are looking into but we have not introduced formal quota or anything like that. I will have a look and see if I can find out a little more about this process.

Q40 ***Chairman:*** Thank you very much for the time you have given us. We do appreciate it. It is an interesting subject which we all have to learn a bit more slowly and we very much appreciate that you have given us time to come here today. If you can send in that further information, we would be very grateful.
Mr Rahm: Thank you. I am very happy to be here.

Examination of Witnesses

Witnesses: LORD ROOKER, a Member of the House, Minister of State (Sustainable Farming and Food) and MS SUE FINLAY, Industrial Crops Division, Department for Environment, Food and Rural Affairs, examined.

Q41 ***Chairman:*** Good morning, Minister. Thank you very much for finding the time to come and talk to us today. As you know, we have just started on an inquiry into biofuels and the effectiveness of the EU targets in this area. It will not be a very long inquiry; we are going to produce a short report before we break up for the summer recess. We much appreciate you coming. I was asked to tell my committee that in fact your particular responsibility in this area has been transferred from yourself to one of your colleagues.
Lord Rooker: It was transferred before I ever picked it up, to tell you the truth, which is why I am accompanied by Sue Finlay from the Industrial Crops Division for any technical issues, but I will do my best.

Q42 ***Chairman:*** It is very kind of you and thank you very much for bringing Ms Finlay with you today too. We are public to the extent that all of this will be going on our website. We will send you draft minutes when they are ready for you to make any corrections that you want. Is there anything that you would like to say by way of introductory statement?
Lord Rooker: Yes. I have a very short opening statement. Obviously, in order to meet the Government's domestic climate change targets, we want to look at a broad range of renewable energy sources. We believe that biofuels have the potential to provide significant contribution to the reduction of carbon dioxide levels. Although biofuels are more expensive than some measures for saving carbon such as biomass or domestic insulation, they are comparable with others such as offshore wind. With the prevailing high oil prices, biofuels have obviously become more cost effective and, in the future of course with better and more advanced technologies, we should see higher carbon savings and lower costs. Biofuels also have the potential to offer a new market opportunity for farmers and rural areas. The potential feedstocks for transport biofuels, oil rape seed for biodiesel and wheat and sugar beet for bioethanol, are of course familiar to farmers and so are an attractive proposition as long as markets can be established, and we are working closely with the industry and farmers to develop markets and promote the uptake. Currently, the biodiesel sold in the UK comes from recycled waste vegetable oil, which shows that there is gold in waste by the way which is a message that we constantly need to get across. It includes of course animal fats and imports and the bioethanol comes from imports. However, the number of companies building biofuel processing plants in the UK, which will use UK-grown crops, is now more than single figures. I have a few examples if you wish to pursue that.

Q43 ***Chairman:*** We did go and visit Green Spirit the other day, which is of course one of the plants about which you are talking.
Lord Rooker: To conclude, companies are now offering contracts to farmers to grow these biofuel crops. The farmers themselves can claim the single payment for certain biofuel crops grown on set-aside land or where the 45 euro per hectare energy aid payment is claimed for crops on non set-aside land. We are very keen to develop the uptake of biofuels both in the UK and abroad and obviously welcome the priority the European Union has given to this issue and indeed welcome your Committee's inquiry.

Q44 ***Chairman:*** Thank you very much. We would very much like to see that list of the UK companies that are moving down this road. If that could be sent to us, that would be very helpful.
Lord Rooker: Yes, sure.

Q45 ***Chairman:*** I would like to begin with your point about the EU and its targets. We have to accept that so far the indicative targets are not being met. Do you think there is a case of the EU suggesting mandatory targets and that should be established, which was I gather initially considered by the Commission prior to the 2003 directive? Of course, if you have a mandatory directive, you have to discover ways of ensuring that it is mandatory.
Lord Rooker: I accept and I suppose that it can be seductive in some ways for business and those potential investors if they know there are mandatory targets because they would probably in some ways have a greater confidence in investing and I understand, from reading the newspapers, that that was a point put to Number 10 yesterday. We do not support mandatory targets at the present time. What we want to do is to enable this industry to flourish in as flexible a way as possible and reflect various national circumstances and it will be the case that not all countries in the EU could operate to a one size fits all. Our overall objective of course is to reduce carbon emissions. We are not expressing the preference in many ways of one fuel as opposed to another or type of technology to another and our objective of course is to let the market provide as well and, if there were mandatory targets, that could lead to difficulties with supply and price levels as well.

That is our current position. I understand that the Commission is producing a report on the implementation of the directive with a view to possible revision and I understand that that will be later this year.

Q46 ***Lord Haskins:*** The EU target for biofuels is 2 per cent. The UK's target is a slightly more modest one of 0.3 per cent for this year compared with the EU's average of 1.4 per cent. Obviously we are having a difficulty matching the rest of the EU in achieving these targets. What factors are restricting the development?
Lord Rooker: I freely admit that on my crash course in research on this issue and I said colloquially, "If I look at these two figures", two figures I will share with you, "this means that we are miles behind", and the answer was, "Yes, we are". There are some factors in terms of barriers, as you say, Lord Haskins. Feedstocks in some ways are exported rather than used in the UK; we have a surplus and therefore we export it. I understand that for some reason there is a lack of crushing facilities in the UK. I understand that there is a plant in Liverpool and one in Kent and I am not sure of any others. There are of course production costs compared to fossil fuels and of course, the point I made, the reluctance of the oil industry to invest in the necessary blending and storage particularly for bioethanol. There is also a factor, by the way, as far as the motor industry is concerned. I understand that the motor manufacturers at the moment are sticking to their warranty claims that vehicles should run on blends no higher than 5 per cent and of course there is a massive lack of awareness of biofuels amongst users. We may be ahead of the game but, in terms of the generality of users and converting other products into fuel, it does take a while to get your head round the fact that you could run your car off what is grown in the fields, that is from an ordinary Joe Citizen point of view. So, there is a collection of barriers. I am not saying that all of them are lethal but we have a long way to go, there is no question about that.

Q47 ***Lord Haskins:*** Is the main difference in German perception that they actually pay a lot less for the stuff than we do in this country because of tax reasons?
Lord Rooker: Yes. We have a 20 pence reduction but I think other countries have somewhat more. However, this is where I put up my usual defence and say that, if you wish to talk about tax rates and duty rates, you are going to have to get someone from the Treasury.

Q48 ***Chairman:*** I think one has heard that remark before.
Lord Rooker: You have probably used it yourself!

Q49 ***Lord Palmer:*** Minister, I have been involved in biofuels over the last 10 years. I mean this in the least critical way possible but my experience over the last 10 years has been that there has been no joined-up thinking. On the last occasion when I had a question on biofuels, I thought that it was in fact Defra's, so I rang up Defra to see what the answer would be and Defra said, "It's not us, it's going to be DTI", so I rang the DTI who said, "No, it's not going to be us, it's going to be the Department for Transport" whom I then rang and they said, "No, it is going to be the Treasury". I did write to your predecessor three months ago suggesting that there ought to be an alternative energy tsar in order that there could be more joined-up thinking. It might be helpful to hear your comments, although this is not your responsibility, on whether you think that might carry favour.
Lord Rooker: I think it is a very fair question when one is dealing with what is in effect—I will call it new technology; it is not quite new in the sense of, let us say, nanotechnology—new technology. A far as government involvement is concerned, it is quite clear that more than one department is involved. If you are able to first of all grow fuel, quite clearly Defra is involved because it is use of the land. What is the fuel used for? Road vehicles. There are a massive amount of emissions from road vehicles. Industry: we want to provide as much home-grown as possible and therefore naturally DTI would be involved as the Department of Trade and Industry of course with the energy brief. I suppose there comes a limit when, if you are right at the centre, you keep saying, "We'll have another block or ministry". What you try and do is get the thing joined up with Cabinet sub-committees, make sure that ministers talk to each other in the departments and make sure that each department does not operate in a silo, and in some ways I have to say—and I am not sucking up to your lordships—the fact is that, in this House, as you all know, questions are to the Government and not to a department. That does make for more of a joined-up approach although, at the end of the day, there is only one person at the despatch box to answer for the Government rather than the department, and more than once I have answered questions in other roles where I have had briefs from more than one department because the Government needs to give a government answer. I quite clearly take your point but it is very early days at the present time. We are behind in many ways and you could argue that we have made a slow start but, in these early days, we have to make sure that, as we progress and meet the obligation and go for what is a substantial increase in biofuels, we make sure that we do all we can to make sure that the Whitehall side of the machinery is joined

up because that has to be good for business. Otherwise, people will not have the confidence to invest and they need to have the guarantee, if you like—perhaps "guarantee" is too strong a word—that there is a market out there and we, as Government, can lead in helping create the market and then we know that the private sector will supply the demand.

Q50 ***Lord Palmer:*** Following on from that, to what extent does the UK have a limited national total for the production of biofuels from biomass?
Lord Rooker: With our current technologies, we believe that we are on course to be able to provide feedstock for 5 per cent of all road use sales from domestic sources without any major changes. There is no doubt that, with advances in technology, both I would imagine in the growing, the crushing and the refining, we reckon that, by 2050, the UK could produce approximately one third of our needs using different feedstocks and that would include green waste such as grasses, straw, wood and organic waste. So, by 2050, which sounds a long way away but these things come quite quickly, to provide one third of our resources home grown would be fairly substantial. That is our best estimate at the moment.

Q51 ***Chairman:*** Our Specialist Adviser, Mr Clery, who has a long history in this area, would like me to ask you a question: Minister. It may be an ephemeral brief but you certainly mastered it in the time available to you.
Lord Rooker: You are about to prove I have not!

Q52 ***Chairman:*** The serious comment is that there has been a major dichotomy between the EU attitude to biofuels and the UK. Almost alone, the UK has concentrated on CO_2 savings which is certainly part of climate warming, and has almost ignored, as you did, Minister, the question of security of supply. My question specifically is: will there be a shift in Government policy to give more importance to the security of supply which biofuels can offer and less concentration on the CO_2 element? The EU has concentrated far more on security of supply. You did not mention security of supply. May I ask if that was an intentional policy omission or just a mistake.
Lord Rooker: No. I think in some ways the energy review which will be produced, I understand, during the summer or before the summer, will deal with this issue. I have to say that security of supply issues relating to energy has converted me personally from agnostic to nuclear to the other way, and to have a good mix. We have to have a good mix. The idea of being dependent for a lot of our energy needs when the gas and the oil run out and when our nuclear power stations quite clearly come to the end of life on imports from what are quite clearly not the most stable of countries and which prone to all kinds of other issues worries me greatly personally as I know it does other ministers. Therefore, the potential for actually growing our own fuel and of course using waste . . . I have just done a year, as Members will know, as Northern Ireland Minister and there is a slightly different operation there in terms of not being so much hands on because you are spread thin, but I did environment and agriculture and I did more work and conferences and meetings on what we do with waste in my first six months than virtually anything else, and that was to prove that you can use waste effectively. Putting it in the land is a waste, a complete waste. There is gold and money to be made in the recycling of waste both in energy and other areas. In terms of security of supply, to be able to grow fuel as well as create as much of our own energy as possible I think is absolutely the responsibility and duty of government.

Q53 ***Chairman:*** If you can leave that thought behind in Defra, I think it will be an immense step forward.
Lord Rooker: I am absolutely certain that I am speaking on behalf of the Secretary of State; I do not think there is any difference there. This is a major issue and this is a component; it is new and it takes a while to get your head around the fact that we could use our land in a way we have not used it before. It was not an option in the past but, due to the advances in technology, using our land for this is something that we would be absolutely barmy not to do.

Q54 ***Lord Haskins:*** Does not the shortage of land mean you would have the whole country covered in oilseed rape to achieve what you are doing? I have a friend in Germany who is actually investing in 100,000 hectares in the Ukraine to supply oilseed rape for the German market, so are there not going to be security issues? What is the difference between the Ukraine for biofuels compared with oil from the Middle East? I think that does not stand.
Lord Rooker: No. Oil from the Middle East has always been risky anyway, but the fact is gas pipelines running all across Europe from the far end are potentially a real issue so far as security of supply, for obvious reasons. I do not know, in terms of available land. We have got something like 5.7 million hectares of arable land that we use in this country. It escapes me what percentage of the land that actually is, but we are not planning to cover the countryside, Lord Haskins, with oilseed rape, I have to say—like we have not covered it in polytunnels either! However, there are opportunities, both for set-aside—not all set-aside can be used anyway for growing crops—and we have to balance, of course, the use of the land with protecting the environment and the habitats, but it may be that what is now commercial land could be used for growing energy crops because technology

enables us to do that. We may get a better performance out of them. When the need is there, when the market is there, ingenuity will actually take the technology forward.

Chairman: Lord Palmer, do you want to ask any more at this stage or not?

Q55 ***Lord Palmer:*** No, but may I just follow on from what you have said there? Speaking as a farmer, it would be wonderful to be able to grow something that was actually wanted rather than wheat which is, as you know, a quarter of the value it was 20 years ago. So it would be great if you really can put that message through your whole department, albeit that you are not responsible for biofuels. I am greatly encouraged by what you said.

Lord Rooker: I think it is important. This does not quite divert, but in 1999 when I was at MAFF originally I actually opened the first public building in this country fuelled by biomass, Webley Primary School in Herefordshire. I was back there earlier this year. It was the first public school; they have got about 48 contracts with local farmers. That is a small example—not fuel, it is true, they were using woodchips and that, so it is biomass—but, nevertheless, this is a very new technology, but there are examples where you can get the message across to farmers that there are other opportunities for market and they have to make sure, in some ways, they make good use of the land and make some money out of it and do not lose control of the supply chain, as they have done with food in some ways.

Chairman: You have three of them sitting up here.

Q56 ***Lord Livsey of Talgarth:*** What incentives have proven to be most effective in meeting the UK's national targets for biofuel market share, duty reductions or industry obligations? I realise some of this is Treasury territory.

Lord Rooker: I think there is a balance, really. There is a Treasury issue, it is true, and I am not hiding behind that. There is a reduction of 20p a litre, I think, for biofuels, and that has been promised to last, I think, until at least 2008. Certainly the Renewable Transport Fuels Obligation will come into force in April 2008, and I understand you are due to take evidence from my colleague, Stephen Ladyman, at some point in that inquiry, and certainly he can give you more details on that. We expect the obligation—that is, the Renewable Transport Obligation—to be a more effective tool, as that provides the long-term market certainty and it is that which is important for people to invest because the target is to get to 5 per cent by 2010 and we are only at .24 per cent now, so we are a long way behind. The existing duty cuts in biodiesel and bioethanol introduced in 2002 and 2005 have brought forward a considerable increase in sales—33 million litres of biodiesel and 85 million litres of bioethanol in 2005—but, as I say, that amounts to .24 per cent of road fuel sales, so we have a long way to go before we can get to the 5 per cent.

Q57 ***Lord Livsey of Talgarth:*** That is generally thought to be an inadequate 20p, because certainly it is fairly clearly demonstrated from other European countries that with a greater incentive you can actually speed up, in the economic sense, the uptake in the market place. Is there going to be any input from Defra, for example, into the Treasury on that basis?

Lord Rooker: I suspect there will be input from this Committee on that basis. You could draw the analogy that I remember when the lead-free petrol came in, that to encourage customers to use it there was a temporary drop—a market mechanism—to change people's behaviour to give them the confidence, if you like, so that you did not have to run round the country looking for the right place to get your fuel. In this case, I understand this fuel will not be served at pumps (?), it will be blended with other fuels, which is why, of course, that 5 per cent limit that the motor manufacturers are using on their warranty on the engines at the moment may, at some time, be a factor that has to be taken into account. Yes, tax and duties can be used to change people's behaviour as it can be used to change industry's behaviour. There are some incentives coming along for constructions of plant in terms of capital allowance arrangements that can be used, but this is a matter wholly and exclusively in the realm of the Chancellor of the Exchequer.

Q58 ***Chairman:*** Mr Clery wants me to ask: crude oil today is about $70 a barrel. What estimates have Defra made, or might Defra make of the ex farm price for oilseed rape for biodiesel and wheat for bioethanol which equates to a crude oil price of $70 a barrel? Of course, Minister, I do not expect an immediate answer to that but I believe it is the key to what other Members of this Committee have raised. For Defra to have a handle on the relationship between the ex farm price of potential fuel crops related to the alternative fuel, being the crude oil, would I think be very helpful for policy all through government.

Lord Rooker: It certainly would but it is also relevant for imports of biofuels as well. For example, we are producing biodiesel; we are estimating 36p to 60p a litre for oilseed rape down to 26p to 40p a litre for the waste cooking oil operation. For bioethanol, which is an important comparison because of the imports from Brazil, it is 32p to 40p a litre for wheat and 30p to 45p a litre for sugar beet. Bioethanol from imported sugar cane is 6p to 11p a litre. So there is going to be a differential even with imports. I understand, looking at my notes because I

understand you have spoken to someone from Sweden, they are importing most of their bioethanol—they are using a lot of it—but you can understand why because it is actually quite a lot cheaper. We can provide you with a figure with the equivalent of a crude oil barrel so that those figures make sense, and we will endeavour to do that as soon as possible.

Q59 ***Chairman:*** Lord Cameron, from our visit to Green Spirit the other day, they were talking about the wheat price (just to pick up Mr Clery's point for a moment), and the element of that seemed to be that if they were going to pay about £70 a tonne for wheat they would go ahead and the farmer would be reasonably satisfied. Would you agree with that? Minister, we all went to Green Spirit.
Lord Rooker: Green Spirit in the South West?
Chairman: Yes. They are at the stage of a great deal of research and are still raising the money to get going.

Q60 ***Lord Cameron of Dillington:*** Their difficulty is that their first purchase of wheat is going to be in 2008 and they have to persuade their investors that they have a purchase price of X and a sale price of Y. They can probably get the sale price of Y right but they have got to persuade the farmers to sign up at the purchase price of X, so that they have a differential which means that their investors get a return. They are achieving that, I think, and they have taken a range of prices which they can offer the farmer which gives a maximum and a minimum which is probably worth the farmer signing up to. So I think they are going to achieve what they want. I am not in the box; I am supposed to be asking questions!
Lord Rooker: I understand there is a potential plant in the Midlands as well, Roquette—if I have got the pronunciation right—with bioethanol from wheat. They have a capacity of 120 million litres, which is more or less the capacity of what you were looking at in the South West. They have a potential capacity of 130 million litres and they are both around the same time-frame; 2008 is when they would hope to start.
Lord Haskins: Whether they will get wheat at £70 a tonne.

Q61 ***Lord Cameron of Dillington:*** They realise that; they have started off on that basis. If Mr Clery's remarks about the fact that you are only interested in CO_2 are correct, you should have no difficulty in answering these questions. There are some EU Member States—Denmark is a good example—who actually believe that biofuels do not produce greenhouse gas emissions enough compared to other renewable energy sources, when the whole lifecycle analysis is considered. There are two questions here: one is domestic production and whether, bearing in mind the nitrogen application for wheat, there should be minimal sustainability requirements in evaluating the environment impact of biofuels. The second half of the question relates to the huge amount of imported bioethanol from Brazil—a long way with transport costs and, also, probably grown on ex-forestry lands in the Mato Grosso, where they destroy the environment and so on, and whether all this should be considered. How do you set about considering it?
Lord Rooker: If you are looking holistically, in terms of the planet, it does not make sense to think you have solved the problem with biofuels if you have created all these other problems of lack of sustainability elsewhere; it has to be looked at in the round. It is true we do not, at the present time, have a means of evaluating, but as far as we are concerned the Government believes that biofuels have got to be sustainable overall. It is not a quick fix; you create another problem for another generation otherwise. I think that is important. The Renewable Transport Fuels Obligation is having developed with it carbon and environmental assurance schemes, so that we want to do something with the suppliers to know that the fuel has come from as sustainable a source as possible. I think that is important. I do not know about the rest of the EU. There is no requirement at the moment to assess the sustainability of biofuels, but in some ways this is early days and we will clearly have to develop a means of checking on this. We have certainly got plans for developing a biofuel sustainability unit to look at this work so that we can apply it to imports as well as UK fuels. First of all, we would have to look at what we are doing here to make sure our own environment is looked at in the round and that it is not a free-for-all—you cannot just do it anywhere, in other words. But it is quite right, therefore, that if we have that obligation on our farmers it should be put on those who import products. This applies to food as well. I think we do have to look at the sustainability arguments, but I do not know of any detail about what Europe might be doing or what other Member States are doing.

Q62 ***Lord Livsey of Talgarth:*** In relation to what we have just been discussing, we have heard this morning from the Swedes that they have actually imposed a duty on natural (?) ethanol of .192 euro to try and put it on a par with home production of crops. I can see some impact of that on the environmental questions which my colleague Lord Cameron has just mentioned, as far as Brazil is concerned. Also, it gives a better playing field for domestic production as well. I would not expect you to pass judgment immediately like that, but it is something that is surely worthy of investigation, is it not?
Lord Rooker: It is, but from what I have got on Sweden, they use a whole range of issues: they have got a biomass train, they have got 700 biofuel buses,

they have got requirements to have large filling stations to have a bio-renewable fuel and there is some requirement coming in for smaller stations. They have done something with their motor manufacturers as well. In other words, there is no quick fix to this; just doing one thing, whether it is a few pence off a litre, will not necessarily work; they have obviously done a whole package on this. As I said, most of their bioethanol is coming in from Brazil, but I do not know what they have needed to do to, if you like, protect their own—

Lord Livsey of Talgarth: They have EU approval for production.

Q63 ***Chairman:*** Rather interestingly so.
Lord Rooker: They have a big country, of course, with a lot of land.

Q64 ***Chairman:*** A lot of trees.
Lord Rooker: A lot of trees and, what is it, about 10 million population?

Q65 ***Chairman:*** And a very strong wish not to be too dependent on Russia for gas.
Lord Rooker: Absolutely.

Q66 ***Lord Sewel:*** I am just wondering where the area for the greatest hope is. Where would you put your money? Is it biodiesel, bioethanol or biomass?
Lord Rooker: If I was asked to tick a box, I think, it would probably be biomass because I understand you might get a better carbon reduction for biomass. I hope I have got that the right way round. The message I want to give is that while we have been slow, the fact is we want a variety of biofuels so that we can create the market conditions for suppliers and investors and users, so they feel comfortable in having their heating system provided by biomass and their car driven by biofuel and have a degree of understanding that both are good for the environment but to a greater or lesser extent one is a bit better than the other. Putting all our eggs in one basket would not be the answer, I think. I suppose if you take a narrow, scientific view on which saves more carbon, then you come down to the issue of saying: "Well, what are you doing about security of supply", so if you put more emphasis on biomass you can do a lot better. I go along with that; to have as big a range as possible. I had no idea until, probably, the last year that you could get as much out of what we might call "waste" as you can in terms of either fuel or, indeed, other products. It is something we have been a bit lax at as a small island; we have not got a lot of land to spare.

Q67 ***Lord Sewel:*** Have we any figures at all to know how the UK compares with other EU Member States and, also, other big producers like Brazil, in terms of the production costs of biofuels? Are there any international comparisons?
Lord Rooker: There probably would be but I have not got any international figures other than those I gave earlier on about what our figures were. Of course, I had that figure from Brazil, but one has to add in, of course, the transport costs to get their fuel here and the environmental costs of getting the fuel miles, if I can put it that way, to get their fuel here, which I think has to be taken into the overall calculation. If there is some international comparison we can supply we will certainly do that.

Q68 ***Chairman:*** Ms Finlay, you are pointing, I note, to a page. I do not know whether there is something you want to call the attention of the Minister to.
Ms Finlay: I think it is quite difficult to bring out international comparators because there are so many different processes and different feedstocks to try to compare. I think most of the figures that we have are not very specific, but we can certainly see if we can find anything.

Q69 ***Chairman:*** Mr Clery says he is delighted to hear your 5 per cent figure because it was fed to you under a different hat a year or two ago. By cutting out exports of wheat (we currently export about 3 million tonnes of wheat a year in round figures) that equals 1 million tonnes of bioethanol, regardless, for the moment, of cost and price, and set-aside (which he finds immoral) wastes land. That is a private opinion, but it has been expressed. The set-aside land that has not been cropped would have itself produced another 1 million tonnes of biodiesel. If you look to technological advances and farming and crop breeding, your 10 per cent is not impossible, by any means, in the timescale that you gave. Mr Clery is still very hesitant about the economics of the production of biofuels from lignocelluosic techniques; they are greatly talked about and they are not working anywhere. So we must not pin too much hope or faith on to, as yet, unproven technologies.
Lord Rooker: I agree with that. You are asking if we, the Government, if you like, in setting up an arrangement, are asking the market to provide, which means we are asking both farmers and the companies to invest in new planting equipment and we are asking farmers, in some cases, to invest in crops they may not have grown in the past. To do that they need (I am not a farmer) to know you can sell what you grow before you plant it, basically. Sometimes, with biomass, you are working for three or four years before you get your return back off the crops. So you need to have an assurance that there is a market. I think the thing we can facilitate, as government, is to help create the conditions for confidence for people to invest in a market; we cannot guarantee anything because we are Members

of the EU and there are others doing this around the world. On the other hand, it is a new technology, a new science, and it is something that we might be able to exploit for our own advantage, both in terms of growing and in terms of the technology we can sell abroad. So it is a road that is worth going down. I have no doubt about that. I take your point about set-aside, it is about half-a-million hectares, I understand, at the present time, so some of that—not all of it—could well be used for growing energy crops.

Q70 ***Lord Palmer:*** I was delighted to hear you say that one should not put all the eggs in one basket, but you have rightly just pointed to one of the greatest things against biomass, in that it has, some people say, a four to five year circle, depending where you are growing biomass, whereas, of course, biodiesel can be grown year-in, year-out, on an 11-month cycle, and that is a fundamental difference. Particularly with more research and development, one might well be able to get crops that will greatly out-yield what they do at the moment.
Lord Rooker: I agree entirely with that. The encouragement of growing fuel crops for our scientists, the plant scientists, to try and get better returns and better yields, because the end-use is a particular use, is enormous, and I suspect there is work going on now. However, you are quite right, a crop that you can plant and sell inside 12 months is a lot better for the farmer than something that might be, as you say, four or five years. You are taking a punt on a contract for a plant that may not be there. I do accept that is a risk.

Q71 ***Chairman:*** Specifically on that, and a last question, what steps are the Government taking in research and development to reduce the production costs of biofuels? Is this an area in which the Government themselves are encouraging universities, whatever?
Lord Rooker: We have certainly got to do what we can about reducing costs. Defra has not carried out any particular analysis with Member States, and we know that costs vary according to the processes available. We are looking at the potential use of duty incentives, on the one hand, to encourage the mixing of biomass and hydrocarbons in a conventional refinery process (this is called "hydro-generation"), which would introduce efficiencies into the production chain. There are bids for a pilot study currently being considered in Defra for that. In other words, we are encouraging the scientists out there to put bids in for work in this field, which would help us to be more efficient and to help reduce costs at the same time as well. I am not saying it is the only area. On the point I referred to earlier on, we are looking at a capital allowance scheme for the cleanest biofuel processing plants, but this will, of course, be subject to state aid approval from the Commission, in due course. So there is some work going on in seeking to reduce costs by getting the scientists to have a look at these areas.
Chairman: Last question, Lord Livsey.

Q72 ***Lord Livsey of Talgarth:*** In view of the need for research and development, there are considerable cuts taking place in research and development in the UK at the moment, as we know; the loss of employment and the closure of some departments. Probably, given the potential for what we have been talking about this morning, there ought to be, I think (it is a personal view) an assessment of where we are going in this direction because the benefits of good research and development in this area can be very substantial indeed.
Lord Rooker: One of the things on my brief at Defra is the science side. In the last two weeks I have visited both the laboratories at Lowestoft and Weymouth and, more particularly, I was at York, at the Central Science Laboratory last week. I have to say this because I have done my notes and put my material to the department: it is one of the greatest unsung successes of the previous administration, before the present one, because it was inherited in the early-90s. Virtually nobody knows it is there. It was very, very expensive. The point about it is that the nature of what you need to know with the science has changed somewhat, so they have got spare capacity. It is true that in some areas of research and science there have been reductions, I suppose, as people have introduced a more risk-balanced approach to looking at issues relating to food safety and veterinary medicines. However, on the environment side and the climate side, the need for more science has actually increased and, therefore, there is a shift over. Most of the private laboratories, and indeed the Government ones, have to bid for most of their work; there is no guaranteed stream—and I think it is pretty important to do it that way—but there is work going on in this area that was not going on five years ago, in terms of changing the customer base. It is only one laboratory but it is a huge complex just outside York; a world-leader with a customer base including the EU and several other departments as well as EU countries, but it is on Defra's books. It is a very clever marketing name, the Central Science Laboratory; it ought to be "the Government's Central Science Laboratory", "the UK's Central Science Laboratory". There are 800 scientists there, doing a huge amount of work, but the shift of work has gone, so you can say in some areas there have been cuts, it is true, but there has been an uplift in other areas, virtually all of them related to the environment in its widest sense.

Q73 *Chairman:* Thank you very much indeed. Obviously you are, I hope, enjoying your job at Defra, and thank you very much for answering our questions so efficiently this morning, even if you pass the responsibility on to others.

Lord Rooker: I have done my best, and we certainly will follow up on a couple of issues. I am delighted to be back at Defra. I must not say "back at Defra" because MAFF does not exist any more, but basically I am like a pig in muck!

Chairman: Thank you very much.

Supplementary Memorandum from Lord Rooker, Parliamentary Under-Secretary, Department for Environment, Food and Rural Affairs (Defra)

When I gave evidence to the Select Committee of the European Union (Sub-Committee D) on 7 June, I agreed to write to you on a number of points. The following responses are offered in the order in which they occurred in the session and are referenced in line with the transcript.

Q44. You asked for the list of companies building biofuel processing plants in the UK which will use UK-grown crops, and I attach this at Annex A. You will appreciate that this information only relates to those companies which have publicly announced their plans.

Q58. You asked what ex-farm price for oilseed rape for biodiesel and wheat for bioethanol would equate to a crude oil price of $70 a barrel. The Central Science Laboratory has provided the following estimate: with the current duty derogation for biofuels at 20 pence per litre and with current biofuel production technology, it is estimated that producers of biofuels could pay up to £204 per tonne for oilseed rape and £125 per tonne for wheat (assuming 100 per cent biodiesel and 100 per cent bioethanol respectively).

Q67. Finally, you asked if we had any figures on how the UK compares with other EU Member States and other big producers like Brazil, in terms of the production costs of biofuels. This is a difficult area as costs vary considerably according to the different feedstocks and production methods used, and for reasons of commercial confidentiality, companies are understandably reluctant to disclose information. The figures in Table 1 show production costs for UK bioethanol and biodiesel and Brazilian bioethanol. The figures were drawn together in 2005, using various reports.

TABLE 1: ESTIMATES OF BIOFUEL PRODUCTION COSTS FOR VARIOUS FEEDSTOCKS

Biodiesel production costs	*Bioethanol production costs*
36–60 pence per litre for oilseed rape	32–42 pence per litre for wheat
26–40 pence per litre for waste cooking oil	30–45 pence per litre for sugar beet
	6–11 pence per litre for sugar cane

In addition, you may find helpful the Home-Grown Cereals Authority's breakdown of UK pump prices for biofuels and fossil fuels, as shown in Table 2 below. This is based on information from the industry.

TABLE 2: UK PUMP PRICES FOR BIOFUELS (IN PENCE PER LITRE)

	Diesel	*Home produced Biodiesel*	*Petrol*	*Bioethanol from imported ethanol*
Base cost	30.0	45.0	30.0	35.0
Retail Distribution	5.0	7.5	5.0	10.0
Duty	48.32	28.32	48.32	28.32
VAT	14.58	14.14	14.58	12.83
Pump price (p/litre)	97.9	94.96	97.9	86.15

June 2006

Annex A

PLANS FOR RENEWABLE TRANSPORT FUEL PLANT (June 2006)

Company	*Location*	*Type of biofuel*	*Capacity in litres per annum*	*Feedstock*	*Current situation*
Argent Energy	Motherwell	Biodiesel	50 million	Animal fats (and used cooking oil)	Started operating February 2005. Considering further plants in the UK
Biofuels Corporation Ltd	Middlesbrough	Biodiesel	284 million	Oilseed rape (and other virgin vegetable oil)	Plant now operating since February 2006 and the Board considers appropriate to proceed with design for second plant.
Global Commodities (UK) Ltd	East of England	Biodiesel	30 million	Recycled vegetable oil	Current small plant plans to build new 180 million litre plant.
Greenergy	Humberside	Biodiesel	114 million	Various virgin oils	Plant due to be on line end of 2006. Plans to double capacity at this plant and feasibility study for additional plant in Liverpool.
British Sugar	East Anglia	Biobuthanol	70 million	Sugar beet	Under construction. Due to be operational early 2007. Further plants under consideration.
Greenspirit	South West	Bioethanol	130 million	Wheat	Expected to commence production 2007. Other plants under consideration.
Losonoco	Ince, Cheshire	Bioethanol	115 million	Biodegradable waste	In planning process.
Losonoco	Edmonton, London	Bioethanol	95 million	Biodegradable waste	In planning process.
Roquette	Midlands	Bioethanol	120 million	Wheat	Expected 2008?

Present Cameron of Dillington, L; Haskins, L (Acting Chairman); Livsey of Talgarth, L; Palmer, L; Renton of Mount Harry, L (Chairman)

Examination of Witness

Witness: Mr Peter Smith, Commercial Manager, Cargill, examined.

Q74 ***Acting Chairman:*** Good afternoon, Mr Smith, and welcome. I am standing in for our normal Chairman, Lord Renton of Mount Harry, who is putting the Government to task, and there will be a few moments' questions but he will be back to chair the second evidence session this afternoon. You are on the web and this will be reported. We will send you a copy of the transcript for any corrections which you may or may not want to make. Have you anything to say at the beginning? *Mr Smith:* If I may, my Lord Chairman, I would like to make a very brief opening statement. Cargill is an international provider of food, agricultural and risk management products and services, helping to meet the needs of millions of people every day from food ingredients and prepared foods to energy, financial services and agricultural inputs. Our core businesses include corn milling and oil seed crushing and processing, producing products predominantly for the food industry. Recently, we have also added bioethanol production to our corn milling operation in the USA and biodiesel production to our oil seed plants both in the US and here in Europe. Within the EU we currently operate a single biodiesel plant in Germany in a joint venture partnership, but we also have a further five biodiesel plants currently under construction, either alone or in partnership with others. By early 2007 these plants will have a collective output of over three-quarters of a million tonnes of biodiesel per year. In the UK, together with our partner, Greenergy Biofuels, we are constructing a 100,000 tonne per year biodiesel plant in Immingham on Humberside. We are also conducting a feasibility study into the possible construction of a further biodiesel plant in Liverpool. Our biodiesel investments are additional to and not at the expense of our food business, and we recognise the paradox of managing both food and fuel supplies out of the same raw materials. We believe that whichever policies are introduced by either the EU or by individual Member States in support of biodiesel and biofuels these policies must take account of that paradox. They must avoid inflexible mandates which give too much priority to fuel use over food use in the event that there is ever a crop shortage. At the same time, policies must give us some stability for investment, not short-term incentives or policies which are too rigid. We also believe that materials used for biofuels should come from environmentally sound supplies and we are working with various stakeholder groups, including Round Tables on soya and on palm, to improve our ability to source these raw materials sustainably. I will be pleased to answer any questions you may have.

Q75 ***Acting Chairman:*** Thank you. I think we will be exploring generally. The interest we have is Cargill's investment policy vis-à-vis the European Union, one country against another, and why certain decisions have been made or not made, or

are likely to be made in the future. I think that is the theme we want to explore. I would like to kick off and point out that the EU directive on biofuels sets an indicative target of two per cent of the market by 2005. The UK's target for that same period is 0.3 per cent for use in 2005, compared with an average EU figure of 1.4 per cent. Therefore, the UK is way behind the rest. To what extent has the UK's low target inhibited the development and growth of the domestic biofuels industry in this country?
Mr Smith: You have already mentioned the figures. To put a bit of meat on that, the UK in 2005 produced 51,000 tonnes of biodiesel versus 1.7 million tonnes in Germany, half a million tonnes in France, even almost 140,000 tonnes in the Czech Republic, where they hit a target of three per cent by the end of 2005. I think it is not a question of the target on its own, it is a combination of the target, the level of duty derogation set here in the UK in comparison with other countries, and indeed the oil price. At a 20 pence duty derogation here compared with over 30 pence per litre in Germany and in France, I think it was inevitable that companies such as Cargill looking to invest in mainstream production facilities would place that investment in the areas in the EU where it was profitable to do so, and that was in Germany and in France. Twenty pence was not enough at that time to develop an industry and spend millions on building biodiesel plants here in the UK, so what we got instead was a kind of cottage industry. We had several small, a few thousand tonnes a year, factories and they could only be economical by operating on inputs which were particularly low cost, such as recovered vegetable oil or waste vegetable oil, not fresh oil from the arable crops here. That is changing, I am pleased to say, but that was the case and that is the reason, in my opinion, why we only hit 0.3 per cent.

Q76 ***Acting Chairman:*** But that 20 to 30 pence derogation was sufficient to enable Cargill to make significant investment decisions?
Mr Smith: Yes.

Q77 ***Acting Chairman:*** Because the Treasury could change its position here tomorrow morning and you would find your position—
Mr Smith: Yes, I think to their credit the UK did at least give a three year rolling guarantee, so there was some confidence to invest here rather than elsewhere, except that the numbers did not add up. If you could produce in Germany and sell with a 30 pence plus derogation, then why invest in the UK? That was the decision-making process.

Q78 ***Acting Chairman:*** Yes, and those crushers do not care where the raw material comes from? The plant is not being supplied with German raw material?
Mr Smith: Largely it is, yes. Both Germany and France are largely operating off their own domestic crops, although interestingly as the biodiesel boom started on the Continent it increased the demand for rapeseed and rapeseed oil. In the UK at that time rapeseed oil in food use was actually in decline and yet the crop increased and we exported our surplus rapeseed to those countries to make biodiesel over there. Basically, we exported a biodiesel industry.
Acting Chairman: Yes. Thank you.

Q79 ***Lord Cameron of Dillington:*** You have already said you did not think the 20 pence duty derogation was quite enough. I am just wondering what you felt about the mandatory biofuels obligation and the 15 pence penalty attached to that as an instrument to try to encourage more investment in this area?
Mr Smith: I think it is turning out to be a significant turning point for the UK, the announcement that the obligation is definitely going to take place. We now have some facts and figures on it, at least up until 2010, although I would like to make a point that beyond 2010 we only hear of intentions and nothing firm. But at least up until 2010 we know what the obligation is going to require and that has stimulated investment, including our own here in the UK.

Q80 ***Lord Cameron of Dillington:*** In terms of comparison, is that as good as the 30 pence duty derogation? Where would you prefer to see the emphasis of the Government in the future, on duty derogation or more fuel obligation?
Mr Smith: Cargill's opinion on these things globally is that we prefer not to see the Government involved in any way, but it is inevitable in this case that that is going to be the case, and certainly the obligation is forcing people to think ahead and make plans now for the incorporation of biofuels into ordinary fuels during 2008. It is going to happen and because it is going to happen, we and others are now investing in biofuels in the UK. Plants currently under construction, together with those that already exist, will give us a capacity of somewhere in excess of half a million tonnes by the beginning of next year. So yes, it is having a significant effect.

Q81 ***Acting Chairman:*** That is presumably going to have quite a significant effect on oilseed rape production in the UK?
Mr Smith: Yes, I would assume so.

Q82 ***Lord Livsey of Talgarth:*** What factors have restricted the production of biofuels in the UK?

Mr Smith: As I have already mentioned, the comparative differences in the rates of duty derogation have been a serious inhibition. I sat before a Commons Committee similar to this one, I think three years ago, and argued at that time that for the UK to build a significant biofuels industry, given both agricultural and mineral oil prices at that time, we needed not 20 pence but closer to 29 pence. We did not get 29 pence, and as a consequence we did not get a biofuels industry. So that, in my view, has been the most significant barrier to biofuels being developed in the UK.

Q83 ***Lord Livsey of Talgarth:*** Why is bioethanol being produced in greater quantities? Is it because of that?
Mr Smith: First of all, I am not familiar with the figures, to tell you the truth, so I do not know the level of bioethanol production here—
Lord Livsey of Talgarth: Apparently, bioethanol has reached 7,814,000 litres as against 2,894,000 litres of biodiesel—
Acting Chairman: I think that is imports. The bioethanol is almost entirely imported into the UK.

Q84 ***Lord Livsey of Talgarth:*** Thank you for that explanation. I wondered about that.
Mr Smith: Certainly there has been no major investment to date in bioethanol production here in the UK. Any which is being produced I think is coming from the spare capacity which exists in the food and drink ethanol production facilities.

Q85 ***Lord Palmer:*** I ought perhaps to declare an interest, having been a long-term supplier and indeed customer of Cargill over the last 30 years. Does the current UK market provide for the establishment of high volume and low cost biofuels production, and what factors do you think really influence biofuels production costs?
Mr Smith: Certainly the environment under an obligation will encourage large-scale, low cost biodiesel facilities to be built here. As I mentioned, we are considering it ourselves at the moment. I am sorry, could you repeat the question?

Q86 ***Lord Palmer:*** The second part of it is, does the current UK market provide for the establishment of high volume and low cost biofuels production and what factors do you think influence biofuels production costs?
Mr Smith: The most significant factor in influencing cost is the cost of the inputs. Rapeseed oil going into a biodiesel plant today is trading at round about £500 per tonne. The inputs into ethanol, either grains or sugarbeet, are very much lower than that, although the capital costs of running the two different operations are very, very different too.

Q87 ***Lord Palmer:*** I am sorry, you said £500 per tonne?
Mr Smith: Yes, for the oil, not for the seed. Nevertheless, given an obligation and given ongoing high mineral oil prices, yes, the UK will build high volume and low cost plants in much the same way as they are being built now in Germany.
Lord Palmer: Thank you very much.

Q88 ***Lord Cameron of Dillington:*** I just wanted to explore this question of biodiesel versus bioethanol. You are, as you have already explained, in Europe at any rate, only investing in biodiesel, is that correct?
Mr Smith: At the moment, yes.

Q89 ***Lord Cameron of Dillington:*** Have you got plans to go into bioethanol at all?
Mr Smith: I would not say no. It is certainly something which is currently being looked at.

Q90 ***Lord Cameron of Dillington:*** You went into biodiesel because it is cheaper?
Mr Smith: Yes, the initial investment is considerably cheaper. The biodiesel manufacturing process is a relatively simple one. You still have to spend tens of millions of pounds to build a 200,000 tonne plant, but in comparison you would spend many, many tens of millions of pounds to build an ethanol plant of the same scale. So the capital costs of building and operating an ethanol plant are many times higher than they are for a biodiesel plant, but the input costs are very much lower. The net result is that the total cost of production is broadly similar for both.

Q91 ***Lord Cameron of Dillington:*** Is it right, therefore, that the 20 pence duty derogation applies equally to both, do you think?
Mr Smith: It is right, in my opinion, because the overall costs are similar, that they should both bear a similar duty derogation. Whether 20 pence is the right level is a different matter.

Q92 ***Lord Cameron of Dillington:*** No, but equal otherwise?
Mr Smith: Yes, it is not unreasonable for them both.

Q93 ***Acting Chairman:*** Do you see competition between bioethanol and biofuels in the market place?
Mr Smith: No, I think ultimately the petroleum companies will be the people who decide which is used more greatly. My understanding is that biodiesel is technically easier to blend than bioethanol. We also have the situation where Europe, because of the dramatic move to more and more diesel cars and less and less petrol cars, is now a net importer of diesel and a net exporter of petrol. Therefore, if they have to buy anything under an

obligation my feeling is that they would prefer to buy diesel or biodiesel.

Q94 ***Lord Cameron of Dillington:*** Presumably also your decision is based on the fact that you have already got a crushing plant up on Humberside, have you not?
Mr Smith: Yes, we have.

Q95 ***Lord Cameron of Dillington:*** Hence your Immingham plant works in well with that?
Mr Smith: Yes, correct.

Q96 ***Lord Cameron of Dillington:*** So your capital investment is going to be less, inevitably, than someone starting afresh?
Mr Smith: Yes, very much so. It is in our nature to add to what we already have, to add value to what we have, so we are tending to build biodiesel plants on the sites of our oilseed processing plants. So, yes, Immingham is close enough to Hull for that to make sense and the Liverpool project would also make sense in that we are crushing oilseeds in Liverpool as well.

Q97 ***Lord Cameron of Dillington:*** But it will not be restricted to British? Immingham obviously being a port, you are going to be taking oil seed from all over Europe, are you not?
Mr Smith: Today the Hull plant does crush almost entirely domestic crops. The Hull crushing plant is not ideally located for the import of seeds, so we would anticipate that that would continue to crush the domestic crop. Liverpool does today import some oil seeds.

Q98 ***Acting Chairman:*** But can European producers compete with Canadian producers of rapeseed oil, for example?
Mr Smith: Europe has a thriving oil seed processing industry and it only thrives because it is cost competitive. Adding biofuels production on to that should not put us at any further cost disadvantage. The only reason why we will import raw materials for biofuels is because the demand for biofuels over the next three years is set to increase very dramatically and Europe should not devote its land to growing fuels. We have to keep the food argument at the fore. It is important that we remain secure in our food supply. We will be able to expand crops significantly to supply a biofuels industry, but not to the extent that is going to be required. If the whole of Europe goes to five per cent, then we are looking in round figures at a demand for 10 million tonnes of vegetable oil for biodiesel alone.

Q99 ***Lord Palmer:*** Just to take up on that point, am I not right in thinking that if half a million hectares of rapeseed oil, for example, were grown on set-aside ground this would in fact meet our obligation of 5 per cent by 2008?
Mr Smith: The 5 per cent is for 2010, I think, and 3 per cent by 2008, but half a million hectares would yield round about 1.6 million tonnes of seed, which is—
Acting Chairman: Half a million tonnes.

Q100 ***Lord Palmer:*** Forty per cent?
Mr Smith: Yes, it is a little more than half a million tonnes of oil. So, yes, it would. In short, the answer is yes, half a million hectares would provide all the oil we need to satisfy a 5 per cent target in diesel.

Q101 ***Lord Palmer:*** That is currently what is actually set aside in the United Kingdom at the moment?
Mr Smith: Yes.

Q102 ***Lord Palmer:*** I have been involved in this for 10 years and everything really has always been the price of crude oil. Originally when I was involved oil was about $25 a barrel and it is now up to $70 a barrel. There are those who think it is going to go up and up and up. To what extent have market forces, particularly the rising price of crude oil, influenced the development of biofuels within the European Union?
Mr Smith: To a very large extent, I think it is fair to say, for two reasons. One, it makes it more economic. It is an argument specifically for the UK. Because our duty derogation is lower than others, as oil prices rise it starts to give us the chance to be able to run a profitable business here in the UK in biofuels. But I think there is an even more significant feature of the rising price of mineral oils and that is the attention on biofuels now seems to be turning less to the environmental benefits and more and more to security of supply in the energy sector. I think people are recognising that we do need to do something to ensure security of supply in energy and biofuels is one of the ways forward in that.

Q103 ***Lord Palmer:*** I have to say, that is music to my ears. The number of times I have said exactly that on the floor of the House in debates! I am glad you have mentioned that. What is the estimated cost of producing biofuels in the UK in relation to other European Union countries?
Mr Smith: Broadly similar. The agricultural products which are used as inputs into biofuels are traded on world markets and therefore the price across Europe is more or less the same. We have already mentioned that the cost of the inputs is one of the most significant factors in the total cost. We also have a thriving oil seed processing and wheat milling

industry here, which suggests that the cost of processing commodities is similar here to where it is on the Continent. Our figures show that we have every chance to be competitive and not worry too much about European imports, so long as we have the raw material supply available.

Q104 ***Lord Palmer:*** What about in relation to the United States of America and Canada as an example?
Mr Smith: As an example, there is a significant difference and that is that the specification for biodiesel—and I am speaking on biodiesel specifically, I am not too familiar with ethanol—in the United States has one very significant difference to the specification agreed across Europe. It is an item called iodine value and, without going into detail on that, it is largely a measure of the fatty acid distribution within the oils that go in. What it means in practice is that the US can make biodiesel to their specification using 100 per cent soya bean oil. Soya bean oil today is trading at round about a £150 per tonne discount to rapeseed oil, and therefore they are using soya bean oil. The European specification allows for only very minute quantities of soya bean oil to be added to rapeseed oil. If you put more than just a few percentage points in, then the resultant biodiesel does not meet the EN14214 European specification for biodiesel.

Q105 ***Acting Chairman:*** Is that a form of protectionism, or is there a good reason for that?
Mr Smith: I do not think I am qualified to answer that question, with respect.

Q106 ***Lord Cameron of Dillington:*** What are the reasons given for that?
Mr Smith: The reason given is that an iodine value of a certain level or above leads to lower stability of the finished product when it is in storage tanks. That is the reason, apparently, why the EU has set a maximum iodine value on its biodiesel. But it must be said that biodiesel produced in the States, as far as I am aware, has not suffered problems of stability in storage.

Q107 ***Acting Chairman:*** It stinks! But generally speaking, you are saying that there is not a huge competitive advantage which North America has against Europe in the production of biofuels?
Mr Smith: Not if we are looking at the prospects of importing their fuels here, no, because although their biofuel will be much cheaper than ours, it still will not meet the European specification, so they will not be able to import.

Q108 ***Acting Chairman:*** Yes, but I know of a company which is planning to invest heavily in the Ukraine to grow rapeseed oil and bring that into the German market, but presumably the Ukraine is a very fertile country for producing these sorts of crops anyway?
Mr Smith: Yes. Traditionally the Ukraine has exported oil seeds to Europe for many years.

Q109 ***Lord Renton of Mount Harry:*** I wonder if you could tell us what steps you are taking in research and development to reduce the production costs of biofuels, because that seems to be one of the key points?
Mr Smith: Yes. Maybe it would be helpful if I start with what we are not doing. What we are not doing is spending a lot of time in research and development on second generation fuels, gas to liquids, for example. Although we feel that that is a very important step going forwards, it is not one of our core strengths, so we are watching with interest rather than spending a great deal of time on second generation ourselves. What we are doing is twofold really. One of the things we are doing is investigating the technology which is currently used conventionally to see how we can improve that using our own in-house technology to reduce the costs in the conventional processing. That is a core strength of Cargill. It is what we do in our corn mills, in our oil seed plants, and what we will be doing also in the field of biodiesel and ethanol. The other thing we are doing is working very, very hard to see how we can reduce the cost of inputs, and that involves a lot of work in the laboratory to see just how much oils other than rapeseed oil we can blend in and continue to meet both quality standards and the specification. That is important for two reasons. One is obviously to reduce our costs. Rapeseed oil is very, very expensive on the market at the moment. Secondly, we feel it is important purely from a security of supply situation. I think I mentioned earlier the prospect of Europe as a whole needing to produce 10 million tonnes a year of biofuels before very long and the fact that Europe is not going to be able to, or should not be growing all that crop for fuel use. Therefore, we will have to import either biofuels or the raw materials, and our preference obviously will be for the raw materials. Those raw materials will not be rapeseed oil. We will have no option at some stage in the not too distant future but to find ways of using oils other than rapeseed oil.

Q110 ***Acting Chairman:*** What sorts of oils from what sources?
Mr Smith: Soya bean oil and palm oil are the obvious choices. As I say, the problem is meeting the specification with those at the moment and we are working hard to see how we can overcome that problem.

Q111 ***Acting Chairman:*** Is there a genuine or a bogus reason for them not being within the specification?
Mr Smith: There is a genuine reason why palm oil (which is even cheaper than soya bean oil) cannot be included at high rates and that is because palm oil in its natural state is a solid fat at ambient temperature. It has a melting point of round about 35 degrees centigrade and it produces on its own a biodiesel with a cold filter plugging point of around plus 15 degrees centigrade, whereas the diesel specification requires minus five or lower. Therefore, palm oil alone is not the answer, but we are playing with the chemistry of palm oil to see what we can do to change that and help things along. As far as genuine reasons for not using soya are concerned, I think we could do better with regard to the specification.
Acting Chairman: Good. Thank you.

Q112 ***Lord Livsey of Talgarth:*** To what extent have imports of low cost biofuels inhibited domestic biofuels production in the EU? You may have touched a little on that, but could you expand on that?
Mr Smith: Yes, I can. To be truthful, not a great deal, I think is the answer, so far. Demand is growing and production facilities are growing, but there is a time lapse between the two, so imports of biofuels have been necessary so far on a limited scale to satisfy the demand whilst the capacity which is being built comes on-stream. So I do not think it has been damaging to the industry so far. The problems lie more into the future. We are viewing with some interest the prospects of biofuels industries being developed, and currently being built, in countries such as Malaysia and Argentina. Both of those countries operate a system of differential export taxes when they are exporting goods, whereby the export tax for their raw materials is considerably higher than the export tax for finished products. In effect, you are getting an indirect subsidy on the finished products and having to pay high prices to buy the raw materials. We are concerned about that. We have significant concerns and we believe that that matter specifically should be addressed under the framework of the WTO negotiations.

Q113 ***Lord Livsey of Talgarth:*** Could you just give us any inkling as to what extent this goes to in money terms?
Mr Smith: Yes. I do not have detailed costings here, but I have seen calculations which suggest that biodiesel coming out of Malaysia will be somewhere around $60 per tonne cheaper than it ought to be as a direct result of differential export taxes. For Argentina, I have not calculated the figures but there is a 25 per cent export tax on soya bean oil and a five per cent export tax on biodiesel, a 20 per cent difference in value. So they are considerable sums.

Q114 ***Acting Chairman:*** Presumably Cargill's big question is the going forward price of oil? You must have taken a view as to what the world price of oil is likely to do in order to underpin these investments. What if the price of oil was to come down to $40 a barrel?
Mr Smith: If we are operating under the terms of an obligation and in the early years of that obligation there would be total support in terms of subsidy on the one hand and a buy-out penalty on the other hand, I believe 35 pence a litre in total, falling to 30 pence a litre in a few years time. Under that scenario the oil, even at $40 a barrel, will still permit us to operate a business here.

Q115 ***Acting Chairman:*** Good. The last question is really Lord Cameron's question. It is the Danish question again. The Danes have got reservations about the environmental benefits, especially with regard to CO_2 emissions, of biofuels and the question is, should there be a higher requirement for CO_2 emissions relating to biofuels than exists at the present time?
Mr Smith: Yes. Are we talking here about the full well-to-wheels, which includes the growing of the crop?

Q116 ***Acting Chairman:*** Yes.
Mr Smith: Yes, Cargill believes very strongly that there should be some form of sustainability criteria on whichever crops are used to produce biofuels. In Europe and in the UK specifically that is not going to prove to be a burden. There are many certification schemes already in existence in UK agriculture whereby crops must meet certain environmental standards and they are certified and the process is audited. So we can add on to that carbon certification, for example. In such a scheme in fact we are operating in partnership with Greenergy under a rapeseed contract known as the Field to Forecourt contract where it must conform to certain carbon and environmental standards. So here we do not anticipate there being a problem. The problem we do see is one of a level playing field going forwards. We are going to become dependent to an extent on imports, either of biofuels or the raw materials to make them, and the question is, are the exporting countries, the exporting producers, going to conform to the same standards? It is essential that we have a level playing field here. If we have certification for domestically grown crops, we must have the same certification for imported crops.

Q117 ***Acting Chairman:*** Do you know if the WTO discussions are addressing this issue?
Mr Smith: I am not sure. It is being addressed, however, under the two Round Tables, the Soya Bean Oil Sustainability Round Table; and the Palm

Oil Sustainability Round Table. Those forums are currently working to develop the criteria which should be used to determine whether or not crops are meeting the sustainability objectives. Ultimately we would like to see, once those criteria have been fully developed, a system of certification introduced and perhaps a certificate trading scheme, as we see in the energy sector.

Q118 ***Acting Chairman:*** So in 10 years' time will Cargill see this development as being of massive importance to them? Is it a marginal development or is it a crucial, historic development?
Mr Smith: I think we see the current generation of biofuels production as having a limited shelf-life, because second generation will come along and take over, and I think that is important. I think technologies which will allow us to use far more waste products than we use today rather than prime crops to produce fuels is a far better future than just developing more and more land into rapeseed, wheat and sugarbeet, particularly when we have to bear in mind that those crops can fail and we still have the number one priority of feeding people.
Acting Chairman: Yes. Thank you very much indeed, Mr Smith. That is very interesting. There is another question from Lord Palmer.

Q119 ***Lord Palmer:*** I am riveted by what you have said and so much of it is music to my ears. I have always been very, very concerned about palm oil. Presumably for a commercial operation, forgetting other constraints and supporting your clients in this country or in Europe, if there was a suitable palm oil which could be used for biodiesel in order to meet these requirements that would be what you would go for?
Mr Smith: Yes.

Q120 ***Lord Palmer:*** That has been my big, big worry all along.
Mr Smith: But we would go for it in a sustainable manner. It is important. In fact we do own palm oil plantations. We and others operate world-class operations out there. We are used as an example of what can be done. In Malaysia and Indonesia, not only Cargill but others are producing palm oil to the highest environmental standards. Unfortunately, other producers do not and that is the issue which has to be addressed. It is proven that it can be done. All we have to do—and the work of the Round Table is moving towards this—is to bring the rest of the industry along with us and ensure that all palm oil is produced sustainably.

Q121 ***Acting Chairman:*** Do you have a view on the likely developments—this is for biodiesel only—of using the oil as a direct refinery input as opposed to putting it through the secondary process of esterification and then the necessary blending?
Mr Smith: Yes, it is a process known as hydro-cracking, whereby raw vegetable oils are put directly into the mineral oil refinery and go through this process of hydro-cracking, which technically I do not understand but it turns it into diesel, and indeed other refined mineral products. Trials have been concluded successfully and we believe that is a development which will take place. Again, my technical knowledge is not strong but my understanding is that only a certain number of the oil refineries are set up in such a way that they can utilise this process. Many others cannot, and those will be the ones who we hope will ultimately become our customers for esterified biodiesel which they will blend with conventional.

Q122 ***Acting Chairman:*** There is a programme of refinery development in the UK, leastways UK refineries would like to see it, and I think the Government probably would as well.
Mr Smith: Yes. I do not know how many of the refineries are undergoing major re-work and will be able to do that, but whichever route we go down I do think that esterified vegetable oils do have a limited lifetime as an industry. We will move on to different generations, whether it is gas to liquids, hydro-cracking, or indeed something that we have not even thought of yet.

Q123 ***Acting Chairman:*** So you need a fairly quick write-off period for the investment?
Mr Smith: We would welcome that.
Acting Chairman: Thank you very much indeed, Mr Smith.

Examination of Witnesses

Witnesses: MR DOUG WARD, CBE, Managing Director, Argent Energy, and MR RORY CLARKE, Director, Rix Bio Diesel, examined.

Q124 ***Chairman:*** Welcome. You have heard more of the last session than I have, so you will know where we are coming from and our interest in the biofuels, the targets set by the EU, why they are not being met, and what the future is likely to be. Before than, just to say again thank you for coming. We are on the web, so to that effect we are being publicly recorded. We will send you a draft of the transcript afterwards if you wish to make any corrections. Is there anything you would like to say by way of an introductory statement, either or both of you, before we start the questions?
Mr Clarke: Thank you for your introduction. I have been involved through Rix Bio Diesel with biodiesel since the beginning of 2002, knowing that the introduction of the 20 pence duty derogation was coming in, and we thought there was an opportunity there. The company I work for is not just a biodiesel company, we are fuel distributors and involved in shipping and barging as well, so perhaps we have a slightly wider view of fuel distribution other than just the biodiesel issue. I think alternative fuels by definition cost more to make than fossil fuels, otherwise they would be the conventional as opposed to the alternative. I think biofuels are not the cheapest way to reduce greenhouse gas emissions, but they are one of the few ways to do so in transport, and possibly the only way available to us at the moment using conventional logistics and technology.
Mr Ward: I come from a slightly different angle. Argent Energy are currently one of the largest producers of biofuels in the UK, producing from animal fats and used cooking oil. We came to the industry from a completely different angle. As producers of animal fats tied up with the issues of BSE and other animal diseases, we were looking for alternative uses of tallow, and we operate in what is a niche market but a relatively large niche market in potential as there is inside the UK about a quarter of a million tonnes of animal fat and at least 100,000 tonnes of used cooking oil available as a feed stock. In addition, I represent the European rendering industry on the technical committees of Brussels on the development of biofuels, and for my sins I am also Chairman of the Renewable Energy Association's Transport Fuel Group, so I have got a fairly broad aspect but a very defined role as Argent Energy.

Q125 ***Chairman:*** Good. That is very helpful to know. You are approaching this from slightly different angles. Could we start on the EU biofuels policy and look at the EU side of things first. As you will know well, the European Commission stated that in addition to the failure of the EU to meet the 2005 target for biofuels market share, the 2010 target is also likely to be not met. Do you think this failure of the EU to meet indicative targets means that the EU should now, in your judgment, move to mandatory targets in order to assure that the targets are met? You will remember, perhaps, that this was initially considered by the Commission prior to the 2003 directive.
Mr Ward: We ourselves recommended to the Commission that they should be made mandatory in the first place.

Q126 ***Chairman:*** You did?
Mr Ward: Yes.

Q127 ***Chairman:*** Do you think that will be effective?
Mr Ward: I guarantee it will be effective.

Q128 ***Chairman:*** How would they implement it? What would be the penalties if people did not meet the target?
Mr Ward: That is the key to it, but whatever the penalty is we are already seeing inside the UK that the major oil companies, biodiesel use is very minimal. It is a token gesture, 15 pence per litre penalty is neither here nor there, I think it represents about a 12 hour profit for the industry, but the fact is that they have spent an awful lot of money creating an image of being greener than green and that is at risk if they do not meet the targets they have already been set.

Q129 ***Chairman:*** That is interesting. Mr Clarke?
Mr Clarke: I am not sure that the RTFO with the extra 15 pence penalty necessarily represents a mandatory target. I think the problem with mandatory targets is sufficient availability of material to meet those targets and what happens to companies which are not able to obtain the material they require to meet their portion of the targets, and how that is passed on. I personally believe, having looked at this quite closely for a number of years, that if you are able to incentivise the market to reach or to come close to the targets you are aiming to achieve, then to transfer that from being an incentive to becoming the compulsory conventional formula for those fuels is likely to be far more effective. Certainly when you look at the introduction of ultra low sulphur diesel and zero sulphur diesel, once you have encouraged the refining companies to switch over to those products, they are here to stay.

Q130 ***Chairman:*** Could I just clarify that? You are suggesting that a specific fuel quality would be a good route to take because that would then be a standard

fuel at the pumps and everybody would know where they were?
Mr Clarke: Yes.

Q131 ***Chairman:*** You are suggesting compulsory blending to make a known fuel?
Mr Clarke: Yes.

Q132 ***Chairman:*** What factors do you think have restricted the development of biodiesel particularly in the UK so far?
Mr Ward: Insufficient incentive.

Q133 ***Chairman:*** Insufficient incentive and the price?
Mr Ward: We as a company went to the Treasury seeking a 20 pence tax concession, which meant that we were able to process animal fats into biodiesel, and the reality is that animal fats have traditionally traded at a lower price than vegetable oils and that 20 pence would be sufficient. When the Government gave the tax concession, we committed to building a plant and hence we have a plant operational today. But if you look at Europe, where the incentives have been the most, that is where the trade has developed and we are unfortunately going to run into a similar situation with the mandatory requirements and the obligation with the penalties because all that will happen is that if there is, as we all suspect there to be in the early years, a shortfall in the supply of biofuels, they will be drawn to the areas which have got the highest mandate and therefore the highest cost to comply. Therefore, 15 pence is likely not to achieve too much in the UK.
Mr Clarke: I agree with Doug entirely in what he is saying, in that the 20 pence is not sufficient to act as encouragement for anything other than used cooking oil or tallow. I think the UK target is set at 0.3 per cent and I think in 2005 that target was met. Interestingly enough 0.15 per cent of that target, about half of it was biodiesel and that was the amount of biodiesel that is available in the UK from used cooking oil and tallow, virtually full stop, because 20 pence is not enough for it to compete on a level playing field with conventional fossil diesel. I think most people would acknowledge in surveys in most of the polls which I have read, and small ones we have done ourselves, that they would go for a greener alternative but not at a greater cost. The other problem when it comes to price is buying a biodiesel factory and looking for a return on your capital. In most industrial processes you would be looking to utilise that capital over somewhere between 15 and 25 years and I think that with the biodiesel market and the incentives which are available at the moment that is extremely difficult. When you look at the market in Germany, not only is the incentive on the fuel significantly greater at approximately 35 pence per litre, but there have been a lot of biodiesel factories built there with up to 50 per cent subsidies for the construction of the factories.

Q134 ***Chairman:*** Up to 50 or 15?
Mr Clarke: My understanding is up to 50 per cent, but I might be wrong on that.
Mr Ward: No, I can assure you he is correct. I have colleagues who have built plants in Germany with two significant factors different to the UK: one, they got a 50 per cent grant, and in addition to that it took us 19 months to acquire the correct environmental licensing so that we could build our plant. Colleagues in Germany, allegedly working under the same legislation, took three months.

Q135 ***Chairman:*** It is a very interesting point.
Mr Clarke: In Germany, I am led to believe it is about incentivising new industry in the former East Germany.
Chairman: Thank you very much indeed.

Q136 ***Lord Palmer:*** To what extent do you feel the UK has limited potential for the production of biodiesel from biomass? Of course, one must not forget that to the lay person there is always this confusion of what biodiesel is, what biofuels are and what biomass is or could become.
Mr Ward: A limited potential on current technologies. On second generation, a vast potential from biomass if you use the term which is in the questions. In terms of producing biomass and further processing, again I come back to the issue of the environmental concerns. We are dealing with products in the UK which this Government chooses to treat as a waste; the rest of Europe chooses not to treat it as a waste. It is as simple as that. In all honesty, in a commercial world we would think very seriously about where we developed further plants other than the ones we have already got on the boards for the UK because of environmental legislation and the UK gold plating European legislation.

Q137 ***Chairman:*** You are actually saying, in brief, that you would rather probably build in Germany than here?
Mr Ward: Unfortunately, I am not an environmentalist. I am required by my shareholders to get a return on the capital employed and there is a much better advantage over there.
Mr Clarke: When you ask about the ability to make from biomass in the UK, I certainly do not think that anybody believes that you can replace fuel use, fossil fuel use, in its entirety from biofuel production and certainly if we were without fossil fuels, growing our own fuel for transport (as perhaps we once did many, many years ago) is not an avenue for us. We would have to change the vehicles that we use and perhaps the way we behave in terms of public transport. Most

of the studies I have looked at suggest that 5 to 8 per cent, which are the targets we are talking about either on the boards now for 2010 or for 2015, are certainly achievable in the UK from set-aside and without an untoward effect on biodiversity.

Q138 ***Lord Palmer:*** You have both given very good examples of specific technical reasons why the UK could be at a disadvantage, but are there any climatic characteristics in the UK which affect the national market for biodiesel, or is that not really an issue?
Mr Ward: No, because we firmly believe that the additives market will be developed. All fossil fuels need additives for winterisation in the UK and biofuels will be no different. The fact is, there has not been biofuel available for winterisation, therefore the additives have not been developed, but they soon will be, because once you have got a million litres of something which requires an additive, somebody is quite keen to sell you something.
Mr Clarke: Yes, I agree with that, additives can, although there are not effective additives which work in the desired way when you blend the fuel which have the same effect when you use the pure biodiesel. So there are additives which work very well for winterising pure biodiesel, but when you mix that additivised biodiesel with fossil fuel you do not get the reaction you would expect and most people who are buying in biodiesel to blend with fossil diesel insist on it being provided without additives for that reason. But I think that is just a matter of development rather than being an insurmountable problem.

Q139 ***Lord Livsey of Talgarth:*** Biofuels incentives and obligations, you have touched on some of that. What incentives would have enabled the UK to meet the EU 2005 target and what measures will be required to meet the 2010 target? Could you give us some indications?
Mr Ward: Yes. My colleague has already said that the German market has developed far in excess of what we would need to meet our targets with what is, depending on the rate of exchange for the euro, something between 35 and 40 pence per litre. That is what was necessary, and in the same terms what is necessary for us to ensure that we meet the targets is that the cost of not doing it needs to become more expensive than 15 pence per litre.

Q140 ***Chairman:*** Which means a high oil price?
Mr Ward: Forget the oil price, if it is mandatory it is not relative. They are going to buy biofuel if there is a mandate to do it with a sufficient penalty in it. If you go for a 35 or 40 pence mandate on top of the price of fossil fuel, it is a fairly easy one to work out. The difficulty we had in trying to convince the Treasury that 15 pence was insufficient was that there is a wonderful Treasury way of economics where they add up all the potential cost to the economy in some way and so they believe they have now got a total of 35 pence which it is vulnerable to. The fact is they are either going to get the 15 pence charge or they are going to get the 20 pence. The two do not get added together in the real world, only in the world of the Treasury.
Chairman: None of us are Treasury ministers!

Q141 ***Lord Livsey of Talgarth:*** Clearly we are supposed to exist in the EU market and what they do in Germany is obviously still well within the EU regulations?
Mr Ward: Undoubtedly, as is what they do in France to ensure that they use home grown materials for their biodiesel, but we seem to take a different view of the legislation.
Mr Clarke: I think there seems to be a fear from the Treasury point of view both of encouraging a huge tax give-away—which potentially it is and certainly in Germany I think that now is beginning to be a concern to them, particularly with the level of imported material which is attracted to their markets—and some of the question marks over the overall ethics and environmental credentials of that material which is coming in to those markets. At the same time, I would also point out that both in the UK and abroad there are probably more casualties than lottery winners from any incentives which have been given to biofuels so far.

Q142 ***Chairman:*** Really? Give us a few examples.
Mr Clarke: The company called Better Green Fuels is a Phoenix company out of a failed biofuel manufacturer. The first BIP in Birmingham went into receivership. Global Commodities has gone into receivership today, or it might be tomorrow!
Mr Ward: Can I just add one thing? None of those companies produced biodiesel to the specification.

Q143 ***Chairman:*** One might have added the financial trauma of Biofuels Corporation on Teeside. Mr Sutcliffe is going to be a witness here, but the financial troubles there I think are dominating the industry, are they not?
Mr Clarke: As I understand it, Biofuels Corporation certainly went back to the market recently, having had their shares suspended, to borrow more money and the bank capped a limit as to the extent of their borrowing facility, and I think that plant now has a total financial borrowing or package available at £90 million. £90 million for the volume they are making does seem expensive to me and whether that will prove to be successful or not I am not in a position to comment. Their figures for March 2006 are due out soon, but of course they are not actually producing yet, so whether their burn rates will be too great to

reach full production with the technology they have remains to be seen. It is not easy to make money is the point I am making, at 20 pence, or whatever.

Q144 ***Lord Livsey of Talgarth:*** That brings me to my second question: to what extent would the imposition of biofuel obligations by the Government reduce the UK biofuel industry's need for fiscal support?
Mr Ward: If it is placed at a sufficient level, it removes it totally.

Q145 ***Lord Livsey of Talgarth:*** I anticipated you might say that.
Mr Ward: Let us be quite honest, making it mandatory and putting an obligation on them to meet it has undoubtedly sharpened the minds of the people who will be obligated. The major oil companies are now in discussions about where they can obtain sufficient materials for 2008, when the obligation is placed upon them. However, a number of those major oil companies are looking at this on a European basis, hence my earlier comment that where the obligation is least, that is likely to be the first place that you stop supply.
Mr Clarke: I agree with Doug about most things, but fundamentally not about that. I think the problem is that if there are not grants available for the building of biodiesel production facilities you have to question how long is available in the market to write your capital off, and certainly either BP or Shell at their refineries in Germany have been experimenting with adding vegetable straight into the refining process. So biodiesel or biofuel production in the way we see it at the moment has, as I think the previous person giving evidence commented, a limited life expectancy in the market place. If you are going to build a proper efficient biodiesel factory, it is going to cost a significant sum of money to deliver a quality fuel to the market place and to be able to write that capital off over less than 10 years is a big thing to ask.
Mr Ward: It is fairly obvious we disagree on that, but I can add something to the debate on hydrogenation. We do operate down in New Zealand and Australia, so I am aware of what is going on down there. Australia is one of the places where BP have signed contracts to put virgin oils straight into their plants. There is a number of technical difficulties. As has already been mentioned, not every refinery has sufficient availability of hydrogen at the right price to do the job. The difficulties are that what you put in at the start does not all come out at the end as transport fuel, so therefore what does it qualify as? It depends exactly on what side products and what side processes you have in the refinery as to whether hydrogenation works or does not work. We ourselves are believers that whilst there is a potential for a limited lifespan on biodiesel from first generation, I think it is far more likely that we will have hit peak oil before that occurs, and peak oil is what is going to give the world the biggest trouble. That is why you are already seeing Brussels moving away from their original announcement of, "We will only want this if it significantly improves environmentally the performance of fossil fuels." That is ditched. The latest word from Brussels in their latest publications is, "providing it is no worse than fossil fuels". The key question which this Government has to answer and refuses to answer is, where does this Government believe peak oil is? All the experts agree that it is going to be years, after the peak before you know it. We are probably well into those years now, it will also take you years to put the things in place to recover from it. We were the first people who took a stab at a commercial plant in the UK, and are at this moment in time working very close to conclusion on another couple of contracts in the UK, as we believe there will be a market here. We believe the oil majors will ensure that they get the material. I think the issues which need to be addressed by the UK Government are: are they happy to go along with the EU, which clearly sees that up to 60 per cent of the renewable fuel is imported? I argue on the basis that one of their original criteria was security of supply. What is the security of supply if you are importing 60 per cent of your feed stock? So you have defeated the purpose, when it is clearly possible in the UK to develop a much larger portion than that.
Chairman: Very good. Thank you. One more and then we will move on to Lord Cameron.

Q146 ***Lord Livsey of Talgarth:*** At what price of crude oil would no state aid be needed to make EU produce biofuels competitively with fossil fuels?
Mr Ward: "Biofuel" is the wrong term because there is a different answer to that whether you are talking biodiesel or bioethanol.
Lord Livsey of Talgarth: I understand that.

Q147 ***Chairman:*** Give us both answers.
Mr Clarke: What price will my feed stock be, because what happens is that as the price of oil goes up and more and more biofuel is made, that has an impact on the cost of the raw material I require to make my product. I have read figures bandied around, such as $100 a barrel for oil, but whether that is true or not depends entirely on the impact on the market that you draw your raw material from.
Mr Ward: The EU figure published in one of their publications is as good a guess as you will get from anybody and off the top of my head I think it is $90 for bioethanol and $60, they say, for biodiesel, but I would agree totally with Rory. It is how long is a piece of string, because your raw material and our own production costs are going up. We have seen the price of electricity go right through the roof and you

cannot produce biodiesel without using some electricity.
Mr Clarke: Those are some of the advantages of the theory behind jatropha, which is a non-edible oil which can be grown in very arid countries. D1 Oils from the North-East have gone down this line and they have started detropha plantations in India, parts of Africa and Egypt, and of course it is bringing agriculture to some of the poorest parts of the world, which I think is to be commended. As long as the energy back out is greater than the energy required to grow the plant and you are able to make the quality of fuel from it, then in my opinion it is a good solution.

Q148 ***Lord Palmer:*** What about shipping it half-way around the world?
Mr Clarke: That is why I am saying as long as the overall energy which you get back out of it is greater than the energy input, and because it has to be grown over fairly large areas as well some of the agricultural inputs as well as the transportation costs are questionable, but certainly we seem to be looking at palm already in Europe which is coming from even greater distances.
Chairman: We will get back to the order of our questions, I think. Lord Cameron.

Q149 ***Lord Cameron of Dillington:*** My question has probably been half answered there because it was, do you think there should be a sustainability requirement in the whole life cycle of these bioethanols? In answering Mr Ward's point about the fact that the EU targets ought to be mandatory, Denmark have said, "No, actually we prefer to spend our money on more greenhouse-effective issues such as producing energy," and they produce 14 per cent of their whole energy requirements from renewables and they think that biofuels is not necessarily such a good, environmentally sound way of investing their money. I can see there is a point in that and I am just wondering whether, if we did introduce sustainability requirements into both the home production and particularly, as you were just referring to, the kind of long-distance imports from Brazil, we could overcome that particular problem? Do you think it would be a good idea?
Mr Clarke: I think the best solution for biofuel production is that with the shortest lines of communication and the greatest energy values. I do not have a problem with the theory of importing either the raw material or the finished product from other countries as long as you can account in some way for the carbon benefit which is being delivered. When I read about areas in Borneo the size of Wales that are being slashed and burnt, virgin rainforest, to make way for palm plantations then I struggle to understand the balance of what is being delivered here. How can you be absorbing any more greenhouse gas than if you had just left the rainforest there in the first place without even involving all the other issues?

Q150 ***Lord Cameron of Dillington:*** Absolutely right, and some of the sugar plantations in Brazil.
Mr Ward: Yes.
Mr Clarke: If you are looking at so-called sustainable palm, then in my opinion all that is doing is displacing itself from the market place, if it is going into transport, and creating a bigger market in the food industry for unsustainable palm, or in other industries.
Mr Ward: Your opening comment was relevant to the Danes. The reality is that they actually produce 50 or 60,000 tonnes of biodiesel but send it to Germany.

Q151 ***Chairman:*** I think a moment's expansion on detropha might be helpful.
Mr Clarke: Because Detropha is a non-edible oil, if there was a large market for the oil to go into biofuels it is not going to have an impact on that commodity price outside of where the fossil fuel price is because if it has no edible use it will only be linked to the fossil fuel price.

Q152 ***Chairman:*** Where is it being grown?
Mr Clarke: Africa, India and parts of Egypt.

Q153 ***Chairman:*** Is it capable of growing with relatively little water, relatively little rainfall?
Mr Clarke: Yes. The figures of that I do not have.
Mr Ward: It also takes very poor quality water as well. You can almost put your effluent straight onto it.
Chairman: That is an interesting point, thank you.

Q154 ***Lord Cameron of Dillington:*** I am just wondering about the sorts of comparisons between biodiesel and bioethanol. Where do you think is the greatest potential for increased production in this country in terms of cost? It would be quite interesting to know from you, Mr Ward, in relation to your use of waste products, tallow, cooking oil, et cetera, how much more potential there is in that area in the waste market. Is there a huge potential?
Mr Ward: Yes. In reality one could take all the fat which currently goes down to the sewers and blocks up the waterworks and with sufficient incentive one could process that into biodiesel.

Q155 ***Lord Cameron of Dillington:*** Is that sort of double your current production?
Mr Ward: One does not know, because there are no figures published for it. It is currently a waste and you would need to get behind it.

Q156 ***Lord Cameron of Dillington:*** So you do not really quite know what the potential for that is?
Mr Ward: No, nobody knows what the potential is.

Q157 ***Lord Cameron of Dillington:*** Between you, how do you see the market going? There are now bioethanol plants being embryonic, they are almost getting there. Are they getting there?
Mr Ward: It is a simple equation. Europe imports somewhere between 25 and 30 million tonnes a year of diesel and exports a similar volume of petrol. European refineries need more petrol like Custer needed more Indians! The fact is, Europe is short of diesel.

Q158 ***Lord Cameron of Dillington:*** So the market place, you think, has got greater potential to use up more biodiesel therefore than bioethanol?
Mr Ward: Undoubtedly.
Mr Clarke: Certainly, as well, in the supply chain from a logistical point of view I think biodiesel is easier to introduce and blend than ethanol is. Ethanol has got a very low flashpoint, it is hydroscopic, so there are problems with handling it and storing it, as there are with biodiesel, but they are greater with bioethanol.
Mr Ward: In simple terms, Rory calls it hydroscopic, it attracts water so they cannot put it down the pipelines where they are currently using pipelines to move vast volumes of fuel about. You cannot risk jet fuel going down the same line as something which has got bioethanol in it.

Q159 ***Lord Cameron of Dillington:*** What about the different costs or the economic environmental case for biodiesel from tallow and recovered vegetable oil versus virgin oil, rapeseed oil, for instance?
Mr Ward: Environmentally we have produced a lifecycle assessment of our process with a Brussels grant. The common term used by the environmentalists is that it is with regard to the footprint of a process and that is the impact which it has on the environment. If we produce biodiesel using our process, using used cooking oil, it has got a negative imprint, in fact it improves the environment. The carbon emissions are greatly reduced with the use of biodiesel.

Q160 ***Lord Cameron of Dillington:*** I can see that, but we cannot quite get a handle on the growth potential.
Mr Ward: On the growth potential there is about 15 million tonnes of material available for our processes around the world. The US exported 130,000 tonnes to Turkey last year. There is about a million tonnes a year coming out from North America—
Mr Clarke: Of yellow grease.
Mr Ward:—of our type of product, yellow grease and tallow.
Mr Clarke: We burn in the UK something like 60 million tonnes of fossil fuels in transport a year, of which about 18 million tonnes are diesel. Used cooking oil which is available in the UK is somewhere between 60 and 120,000 tonnes. That is not including the tallow which Doug has available. So as a UK-based solution it has only got limited legs.

Q161 ***Lord Cameron of Dillington:*** Fair enough. So in the end, if we are going to fulfil our obligations then we are going to have to use more oil seed rape from the point of view of our country?
Mr Clarke: Oil seed rape is the most suitable product domestically to grow for biofuels.

Q162 ***Lord Cameron of Dillington:*** Thank you. One last question: in terms of the production costs of biodiesel, how do we compare in the UK with the production costs in the EU?
Mr Ward: It depends how much subsidy you have had on your plant.

Q163 ***Lord Cameron of Dillington:*** Ignoring subsidy.
Mr Ward: Ignoring subsidy, it will vary from one country to another around Europe. The price of electricity, the labour costs, they are up and down all over the place. There is not a magic formula. If you think of the major ingredients for the process, you have got your capital costs, you have got your labour costs and you have got your energy costs, which vary.

Q164 ***Lord Cameron of Dillington:*** But at the moment is our biodiesel more expensive or less expensive?
Mr Clarke: I think that is impossible to answer.
Mr Ward: It is impossible.
Mr Clarke: There are plants all over Europe from the size of people's garden sheds to 200,000 tonnes and the scale of the plant, the yield, the land price, the labour costs, they are all going to vary considerably. Smaller plants tend to be more flexible and to be able to use recovered materials, which cost less and are more competitive. Larger plants, of course, cannot rely on that, for the reasons we were just discussing, in the same way. So the economics are going to work differently to some extent in different places. In most industrial processes the eastern parts of Europe seem to be more attractive from a land and labour point of view.

Q165 ***Chairman:*** Thank you. I have to declare an interest in that my nephew in Scotland is in the first category, doing it in a small shed and he arranged it all himself. I rather admire him for it. I am reminded that to date all the RTFO obligation talk has been on a percentage obligation. The oil companies must sell to 5 per cent of their total production. You came out very clearly in saying the low sulphur principle worked and that what we need is actually a compulsory fuel

specification blend and that is what will work. You strongly implied that it should be a fuel specification and therefore compulsory blending.
Mr Clarke: I believe that if the RTFO is successful that is what it will become, that they will include a percentage of biofuels. But ultimately then, if the material is available, the big stumbling block with making it simply part of the specification is the availability and source of the product that you are going to blend with it. With all other things with our fuel simply up to now, with cleaning up the environment, it has been a matter of changing the specification.

Q166 ***Chairman:*** Do you agree with that, Mr Ward?
Mr Ward: Yes, in broad terms. It is not quite that simple because, going back to the argument about biodiesel and bioethanol, the oil companies are quite happy that the initial target for 2008 is only 2.5 per cent, but that is 2.5 per cent of total transport fuels. That can be met by a 5 per cent blend of biodiesel without any bioethanol, and those are the issues which are tied up inside that. Do you make it a requirement that all your fuels have it? You would have difficulty in convincing the petroleum and the refining industry that that is required when you have already got more petrol than you know what to do with.

Q167 ***Chairman:*** Thank you. We are running over our time, so just a final question. What steps are you taking in your own companies, your own commercial interests, in research and development to reduce the production costs of biodiesel?
Mr Ward: There are certain things I am doing that I would not be allowed to tell you about.

Q168 ***Chairman:*** You would not be allowed to by your shareholders?
Mr Ward: It is commercially sensitive if we can reduce production costs.

Q169 ***Chairman:*** You mean you can do it but you want to keep it to yourself?
Mr Ward: I would be surprised, if anybody is working down a unique path, that they would want to be discussing it in a public forum. We are clearly, all of us, seeking to ensure that we drive down our costs as far as we possibly can and therefore making our plants more efficient in terms of their operational costs, but also into the value of the by-products that we produce from it, which effectively reduces the cost or the value of your finished biofuel.
Mr Clarke: I do not really have anything to add to that, I am afraid.
Chairman: No, it is not your field. Thank you both very much indeed. We much appreciate your coming and your help in answering our questions. As I say, we will send a transcript to you and do make any corrections you wish to make. We appreciate your coming to talk to us this afternoon.

WEDNESDAY 14 JUNE 2006

Present
Cameron of Dillington, L
Haskins, L
Lewis of Newnham, L
Livsey of Talgarth, L
Palmer, L
Peel, E
Plumb, L
Renton of Mount Harry, L (Chairman)
Sewel, L

Memorandum by The Renewable Energy Association

INTRODUCTION

1. The Renewable Energy Association (REA) welcomes the opportunity to submit this evidence. The REA has over 420 members, active across the entire range of renewable energy resources and technologies. The REA specifically represents the interests of some 40 members involved in the development of a market for renewable road transport fuels (biofuels), particularly biodiesel, bioethanol and biogas.

RESPONSES TO THE COMMITTEE'S SPECIFIC QUESTIONS

BIOFUEL TARGETS

1. *Which Member States have been most successful in meeting their biofuel targets; and how have they achieved this?*

2. The EU Biofuels Directive has adopted an EU target for a 2 per cent market share for biofuels in 2005, rising to 5.75 per cent by 2010. Both targets are established on the basis of energy content. Under the terms of this framework Directive, Member States have been required to establish their own national targets, taking as an indicative target the levels established for the EU as a whole. Recognising this somewhat flexible approach to target-setting, attainment of an often somewhat arbitrary national target cannot, in itself, be interpreted as a measure of success in increasing the market penetration of biofuels.

3. Notwithstanding the implications of this flexible target-setting process, it is apparent that certain Member States have performed noticeably better in maximising the market penetration of biofuels. Although an absence of data precludes an up-to-date representation of the situation, data for 2004 would suggest that France (0.67 per cent), Germany (1.72 per cent) and Sweden (2.28 per cent) lead in terms of actual market penetration. In each case these Member States had imposed relatively ambitious interim targets for 2005; 2 per cent in the case of France and Germany, 3 per cent for Sweden. By contrast, Member States with more modest targets appeared on course to fall short of even these; the UK, with a target of 0.2 per cent achieved only 20 per cent of this, with an actual market penetration of 0.04 per cent.

4. The principal conclusion to emerge from this data would appear to be that a modest level of ambition begets a sombre level of achievement.

5. Achieving the relatively aggressive levels of biofuels penetration has been achieved in Sweden through a coordinated set of policy actions, including primarily:

- strong duty rebates;
- favourable import tariffs for bioethanol;
- coordinated initiatives encompassing vehicle manufacturers, local government and other stakeholders; and
- a positive package of concessions to encourage individuals and organisations to adopt high ethanol blends (E85).

6. Germany's success has been driven primarily by a staged process of detaxation, which has had a specific impact in the diesel market. Initially supplies of 100 per cent biodiesel (B100) only qualified for full detaxation litre which had a powerful impact in driving sales of this product into a large but niche market. Subsequently this detaxation was extended to the bio-component of blends, so stimulating sales of mass-market B5 blends. Although the German Government has now announced a change in the detaxation rules which will impose a small tax on biofuels from August 2006, it is not expected to halt the progress towards the achievement of their obligation to increase the market share of biofuels to 5.75 per cent by 2010.

7. In France, the Prime Minister confirmed in September 2005 that France would adopt the 5.75 per cent target for 2008, rising to 7 per cent by 2010 and 10 per cent by 2015. This demonstrates a strong political commitment in France which has given the biofuels industry, both biodiesel and bioethanol, a real impetus to move forward. The means by which this political commitment is being translated into practice involves a highly regulated but potentially powerful approach to incentivising biofuels supply, with a partial detaxation regime that bears many attributes of an obligation approach, allied to production quotas for a number of producers selected on the basis of a tender process.

8. Biofuel penetration in the UK has been disappointing with the fuel duty rebate of 20 pence per litre only sufficient to stimulate niche production from such feedstocks as Used Cooking Oil and tallow. There is still no UK production of bioethanol. The UK sets its targets by volume and not energy and will fall far short of the indicative target for 2010, which would suggest a volume-based target of c.8 per cent as against the projected 5 per cent. The Government has said that this target is limited in practice by the 5 per cent biofuel inclusion level permitted in EU fuel standards. However, other Member States have simultaneously encouraged the use of higher blends such as E85 (up to 85 per cent bioethanol) and B100 (100 per cent biodiesel).

Economic Instruments

2. *What financial instruments or incentives have proven to be most effective in meeting national targets for biofuel market share?*

9. With the relatively early stage of market development across the EU, and with only a small number of Member States having made any significant progress in delivering a biofuels market, it is probably premature to reach a conclusive statement regarding an optimum approach. There are, however, some common attributes of these national markets which could be considered contributing factors in the successful establishment of biofuels' market share.

10. Powerful fiscal incentives have been employed in Germany, Sweden and France. These incentives have ensured that biofuels supply and—in the case of Germany and France—production, have presented a sufficiently attractive commercial proposition to deliver the level of returns necessary to encourage investment and new market entry. Furthermore, the scale of these incentives has tended to communicate to the industry an unequivocal policy direction that will act to reinforce investor confidence.

11. Protection of domestic markets has been a prominent feature of market development in Germany and France. Although the nature of the measures has differed, both Member States have created the conditions for a domestic feedstock production and refining industry to flourish. The positive impacts for the agricultural and processing sectors have provided the political platform to support the fiscal intervention necessary to develop the biofuels market.

12. In Germany, domestic biodiesel producers have enjoyed a degree of protection through the fuel standard EN14214 which has effectively required the supply of rape methyl ester (RME), particularly for B100 biodiesel. Taxation of imported bioethanol at the higher rate of Euros 19.2/hl applying to undenatured product has diminished any competitive advantage enjoyed by imported fuels.

13. In France the central tender process for biofuels has tended to ensure that domestic demand is satisfied by domestic production.

14. Experience outside of the EU illustrates the potential impact of a mandate as a policy instrument. Historically Brazil has employed mandates to considerable effect in creating its bioethanol market. Although latterly the advent of flexfuel vehicles and the prevailing oil price have tended to become the dominant market factors, Brazil continues to adopt a highly interventionist approach indictating supply and demand of ethanol. In announcing a Renewable Fuels Standard in the Energy Policy Act 2005, the US Government has continued to fuel strong market growth.

15. Despite a range of approaches and permutations that reflect national circumstances and political culture, it is possible to characterise successful policies as being consistent, coordinated and with powerful incentives for commercial actors to align themselves with Government policies.

Biofuel Obligations

3. *To what extent has the imposition of biofuel obligations by Member States reduced the biofuel industry's need for fiscal support?*

16. Although obligations have been established in a small number of Member States (France, Austria and Slovenia) and have been announced or are under consideration among a somewhat larger group (United Kingdom, Germany, Czech Republic, Sweden, Slovakia, Italy, Lithuania, Poland and Hungary) there is no relevant empirical evidence upon which to make a valid assessment of their impact. The following comments therefore apply at a generic, theoretical level.

17. For any obligation mechanism the effectiveness of the measure in delivering biofuels supply will be determined by the level of incentive it presents, or perhaps more accurately by the level of sanction it imposes upon parties that elect not to supply. Where it is cheaper for an obligated party to pay the penalty (the "Buy-Out Price" in the case of the UK RTFO) this will be the preferred compliance option for these parties. In such circumstances an obligation cannot replace the requirement for a duty rebate or similar fiscal incentive that may create adequate commercial motive to supply biofuels.

18. The penalty is therefore a critical parameter for any obligation scheme. For theUK RTFO, the decision by Government to set the Buy-Out Price (BOP) at a point that is itself linked to the prevailing rate of duty rebate means that the rebate retains a pivotal role in the commercial equation determining biofuels supply. Whereas, a minimum BOP of 30 pence per litre had been recommended to Government by the REA and other industry interests, Government chose to interpret the BOP as being in some way additive, and so elected to restrict the BOP to 15 pence in the period 2008–09. In subsequent years Government has indicated a cap for the aggregate BOP and duty rebate, of 35 pence in 2009–10 and 30 pence in 2010–11. This would appear to be an unnecessary complication for the UK incentive framework, where the residual duty rebate and the nascent obligation mechanism have discrete functions during the period of transition from one to the other.

19. Where obligation mechanisms are implemented effectively, with a penalty set at a level that acts to encourage supply, they have the distinct advantage that they will minimise the costs of compliance borne by the economy:

- Under conditions of rising fossil fuel prices, with a fixed cost of biofuels and a fixed penalty, biofuels will become increasingly competitive and so any additional costs imposed by the mechanism upon the consumer or shareholder will diminish. By contrast a duty rebate will continue to present its full cost to the Exchequer.
- With falling fossil prices the marginal costs of an obligation will rise, but only in line with the falling fossil price, leaving the net position of the consumer largely unaffected and so minimising political impacts.

20. The inherent flexibility of the burden imposed by an obligation will therefore tend to diminish shocks and enhance the long-term stability of the mechanism.

21. Under tight market conditions, with scarce supplies of biofuels, there is a risk that obligations may prove inflationary as biofuels are "priced-up" to the level of any sanction. In an EU market which may see differentiated levels of penalty, the available supplies will flow to those regimes offering the most advantageous price. For any Member State that does not offer a penalty sufficient to secure the marginal supply, the costs of the penalty will continue to be borne by the economy but without the benefit of biofuels supply. The risk posed by this situation, with volatility in the volumes available to national markets and corresponding shifts in the efficacy of national policies, suggests a case for an harmonised obligation framework across the EU.

Production of Biofuel

4. *Which countries have the lowest biofuel production costs and why? What steps have Member States taken in research and development to reduce the production costs of biofuels?*

22. The Association does not hold details of production costs or R&D programmes indifferent countries, and would not be in a position to disclose information regarding the cost base of any individual company.

23. However, it would be worth noting in this context that the profitability of a biofuels industry is driven by two key factors which are fundamentally unrelated—raw material prices and oil prices. The potential squeeze between these two factors present very particular commercial pressures which do not predispose to easy investment in a new industry. The management of these unrelated factors gives particular policy challenges if

Government wishes to see the development of a biofuels industry. In the UK the introduction of the fuel duty rebate at the 20 pence per litre level was clearly insufficient to give the necessary confidence that the differential between raw material and oil prices could be managed successfully. The use of an obligation may be more successful in that it provides greater flexibility.

Trade in Biofuel

5. *Which Member States import the greatest volume of biofuel and why? What impact have imports of cheap biofuel had on domestic production in the European Union?*

24. Sweden is the EU's largest importer with about half its biofuel consumption supplied as imports. Germany and the UK are also significant importers.

25. Imports arise for a number of reasons. Firstly, the overall policy towards the promotion of biofuels will set the general level of consumption. The more ambitious the political direction given by Government the greater will be the demand. Hence the policy decision by Sweden to become an oil free economy by 2020 sets a political environment against which, in the transport sector, commercial interests will look to see how best to maximise biofuel penetration by whatever means possible. Secondly, Governments can make policy decisions about how much domestic production they can foster to ensure the level of demand that can be met internally. Brazil for example took a conscious decision to promote domestic production of bioethanol by imposing a mandate for ethanol use and offering generous state support for an emerging industry. France has taken a similar decision and aims to be a major biofuel supplier using domestic feedstocks. Thirdly, Governments have to take a realistic view of potential biofuel production from domestic feedstocks, at least in a start-up phase. This can lead to greater imports, as in Sweden, where domestic feedstocks are currently limited. Alternatively Government action to promote the use of domestic feedstocks can effectively limit imports, as has been the case in Germany and France. Either way, the requirements of a start-up phase of a new industry require Governments to take pro-active decisions to influence consumption levels and to determine the level of domestic production. A policy decision to foster the use of domestic feedstocks in a start-up phase is very different to calling for enduring support for industry against imported feedstocks.

26. In general terms, imports of cheaper imported feedstocks will limit domestic production if demand is kept at low levels. As demand rises—both in the EU and globally—imports will play a part but potentially a diminishing one. Rising biofuel prices against increasing demand will also encourage the development of innovative technologies to maximise the use of available land and biomass.

27. The increasing interest within the EU towards the sustainable production of biofuels introduces an additional competitive dynamic into the global marketplace. Not only will domestic production and imports have to compete on costs of production—they will also have to compete on sustainability. This may alter the balance as between domestic production and imports but at this stage it would be difficult to predict any specific outcome.

Technical Barriers

6. *What are the technical requirements that have acted as barriers to the introduction of biofuel into national fuel markets?*

28. The EU Fuel Quality Directive (98/70/EC of 13 October 1998) establishes specifications for petrol and diesel and limits the use of ethanol in standard petrol to 5 per cent. EN 590 delivers the same 5 per cent limit for direct blending of biodiesel into diesel. The UK Government has seen this 5 per cent limit on direct blending as providing a "natural" constraint on the development of the UK biofuels market. In taking this position the UK Government has failed to seize upon the opportunity to develop a high blend market in both biodiesel and bioethanol.

29. This passive stance of the UK Government appears very much at odds with the more proactive response that would be required to meet the indicative targets established under the existing Biofuels Directive. In setting a target for 5.75 per cent of biofuels by energy content, the EU has implicitly sought for Member States to introduce measures to move beyond this somewhat artificial limit, whilst simultaneously providing those States with the flexibility to introduce measures appropriate to their national circumstances. Had the UK chosen to adopt more ambitious targets then the policy imperative to lift the 5 per cent limit would have been greater, and it is probable that the UK Government would now be a more active protagonist in the process

of lifting the constraints imposed by EN590 and the Fuel Quality Directive. The situation emphasises the limits of the powers of the Directive in securing Member State compliance.

30. The situation also leads to the conclusion that the future development of a biofuels industry in the UK must not become permanently tied to the direct blending constraints of the retail fuel specifications. The industry should be able to develop free of this constraint which is considered artificial and divorced from the practicalities of handling and using these fuels. In response a twin-track approach by Governments should be encouraged:

- The 5 per cent limit for direct blending should be revised upwards as soon as possible to a level that reflects the actual, practical performance of biofuel blends, likely to be at least 10 per cent.
- Promotion of the use of higher blends such as E85 and B100, which incorporate biofuels at significantly greater proportions than conventional, retail fuels.

The latter approach will be particularly significant in building the technological capability and market capacity to develop a biofuels industry that is increasingly independent of the constraints of the fossil-fuel market, and so capable of making an enduring contribution to fuel security objectives.

31. Beyond the constraint of the 5 per cent limit imposed by the Fuel Quality Directive, vapour pressure limits for gasoline and the affinity of the fuel with water are frequently presented as obstacles to the introduction of ethanol into gasoline.

32. The Fuel Quality Directive limits the "Reid Vapour Pressure" in conventional gasoline in an effort to control local releases of volatile organic compounds (VOCs). Practical aspects of the introduction of 5 per cent blends to the market present a potential risk that some gasoline may fall outside of specification under certain circumstances. However, the experience of the UK independent sector, which is rapidly developing a successful 5 per cent ethanol (E5) market, suggests that these concerns may have been overplayed. Scientific evidence also suggests that RVP levels in ethanol blended petrol could be relaxed with no ill effects, and hence the initiative of the European Commission to introduce regulatory changes in this area is to be welcomed.

33. The affinity of ethanol for water is less of a technical obstacle than a cost factor. The proposed UK approach of blending ethanol at distribution terminals, in order to avoid the risks of co-mingling of water with aviation fuel in distribution pipes, does carry higher costs than would refinery blending. However, in the UK context these costs have been provided for in the setting of the proposed levels of incentive under the RTFO.[1]

34. Biodiesel appears to present fewer immediate technical problems in its introduction in low-percentage blends. In some aspects of the fuel quality requirements, notably the cold-flow properties of the fuel, local variations have been permitted to reflect physical conditions. In this case, consistency of the blended fuel with the diesel specification EN590 has tended to be the fundamental quality criterion, reflecting a certain pragmatism in the introduction of these fuels. This situation also highlights, however, the limitations of the current biodiesel standard EN 14214. Recognising that biodiesel properties can vary significantly without significant impacts on the performance of fuels, the recommendation in the Biofuels Strategy[2] to revise this specification to facilitate the use of a wider range of feedstocks should be encouraged.

Looking Ahead

7. *Should the European Union take further action to promote biofuel production; and, if so, what action is required?*

35. The European Commission has acknowledged the value of biofuels in:

- Contributing to fuel security and diversity of supply, a particular challenge in the transport sector which depends heavily on fossil oil.
- Contributing to the reduction of greenhouse gas emissions in the transport sector where emissions are still rising.
- Offering new economic development opportunities in rural areas.

These policy drivers are still valid and are likely to remain so for the foreseeable future. Given the disappointingly poor showing for the up-take of biofuels across the whole of the EU in 2005, compared to the indicative target set out in the Biofuels Directive, the REA believes that further action to promote biofuel production and sales remains imperative.

[1] RTFO Feasibility Report, DfT, 2005 http://www.dft.gov.uk/stellent/groups/dft_roads/documents/pdf/dft_roads_pdf_610329.pdf

[2] An EU Strategy for Biofuels, COM(2006) 34 final, Commission of the European Communities, February 2006.

36. The following actions will be required:

- More aggressive targets for the period after 2010 should be set—at least 8 per cent by energy for 2015 as recommended by the European Summit in March 2006 and higher thereafter. Increasing targets are fundamental to providing the opportunity for market-entry of second generation biofuels, which would otherwise have difficulty competing with first generation plant.
- Establishment of a common incentive that is effective in securing the desired, direct policy outcome in terms of supply of biofuels; in effect an EU-wide mandate adopted by all the Member States. Such an approach would maximise commercial confidence in an enduring policy framework.
- If a mandate proves once again politically impossible to secure, an EU-wide obligation should be set. The framework for this should be set forward for the longer-term even if precise target levels are not specified. This would allow long-term investment in an efficient industry to take place, encourage investment in innovative technology, ensure fair competition across the EU, and enable intra-EU trade to develop, thus allowing Member States to exploit their respective competitive advantage atvarious points in the supply chain.
- Explicit action to overcome the 5 per cent constraint in the Fuel Quality Directive and EN 590.
- The encouragement of the use of high blends of biofuels independent of the fuel specifications for direct blending.
- Co-ordinated R&D to promote second generation biofuels.

37. It is also critical that the EU should develop a common approach to carbon accounting and sustainability reporting that is universally acceptable. Already the UK has decided that it will introduce mandatory reporting of carbon and sustainability in parallel with the introduction of the RTFO. Other Member States, notably the Netherlands, appear to be pursuing a similar course of action. However, in markets where the commodities traded are essentially the same there is little point in establishing conditions that will in effect, lead to the establishment of discrete national markets. This could impose significant additional costs in the UK market, and in an EU market that is likely to be short of biofuels this will mean supplies will go elsewhere and so undermine UK policy.

38. Biofuels will become a common commodity traded in a common market—it is therefore a community competency to develop and introduce these standards in a coordinated and effective manner that avoids the risk of distorting competition. It is also probable that the scale of the UK market alone may not have the traction to bring upstream stakeholders, such as Brazil and Indonesia, into their accounting process so long as other, less-regulated market opportunities exist. There is a strong case for EU-level representation and coordination under these circumstances.

Closing Remarks

39. The Association welcomes the opportunity to contribute to this Inquiry through the presentation of both written and oral evidence. We would be pleased to provide any further clarification or information that we can to assist the Inquiry.

June 2006

Annex 1

PROGRESS TOWARDS EU AND MEMBER STATES' BIOFUELS TARGET

Member State	*Consumption (%, energy content)*			*Targets (%, energy content)*				
	2003	*2004*	*2005 (ref value 2 per cent)*	*2006*	*2007*	*2008*	*2009*	*2010 (ref value 5 per cent)*
Austria	0.06	0.06	2.5	2.5	4.3	5.75	5.75	5.75
Belgium	0	0	2	2.75	3.5	4.25	5	5.75
Cyprus	0	0	1					
Czech Republic	1.09	1		3.7 or 1.52	4.67			5.55
Denmark	0	0	0	0.1				
Estonia	0	0	2	2				
Finland	0.11	0.11	0.1					
France	0.67	0.67	2	2	3	4	5	5.75
Germany	1.21	1.72	2					5.75
Greece	0	na	0.7	2.5	3	4	5	5.75
Hungary	0	0	0.6					4
Ireland	0	0	0.06	1.14	1.75	2.24		
Italy	0.5	na	1					2.5
Latvia	0.21	0.07	2	2.75	3.5	4.25	5	5.75
Lithuania	0	0.02	2					5.75
Luxembourg	0	na	0	2.75				5.75
Malta	0.02	0.10	0.3					
Netherlands	0.03	na	0	2	2			5.75
Poland	0.49	0.3	0.5	1.5				5.75
Portugal	0	0	2					
Slovakia	0.14	0.15	2	2.5	3.2	4	4.9	5.75
Slovenia	0	0.06	0.65	1.2	2	3	4	5
Spain	0.35	0.38	2					
Sweden	1.32	2.28	3					5.75
UK	0.03	0.04	0.2			1.7	2.6	3.5
EU25	**0.5**	**0.6**	**1.4**					

Source: European Commission

Examination of Witnesses

Witnesses: Mr Sean Sutcliffe, Vice Chairman, Renewable Transport Fuels Group of the Renewable Energy Association, and Managing Director, Biofuels Corporation plc, Mr Graham Meeks, Head of Fuels and Heat, Renewable Energy Association, and Ms Clare Wenner, Head of Transport Biofuels, Renewable Energy Association, examined.

Q170 ***Chairman:*** Good morning, Ms Wenner, Mr Meeks and Mr Sutcliffe, and thank you very much indeed for coming this morning. As you know, we are conducting a short inquiry particularly into the EU targets for biofuels and we hope to produce a report before the summer holidays. You are very much leaders in this situation, so we are delighted you have come to see us today. Is there anything you would like to say by way of preliminary or introductory statement?

Mr Sutcliffe: Just briefly. I am Sean Sutcliffe, here primarily as Vice Chairman of the Renewable Energy Association, the Renewable Transport Fuels Group, flanked by Clare Wenner, Head of Transport Biofuels from the REA and by Graham Meeks, also from the REA as Head of Fuels and Heat. I think the key point is that we are still at the start of a new sector certainly in the UK and to some extent across Europe and the key factor which hopefully will come over today is that we are looking for longer-term certainty, longer-term structure in terms of targets to allow the market to grow and to be invested in and to be progressive. The second point is that we will be learning as we go along. We cannot set out all of the details today because we just do not know. One thing we do know is that it needs to be an industry that is fundamentally sound and that means financially fundamentally sound, but also sound in terms of sustainability and in terms of delivering carbon savings over the long term, although, as I say, we are at the start of the journey, so we will have to learn as we go along in these areas. The final point really, and

we are looking at this within an EU context, is that the UK has been very clear that the fundamental driver for biofuels is to do with carbon. We in the REA believe that to be the right driver, but recognise there are subsidiary benefits in terms of agricultural development and in terms of security of supply and we recognise that the EU and other Member States may have slightly different perspectives in terms of the driver, but we are certainly coming at it first and foremost from the carbon savings and the global warming perspective. That, I hope, is succinct enough and we are happy to start the proceedings.

Q171 ***Chairman:*** Well, thank you, Mr Sutcliffe, very much. I think you have raised a number of points which, in our different questions from different members of the Committee over the next half hour, we will be picking up. Could I start with something fairly basic, that we are an EU Committee, so we are particularly concerned with EU targets, the EU Directive, how we, the UK, are doing compared to Germany, France, Italy, Spain and so forth. Therefore, could I start by asking you, in your judgment, has the EU Directive on Biofuels had much impact and is it one of the reasons why production and consumption too have gone ahead perhaps more than the market would have achieved by itself? Is that correct?
Mr Meeks: The fundamental economics of the situation mean that, with the relative prices of oil and the feedstocks that go into biofuels production, some of the biofuels production is probably at best economically marginal and against an oil price today at the present time will be less than economic. That means that clearly people are not going to rush into that market and shareholders are not going to be satisfied with enterprises that proceed upon that basis, so it is evident that, in order to move the market, intervention has been necessary. The question, I suppose, one could take a step further and one could ask whether the EU's intervention has been necessary over and above individual Member States' governments' own activity and I think that is very much a mixed picture. I think a number of Member States have seen merit in pursuing a biofuels policy and have probably acted ahead of the curve, if you like, in terms of implementing their own policies, whereas others have been extremely laggard, if you like, in terms of how they respond. Denmark, as you probably know—

Q172 ***Chairman:*** We have a witness coming from Denmark, yes.
Mr Meeks: I think that will give you an interesting perspective no doubt. From the UK perspective, which is principally where our members' interests lie, I think we are of the view that, if there had not been some legislative pressure downwards from the European Union, we probably would not have moved forward with the policy as quickly as we might and perhaps the introduction of measures, such as the Renewable Transport Fuels Obligation introduced through the Energy Act in 2004, may not have been embraced perhaps as warmly as the Government might have done if they had not had the EU and the Commission breathing down their neck with proceedings for derogation from the Directive, so I think yes, from a UK perspective, from where we are best qualified to respond, the Directive has certainly been helpful in pushing forward UK policy to a large extent.
Chairman: Thank you. Biofuel targets, Lord Lewis?

Q173 ***Lord Lewis of Newnham:*** Could I just preface my remarks by taking up a point which you have just made about the economics of the situation. If you look at the price of a barrel of oil today, it must be in a very favourable situation from the point of view of the serious consideration of biofuels as an alternative source of it.
Mr Sutcliffe: Clearly a higher oil price helps the economics of biofuel by definition. I think, in looking at investment decisions, people are going to be looking at long-run oil prices and I guess I would defer to John Brown, Lord Brown, in this who is looking at $40 or perhaps $25, so yes, in the short term high oil prices do ensure that the cost to the consumer is a lot less than it would otherwise be, but I remember the world of $10 oil, coming from an oil background, and looking at investment decisions, as do BP, against the fact that this is probably an aberration of some sort. In the longer term of course those pundits who talk about a $100 barrel of oil are making a case for this being an industry that is not necessarily going to need economic support in the long term, so I look at both sides of that argument in terms of oil price.

Q174 ***Lord Lewis of Newnham:*** So, Mr Sutcliffe, you look at the pot as half full rather than half empty?
Mr Sutcliffe: Correct.

Q175 ***Lord Lewis of Newnham:*** Can I turn to the biofuel targets. The UK was unable to meet the EU target of 2 per cent and in fact it was 0.3 per cent, I believe. Why do you believe that we are so far behind what is even the European average which is 1.4 per cent?
Mr Sutcliffe: I think there are two main reasons. Firstly, quite frankly the market support measures in the UK were introduced later and at a much less progressive level than elsewhere, so Germany and France in particular and to some extent Italy and Spain have been much more progressive in terms of looking to stimulate this market quickly. The UK put in a 20 pence derogation somewhat later than other people and it was set at a level which was said to be too

little to stimulate investment at the time, and that has proven to be largely the case. I think the other point to make is that historically the drive has been, certainly in biodiesel, towards 100 per cent biodiesel, so that is a niche market, if you like, in the transport sector, and in ethanol, significantly the E85 market, and in the UK structure, if you can call it a more orderly market, ie, dominated by some large players, perhaps there is more inertia to those sorts of niche players. In the future of course in a sense that is a benefit because the market is moving towards blending, and we will talk about the blending rates from 5 per cent going up to 10 per cent in due course, and in a sense the market structure in the UK combined with an obligation will make it easier to get quick market penetration in the UK. Those are the two factors why the UK has fallen behind, and hopefully the RTFO and the EU measures with perhaps a bit more bite will reverse that trend.

Q176 ***Lord Lewis of Newnham:*** Do you believe in domestic production rather than importation? For your carbon-conscious argument, it must mean that you do not want to import it from Brazil.
Mr Sutcliffe: Well, this is a separate question. In terms of carbon benefits, that is the key driver. What we do know at the moment is that the carbon savings from different feedstocks can vary quite widely. The data behind that, and I have been searching through to look at that data, is at best sketchy to date, so that is one of the things we have got to put in place over time to understand the carbon savings. I think it is probably the case that production from UK feedstocks will be good and bad in carbon saving terms, depending on the measures being taken—
Chairman: We are coming on to that later when we have a specific question on the carbon savings.

Q177 ***Earl Peel:*** Just to help somebody like myself who knows very, very little about this subject and to try and bring some perspective into it, could you just perhaps tell us at what level the fossil fuels prices have to be to make biofuels competitive compared to today's prices?
Mr Sutcliffe: I think in a sense I would look at it the other way and say that we are looking at a structure which has renewable fuel as part of the mix and the market structures will ensure we get competition within biofuels to achieve that, so the obligation-type structure will move us away from, if you like, comparisons between fossil fuel and biofuel towards saying that that is a part of our long-term energy mix and we will drive down the prices in the biofuels by getting competition within them. Therefore, in a sense I would turn the question around, but if I had to answer it precisely, I would say that at $25 a barrel, it will need more market support and, as you get to $100 a barrel, it probably would not in the long term, but there is a range in between there where in the short to medium term it will need some support, but you can see the cost curve coming down to bring it into long-term competition.

Q178 ***Earl Peel:*** But it is up at the $100 mark that you begin to make economic parity?
Mr Sutcliffe: No, I think what I am saying is that at that level it is very clear and what I do not know is how the cost curve is going to come down when we talk about improved agronomy and getting down the production cost curve. I do not know where that breakeven is going to be in the long term.

Q179 ***Lord Sewel:*** I was just wondering if you could tell us what you think the appropriate targets for the UK would be for 2010 and 2020 and what would the Government have to do to give us a fair crack at achieving those targets?
Mr Sutcliffe: The EU target of 5.75 per cent by energy which translates into, I do not know, 7 or 8 per cent by volume has certainly been a level which we thought was appropriate for 2010. The Government has seen fit to move perhaps more modestly than that which is 5 per cent by volume by 2010; it is a start. We certainly think that a 10 per cent target by 2015 is absolutely achievable and beyond that we are into aspirational targets, as some people call them, and a bit more focused on targets where policy measures are in place to achieve them. What has to be done to achieve the 10 per cent target by 2015 is essentially an extension of the RTFO targets, whether through the UK legislation, and they have an opportunity to do that through the legislation being put forward at the moment, or through an EU mandatory target for 2010 together with the pressure which is already being put to bear on the fuel standards bodies, the CEN, to allow a higher inclusion rate of biofuels, biodiesel and bioethanol, into the standard blends.

Q180 ***Lord Sewel:*** Do you see the progress with a greater contribution coming from bioethanol or biodiesel?
Mr Sutcliffe: I do not know. In the same way as there is a place for petrol and diesel in the European markets today, I think in the longer term there is going to be a place for biodiesel and bioethanol. Biodiesel has perhaps somewhat easier integration benefits, but I think some of the technical barriers to bioethanol have been rather overplayed and people will be able to get this into the market with less difficulty than perhaps they say. For the long term I think it will depend on broader engine technology issues as well as long-term costs for the biofuel technologies.

Q181 ***Chairman:*** You mentioned "mandatory" Directives from the EU. Would you support that? Would they be effective? How would they be enforceable?
Mr Sutcliffe: I think that at the moment the targets set by the present EU Directive are reference targets and non-mandatory and what we are seeing is that they have had limited impact. We had a 2 per cent non-mandatory target for 2005 which has been woefully missed by many Member States. Clearly by having a mandatory target and Member States setting out how they would achieve it, it would have more bite.

Q182 ***Chairman:*** So you might approve of that?
Mr Sutcliffe: Yes.
Ms Wenner: Absolutely.

Q183 ***Lord Livsey of Talgarth:*** On the major resource of land and how it should be best used, what priorities for land-use do you see as between food, biomass for heat and power and liquid biofuels because obviously there is competition between food and energy sources on the land?
Mr Meeks: I think it is an attractive notion that there is some form of cut-throat competition between these different end markets for what might be imagined to be a relatively scarce resource. I think, if that were the case, that would be a lovely problem to have. The reality of the situation today is that much of the feedstock that is required for those different end uses is actually a very different product. If we look at the heat market, for example, it is primarily a wood fuel product which is going to serve that either as a chip or as a pellet. Power generation certainly in the UK is largely imported residues that are then co-fired with some domestic production of a very tiny amount of energy crop and that market is still set to move. It is really with biofuels and food where one can begin to see perhaps more tension at this point in time. However, if one looks at how those materials are being used today, I think the NFU have estimated that we have sufficient grain surplus from the UK perspective to meet the 5 per cent target for 2010 on the ethanol side and that we are some way short of self-sufficiency, shall we say, in the biodiesel area, but they reckon that to get to a point where we can meet 5 per cent of our demand would need something like 500,000 hectares. Looking at what we have in terms of set-aside in the UK today and what one can naturally assume through changes in land-use, we could cover that 500,000 hectares and bring more into production. Longer term of course there are what we call the 'second generation biofuel technologies' where we will begin to use the residues and we will be able to make much more use of the residues which, one would hope, would ease competition for food supplies, though it may create a little bit more competition in other places. However, that is not a problem, I do not believe, for today and I do not believe it will be a problem certainly for the next 10 years really. We are using today in power probably less than 10 per cent of the available residues and products that could be going into the power market, so we are a long way from a position where we believe that this is going to cause a strong conflict. Of course a lot will happen and, as the demand for biofuels goes up and it increases pricing pressure on oilseeds and starches, we will see changes in agronomy, we will see changes in the development of specific varieties that may be grown for energy purposes and that should allow us to increase yields which, in turn, one would hope would ease some of those pressures.

Q184 ***Lord Livsey of Talgarth:*** Perhaps I could pin you down with one short question. Do you think enough work has been done on biomass and when do you think biomass is going to play a more important part in the equation?
Mr Meeks: What precisely do you mean in relation to biomass?

Q185 ***Lord Livsey of Talgarth:*** Well, we know that biofuels from the sources you have already mentioned, biodiesel, et cetera, are well developed and going along. Biomass seems to be behind in terms of development, yet perhaps has great potential. How can you speed this up?
Mr Meeks: I think we have had very little R&D focus upon the utilisation of biomass for biofuels in this country. We are looking at falling behind in terms of an important area of development that could meet a global need, so I think more focus on, and direction of effort to, R&D.

Q186 ***Lord Haskins:*** We have been told that Defra is putting much more emphasis on biomass than biofuels. I am interested in your view.
Mr Sutcliffe: Well, I think there is room for all these areas. If I can just broaden the answer to a global perspective, the IPCC suggests that there are 1,400 hexajoules of world sustainable biomass production and that compares to world primary energy requirements of—

Q187 ***Chairman:*** What was that?
Mr Sutcliffe: It is joules with an awful lot of noughts! In any event, it is three times the amount of primary energy requirements for the world today, so I think, if you look at it in a global perspective, and the International Energy Association concurs with this view but at a relatively lower number, the biomass globally can be at least a 25 per cent contribution to world requirements, so we are not running out of land any time soon.

Q188 ***Earl Peel:*** This leads on from the supplementary that I asked before, but what is your assessment of how the price of crude oil will impact on EU and UK liquid biofuel production?
Mr Meeks: If I may pick up from where Sean—

Q189 ***Chairman:*** We have done the $100 bit and we accept that.
Mr Meeks: High oil prices make it an easier public policy decision to support biofuels because the amount of either support that comes from the taxpayer or from the consumer which one then has to add into the commercial equation is that much less, so in terms of making it easier for the Government to make a decision to intervene and provide some measure of incentive for biofuels which incurs a cost, then the higher the oil price, the easier the decision is to be made, so certainly it is an important driving factor. I would just reinforce a point that Mr Sutcliffe made which was that the high oil price cannot be taken for granted, I think, by investors. They are still going to be somehow looking to have the risk, if you like, underpinned, the risk of price volatility in the oil market underpinned, to some extent. This is a Government-sponsored initiative to go down this route and the Government should ensure that the incentives which underpin the policy are sufficient to allow the private sector, when it is investing into the market, to make an adequate return.

Q190 ***Chairman:*** But the Government is surely not going to do that? There is no possibility of the Government doing that.
Mr Meeks: It already is to a degree.

Q191 ***Chairman:*** Looking at the oil price at the moment, you have BP saying, "Why is the oil price more than $40?" That is because it has been a very speculative market. I think the idea that the Government is going to reinforce the impact by saying, "Don't worry. We guarantee you an oil price of $80 a barrel", that is for the birds.
Mr Meeks: I do not think the Government is going to guarantee an oil price through a mechanism such as the Renewable Transport Fuels Obligation. What they are actually doing is providing some degree of insulation from a volatile oil price, and that is the mechanism by which that is underwritten, if you like.

Q192 ***Lord Cameron of Dillington:*** Like you and Lord Lewis, I come at this almost entirely from a carbon saving perspective. You started to touch on the whole question of imports of bioethanol and fuel by, for example, Brazil knocking down subtropical forests. What role do you think imports are going to play in the UK biofuel supplies either in terms of primary products or fuel itself?
Ms Wenner: Imports are going to play a fairly substantial role either as feedstocks from international commodity markets or as finished products. We do not have the land in the UK just to go on fuelling this for ever and it may be that the imports are both more competitive in some instances on production and, who knows, we are very much in the early days and I know you want to broach this, so we will leave it perhaps for later, but we are going to be competitive on the carbon and sustainability outturn. That is a very, very new issue which none of us has actually got our heads round. It is all very well being competitive on cost, but you have got to be competitive on carbon and sustainability as well, so imports will play a role, but what role precisely is rather difficult to say, possibly a bigger role in the biodiesel world with imported oils and possibly, it rather depends on what the availability of supplies is from places like Brazil, because the calls on the Brazilian bioethanol are pretty substantial domestically as well as from other markets than the UK.

Q193 ***Lord Cameron of Dillington:*** So it seems to me that the key is putting some sort of mechanism in place whereby the whole process is analysed in terms of its carbon effect not only through the transporting of fuel from Brazil and the knocking down of forests there, but, even with the domestic supply, if someone is producing wheat, the whole cycle involves many tractor passes and using artificial hydrogen and so on, so how could you possibly reward a more sustainable feedstock or production method within the process?
Ms Wenner: I think we are so much at the beginning of a very new road here that what we have to do is to get some methodologies in which start to give you the data from the different fuel chains. At the moment we simply have not got that. We have got quite a lot within the UK and perhaps I could make the distinction between carbon and other wider sustainability issues, like biodiversity and water and soil conservation. We have got quite a lot of information in the UK through such schemes as the Assured Combinable Crop Scheme on some of the sustainability issues. I think we are a long way down that and I think cross-compliance is quite an important factor in all of this. We have got some international schemes, but they require an enormous amount of buy-in to be effective—I am just talking sustainability for the moment—they require huge buy-in from the international community actually to make them work, so, if you want to make sure things are done sustainably, you have got to get the Brazilians with you, you have got to get the Indonesians with you. That is going to take time and it is going to take supply chains time to get used to these concepts in a way that is only just beginning. When you come to carbon, we are all in a very, very new area.

The REA has been working with the HGCA to trial some carbon accounting methodologies on the back of the ACCS form and it has worked quite well, and I am sure you will have seen the HGCA press release on the matter. It has actually worked quite well and it is possible. It is time-consuming, but it can be done. I have no particular reason to believe that that could not be rolled out to the EU. Where I think we are really under some pressure is in how we actually account for the carbon from the different fuel chains which involve imports. At the moment the proposition is that we should use technical experts to set default values until we get real data, but we have got supply chains there for whom this is utterly new and we have got to work with those supply chains to get real data. If we start imposing minimum standards for sustainability, which may even be illegal in WTO terms, or indeed minimum standards for carbon saving because we want to reward people in a better way, we will not be able to do it at the outset, but we have got to get the data. We have got to crawl before we walk before we run. It will take time to get this in. What I think I would like to leave you with is the assurance that this is something that we take tremendously seriously and those who are importing from overseas take tremendously seriously, but it is not an easy problem.

Q194 ***Lord Cameron of Dillington:*** How depressing!
Mr Sutcliffe: There is absolutely going to be a role for domestically produced feedstocks and imported feedstocks in order to make a meaningful carbon contribution. For those people who say that transport is a big carbon cost, in actual fact that is wrong. The transport cost is generally less than 10 per cent. What is much more important is the fertiliser usage and in fact the nitrous oxide and, quite frankly, finding data on that is very difficult today, so down the track, there will be competition for carbon, but we do not recommend imposing mandatory carbon targets until we actually understand the science a little bit better. That is a long-term goal but in competing with fossil fuel, let us get something which works first.

Q195 ***Chairman:*** Is there a danger that too much attention to carbon dioxide savings could kill the UK biofuels industry before it gets properly going?
Mr Sutcliffe: Absolutely. We have not got an industry to date to speak of. Obviously my company is involved, but, compared to the Europeans, the Brazilians or the US, we have not got an industry. Let us get it up and running and let us make it better.

Q196 ***Chairman:*** Therefore, at this moment, you do rely on a good deal of financial assistance or fiscal assistance?
Mr Sutcliffe: We are competing against huge established industries today.

Q197 ***Lord Palmer:*** I think all three of you know that I was one of the people behind the British RTFO. How important do you think it is for the future financial stability of the whole biofuels industry?
Mr Meeks: I think we believe it is absolutely fundamental.

Q198 ***Lord Palmer:*** That is great, thanks! Do you think the 15 pence per litre buy-out price is sufficient to ensure that oil companies meet the five per cent target?
Mr Meeks: I think this is where we get into the guts of it. An obligation in itself could be extremely important. It could be a very strong incentive or it could be completely meaningless if the incentives that it places upon the obligated parties, predominantly the oil majors in the UK market, are insufficient for them to change their behaviour. In the period running up to the Budget, we, as an organisation and across the biofuel supply industry, argued very strongly that we should have had a much higher level of buy-out price introduced in tandem with the existing duty rebate, the reason being that we are going, as Mr Sutcliffe pointed out, from an industry which is staggering to get on to its feet today to something which is going to contribute 5 per cent of the UK's road transport fuels. That is not an inconsiderable shift in an industry and indeed in a very established fossil fuel supply industry. To deliver that sort of change does not require a gentle nudge, but it needs a big shove in the right direction and the evidence, I think, when one looks at government policies across a whole range of renewable and energy efficiency measures, is that you need a big incentive to really get people to sit up and take notice and to change their behaviour. We are extremely worried and we remain worried that the current 15 pence buy-out price, which incidentally will only operate for the first two years and it will then probably fall to something like 10 pence assuming current levels of duty rebate, we are worried that, if that is the case, the two routes the oil companies have to go down, either meeting their obligation by supplying fuels or by what we call 'buying out', the difference between those two options may be too small. If it is too small, then they will simply not invest in the infrastructure and the systems that allow them to comply with the obligation through supplying fuels. In fact we advise the Government consistently that ultimately it is a risk for them that their policy fails while monies are still collected from the consumer and are going to no meaningful end, and that if that policy fails then the Government will be left with a deficit in terms of its carbon savings. A higher incentive, a higher buy-out price, we believe, would have been more effective and I think the Government now has to monitor the situation very closely.

Q199 ***Lord Palmer:*** I think we have covered my next question which is whether carbon should be required for fuel to qualify under a Renewable Transport Fuel Obligation, and I think you answered that.
Ms Wenner: If I may make one more point on that, we actually believe that we should not get too far out of step with the rest of the EU on the whole area of assurance as well. Otherwise, the UK will be put at a competitive disadvantage, so I think we need to be moving EU policy in this direction. I know it has been mooted by the Commission and I know a number of organisations and Member States are very happy with the notion, but it is not there yet and I think that the UK should be careful not to get too far out of step and to make sure that we actually wrap in with the other Member States to keep the whole industry, including the UK, competitive.

Q200 ***Chairman:*** I think that is a very fair point and it is a very important point to make. The difficulty is quite simply how to do it. You have had in Defra and the Treasury much more hesitation. I was reading this very interesting paper by the Dutch, *European Biofuel Policies in Retrospect*, an extremely interesting paper which has actually just come out in which it says the UK has been hesitant, I thought a very polite word, and actually we have woken up to this very much later than all the EU countries.
Ms Wenner: I think we have woken up late to the industry, but, if I may say so, we are probably leading the way on the carbon and sustainability assurance. We are somehow the experimenters in the way that we were with ETS as well, the UK ETS before the EU Emissions Trading Scheme came in. We will make mistakes and we will require our legislators to be understanding and forgiving, but we will show some sort of a way to see how it is possible, and it is something we are honestly working with.

Q201 ***Chairman:*** Could I just ask you a question about yourselves, the Biofuels Corporation. What feedstocks are you currently using in your Teesside plant? What proportion is imported from outside the EU and the UK? Most important of all, what considerations would encourage you to proceed with the proposed second phase, which I gather is 250,000 tonnes per annum, of your development?
Mr Sutcliffe: We are using rapeseed oil which is sourced from the UK, palm oil which is sourced from Malaysia and non-GM soya bean oil from Brazil. I cannot give the proportions because it is price-sensitive other than to say that a significant proportion is imported, although we were, I think, the largest buyer of rapeseed oil in the last 12 months for UK biodiesel production. I think that is consistent with saying that we expect to see a mix in the future. We are also working with our suppliers on sustainability and carbon data and I was out actually seeing a plantation in Malaysia to see how they can actually physically get there to ensure that it does meet Lord Lewis's objective of being low carbon and highly sustainable in the future, which it can do. To proceed with the second stage of development, longer-term targets and progressive targets are talked about, a 2015 target and an EU mandatory target, extending the RTFO is important, and also the extension of the blending requirements with conventional diesel which will allow effectively a doubling of addressable market for us[1], recognising that our company is in fact serving both the UK and European markets and more than half of our production to date has actually been exported from the UK, so that is bringing value to Teesside which we are very proud of. Therefore, a part of the question is whether we will proceed and the second part of the question is whether the UK will benefit from that production and we definitely need some contracts from the UK oil industry for that obviously. There is a third question which I have written down.

Q202 ***Chairman:*** Well, it is a tricky one, is it not? If the current fiscal incentive of 20 pence per litre for biodiesel was to be removed as an RTFO was introduced, would this affect your decision to invest in further capacity and your ability to raise capital to do this?
Mr Sutcliffe: Well, it is a very good question. Essentially the RTFO and the fuel duty rebate serve different purposes. The RTFO gives a long-term volume certainty, if you like, as long as the incentives are set at a high enough level, but what it does not do is guarantee prices because it sets a maximum and then competition will determine what price we actually get in the marketplace, so long-term volume comes from the RTFO. We will not see how prices will pan out until we see it in action. The fuel duty rebate *au contraire* does not give any volume certainty at all, as we have seen to date. What it does do is give a little bit of price support in the short term, so we see in terms of investment decision the long-term RTFO as being critical, and it has to be progressive, combined with a continuation of the fuel duty rebate until we see how the RTFO works in practice.

Q203 ***Chairman:*** Thank you, all three of you, very much indeed. If there is anything that you would have liked to have said to us, but you just did not have time, I would ask that you do please send it in in written form because I know that this has been a bit hurried, but thank you very much indeed, you have given us a very clear picture, and good luck in what is a very exciting industry.
Mr Sutcliffe: Thank you very much for a fine set of questions.

[1] 'blending requirements' refers to the regulatory limits that impose a maximum biofuel content in retail diesel fuel supplied to the specification EN 590.

14 June 2006

Supplementary Memorandum by The Renewable Energy Association and Biofuels Corporation plc

Preface

1. This evidence supplements and expands upon the Oral Evidence given by Sean Sutcliffe, Graham Meeks and Clare Wenner to the Committee on 14 June 2006.

2. Sean Sutcliffe gave this evidence in his capacity as Vice Chairman of the REA's Renewable Transport Fuels Group. This memorandum is intended to supplement that evidence with reinforcement and some additional points that Biofuels Corporation plc itself would like to make.

Introduction

3. Biofuels Corporation is an AIM listed company with a market capitalisation of around £80 million.

4. We operate one of the largest biodiesel processing plants in Europe at Seal Sands, Middlesbrough on the north east coast of England. When at full capacity, this plant will produce 250,000 million tonnes of biodiesel per year, equivalent to some 284 million litres suitable for pure or blended use as a road transport fuel.

5. Biodiesel is produced from a variety of vegetable oils, including but not limited to rape, palm, canola, soy, linseed, coconut, mustard and cotton oils. It can also be manufactured from tallow oil and yellow grease (used cooking oils).

6. It offers similar power and energy content to Ultra Low Sulphur Diesel (ULSD), and has emerged as a realistic and desirable alternative, or blended addition, to mineral diesel.

7. Biodiesel is becoming an increasingly valuable contributor to the worlds drive to reduce greenhouse gas emissions. It has been in general pure use for the last 10 years in continental Europe. In the UK, the majority of biodiesel used is as a 5 per cent blend with mineral diesel.

8. Advantages of biodiesel include the following:

- Virtually zero sulphur content.
- Zero aromatic content (toluene and benzene).
- Comparable energy and power content.
- Flash point of 300 °F against 137 °F for mineral diesel.
- Significant reduction in particulates (soot) and hydrocarbons.
- 70 per cent reduction of carbon monoxide emissions in diesel exhausts.
- Non toxic and biodegradable.
- Fully degraded from a waterway environment within approximately 28 days.
- Significant lubricant characteristics enabling a reduction in wear.
- Extended efficiency for injectors and for all engines using ULSD resulting in lower maintenance costs.

The Importance of Investor Confidence

9. The biofuels industry in the EU is relatively new, and investors need confidence to provide the necessary capital to allow the industry to grow, and to help the transport sector play its role in reducing greenhouse gas emissions. In order to build this confidence amongst investors, we believe three things are necessary:

(a) *Targets to allow the market to grow,* attract investment and to be progressive;

(b) *A recognition by policy makers that we will have to learn by experience.* It is important for the industry to commit in principle to both delivering meaningful carbon savings over the long term and ensuring proper sustainability standards are developed and implemented. However, it is ill advised to try to implement too rigid and detailed a framework too early on carbon saving and on sustainability until we have greater experience of how the market operates.

(c) *An EU and broader international perspective to policy making.* Biofuels and their feedstocks are internationally traded commodities. It is therefore important to ensure that artificial trade barriers are eliminated so that the full carbon reducing potential of biofuels can be brought forward at minimum cost.

Driving the Market Beyond 2010

10. The EU Biofuels Directive sets an indicative target of 5.75 per cent by energy content for 2010, and 2 per cent by 2005. The existence of the Directive has arguably been a considerable catalyst for Member State governments to take action to promote biofuels within their own markets.

11. The UK government, in its announcement of the Renewable Transport Fuels Obligation (RTFO)[1] has identified 5 per cent by volume as the UK's target for the proportion of total road fuels supply that should be met by biofuels in 2010. This falls short of the EU Biofuels Directive[2] indicative target for 2010 of 5.75 per cent by energy content (the equivalent of 7.4 per cent by volume).

12. Beyond 2010, we believe there is significant scope for biofuels to provide an increasing proportion of EU road transport fuel supply. There are three main considerations in ensuring this happens:

(a) *Current fuel standards*—5 per cent by volume is currently the maximum proportion of biofuels possible to comply with existing fuel quality standards for retail fuel sales—EN 228 for petrol and EN 590 for diesel.

(b) *The knock-on effect this has for vehicle warranties*—In turn, these standards drive the level at which manufacturers of existing UK vehicles will honour engine warranties. Some vehicle manufacturers offer warranties as long as seven years. Consequently, in 2010, a blend beyond 5 per cent could compromise the warranties of vehicles being sold today. However, were a more ambitious target of 10 per cent to be introduced for 2015, vehicle manufacturers would have time to ensure they have dealt with any implications in the first vehicles produced (in 2008) that would still be under warranty by this time. Moreover, there would not appear to be any particular reasons why moving beyond 5 per cent by volume should present vehicle manufacturers with any significant challenge—this has already happened in several Western European Countries and in South America, where blends are as high as 100 per cent. In Germany, for example, there are already over 300,000 vehicles capable of running on 100 per cent biodiesel, and in Brazil, sales of flex-fuel cars (that can run on biofuels, mineral fuels, or a combination of both) formed a quarter of all sales in 2004[3].

(c) *The need for a clear and ambitious long-term EU policy framework for biofuels*—that sets out long term vision for the future role biofuels will have to play in meeting transport sector demand. We consider that action at EU level, as well as by Member States, is essential for three main reasons:

(i) EN228 and EN590 are pan-European standards, and can therefore only be changed by collective EU-wide action in the appropriate standards setting bodies;

(ii) Vehicle manufacture and supply is an international activity, so unless action is taken at EU level, it is unlikely that unilateral action by individual Member States will have any significant effect on vehicle warranties;

(iii) It is important not to distort the market. Wide variations in both the levels of uptake of biofuels and in some of the details of how policy is implemented in different Member States could lead to perverse outcomes, with biofuel supply not necessarily following the most effective routes for both cost effectiveness and carbon effectiveness.

Ensuring Sustainable Supplies of Feedstock

13. As a company which is addressing such an important environmental need, we recognise the importance of ensuring the positive contribution we make in helping to reduce carbon emissions is not negated by involvement in, or creating incentives for, unsustainable practices in the production and processing of feedstocks throughout our supply chain.

14. This is especially important in our case given our use of palm oil as a significant feedstock, and concerns highlighted recently by Friends of the Earth and other environmental NGOs in relation to unsustainable practices in palm oil production, driven to some extent by Western European demand for palm—today mainly in products sold by the food and cosmetics industries.

[1] Department for Transport Renewable Transport Fuel Obligation (RTFO) available at: http://www.dft.gov.uk/stellent/groups/dft_roads/documents/divisionhomepage/610328.hcsp

[2] Directive 2003/30/EC of the European Parliament and of the Council on the promotion of the use of biofuels or other renewable fuels for transport—available at: http:lleuropa.eu.int/eur-lex/pri/en/oj/dat/2003/1_123/1_12320030517en00420046.pdf

[3] Canadian Automotive Network figure from: http://www.auto 123.comlen/info/news/greenwheels,view.spy?artid = 54894

15. In particular we strongly believe that the biofuels industry should be based on sustainably produced feedstocks which, in particular, do not create any future rainforest destruction. Continued dialogue with NGOs is vital to ensure that a robust environmental standard is drawn up. Benchmarks agreed by the industry must be high enough to ensure that there is an industry-led drive for continuous improvements in feedstock farming practice. In many Asian countries where rainforest has already been cut down for palm plantations, as Friends of the Earth acknowledge[4]:

> *"we need all of those companies that have fuelled the expansion of the palm oil trade . . . to address the social and environmental problems with the utmost urgency"*

16. We believe the involvement of companies such as Biofuels Corporation is key to introducing new sustainable standards into plantation management and the prevention of further habitat destruction. Our engagement with the palm oil industry in South East Asia places us in an excellent position to influence palm production techniques and ensure much more sustainable practices are adopted for palm oil production. To this end, we have taken a number of steps as follows:

(a) As recommended by Friends of the Earth and WWF, we have joined the Round Table on Sustainable Palm (RSPO)[5]. We are committed to the Criteria and Principles that RSPO agreed in October 2005[6], the details of which are attached to this submission. In particular, we would wish to draw attention to Criterion 7.3, "New plantings since November 2005 have not replaced primary forest or any area containing one or more High Conservation Values", and Criterion 7.7, "Use of fire in the preparation of new plantings is avoided other than in specific situations, as identified in the ASEAN guidelines or other regional best practice".

(b) We are members of the Low Carbon Vehicles Partnership, and are working actively with other UK industry stakeholders on an environmental standard which we believe should incorporate the RSPO principles and criteria, but will also need to address other concerns in respect of land use impacts and biodiversity, more details of which are given in our answers to questions 7 and 8.

(c) We support the development of a robust accreditation scheme in order that biofuels companies can demonstrate their compliance with the environmental standard referred to above. To this end, we have started a programme of developing bilateral arrangements with our key feedstock suppliers to develop methods of ensuring traceability of feedstocks to ensure sustainable practices are not only adopted, but can also be transparently demonstrated. Our work in this area is presently particularly focused on palm oil production, as we recognise this to be the area requiring most urgent attention. This work on accreditation and traceability is in its early stages, is moving ahead quickly, and will develop further in parallel with the development of the content of the standards.

17. We therefore strongly support the introduction of a wider Sustainability Code where definitions/ benchmarks of sustainability are clearly set out and agreed upon across the industry in discussion with environmental NGOs and relevant Government agencies such as English Nature. We believe it is particularly important that such a Code tackles directly the concerns expressed by a number of environmental NGOs, particularly WWF and Friends of the Earth, in relation to palm oil production in developing countries. It is also important, in line with European Commission intentions[7], that the standards, whilst high, should be compatible with open trade principles, and are able to win the support of feedstock producer companies and countries. To this end, we are key contributors to related work by the Round Table on Sustainable Palm and have been prime movers in ensuring that the high standards developed by RSPO are adopted by the Low Carbon Vehicles Partnership as it develops standards for the UK.

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[4] Extract from conclusions (p 23) of "Greasy Palms—palm oil, the environment and big business", Friends of the Earth, available at http://www.foe.co.uk/resource/reports/greasy_palms_summary.pdf

[5] http://www.sustainable-palmoil.org/

[6] http://www.sustainable-palmoil.org/PDF/CWG/RSPO%20Principles%20&%20Criteria%20for%20Sustainable%20Palm%20()il%20final%20public%20release).pdf

[7] An EU Strategy for Biofuels, COM (2006) 34 final, available at: http:europa.eu.int/rapid/pressReleasesAction.do?reference=IP/06/135&format=HTML&aged=0&language=EN&guiLanguage=en

Memorandum by the Director General, UK Petroleum Industry Association

The UK Petroleum Industry Association (UKPIA) represents the nine companies engaged in oil refining and marketing in the UK. Our members supply most of the transport fuels and other oil related products used in the UK. As such, we have a major interest in the topic of biofuels and biomass, and welcome the opportunity to respond to the Committee's consultation on this important issue.

Our more detailed responses are confined to those questions where we have specific knowledge or expertise.

Summary

UKPIA's views can be summarised as follows:

- The oil industry believes that due to their low cost, availability, and ease of use petrol and diesel will remain the dominant road transport fuels globally to 2030 and beyond, a view that is shared by the International Energy Agency in their forecasts of future energy use.
- The industry takes seriously, and is closely involved in meeting, the challenge of reducing greenhouse gas emissions. Savings are likely to come from a range of options, across all sectors, including bio-fuels & bioenergy, renewables, new technology, increased energy efficiency and changes in consumer behaviour.
- The oil industry is actively developing and/or deploying new technology which will reduce emissions of greenhouse gases such as biofuels, wind, solar, carbon, capture and storage, hydrogen and also fundamental research. Energy efficiency is also being improved in our operations for example by installing gas fired CHP in refineries.
- In the UK, the downstream oil industry is currently working towards meeting the UK Government's target of replacing 5 per cent (volume) of road fuels by bio fuels in 2010–11 under the Renewable Transport Fuels Obligation (RTFO), introduced in response to the indicative limits (5.75 per cent by energy 2010) in the EU Directive 2003/30/EC on biofuels adopted in 2003. The RTFO will require significant investment by the industry at refineries and in the supply/distribution chain, particularly for bioethanol.
- We believe that it is important that EU policy to encourage the take up of biofuels, should give flexibility to Member States so that they can adopt measures and targets appropriate to their domestic market. Policy should also be framed so that it helps the future introduction of advanced biofuels with the potential for larger greenhouse gas savings, as well as opening up a range of new biomass sources, including waste, that can be utilised.
- The Directive identified reduction of transport greenhouse gas emissions, security of energy supply/reduction in oil dependence and support for rural communities/agriculture as policy objectives. If the aim is a reduction in CO_2 emissions, then the most effective uses of biomass should be permitted, not just conversion to liquid fuels, which is a less cost effective method of saving CO_2.
- For biomass this would mean extending its use from transport fuels to heat and power generation. In the UK, studies by a number of groups, including the DEFRA Biomass Task Force lead by Sir Ben Gill in 2005, have highlighted the higher potential and lower cost per tonne of carbon saved. This application may also be of greater benefit to security of energy supply for individual Member States than conversion of biomass to liquid road fuels. An example is Denmark which in 2003, obtained over 11 per cent of its energy from biomass mostly straw, wood, agricultural waste, general waste & wood waste.
- There are technical barriers to the use of a higher proportion of biofuel mix with conventional petrol and diesel, currently limited to 5 per cent by volume in the road fuels standards recommended within the EU. In the medium term, the industry is working with others in the European Standards Organisation, CEN, to look at increasing the limits. However, at the moment the main biofuel constraint appears to be on the supply side (crops and processing capacity) rather than the technical standard being a major limiting factor.
- Experience in the UK has indicated that consumers need to be incentivised via fiscal measures, to take up new fuels that are more costly than conventional petrol or diesel. This is borne out in other EU countries, such as Germany, where the take up of biofuels was stimulated by substantial and costly fiscal incentives. These may have a role to 'kick start' the sector but are not sustainable in the long-term in terms of cost or a giving clear, reliable pointer to future policy direction.
- Secure, reliable, good quality sources of biofuels are vital to meet the growing EU needs, as legislation within Member States to meet targets set by the Directive increases demand. It is likely,

in the short term, that a significant proportion of this requirement will be imported from outside the EU, particularly in the case of bioethanol, as neither sufficient crop cultivation or processing capacity exists at present, although new plants are coming on stream in most countries.

The downstream oil industry will have a growing requirement for biofuel blending components from reliable, quality accredited and price competitive sources both from within the EU and elsewhere but is not likely to become involved itself in production of biofuel components.

Bioenergy Sources and Effectiveness

When considering UK bioenergy, potential crops include:

- Rapeseed which can be converted into biodiesel.
- Sugar beet which can be used to produce ethanol by fermentation.
- Wheat which can be used to produce ethanol by fermentation.
- Miscanthus which can be burned to produce heat and power.
- Wood from short rotation coppicing which can be burned to produce heat and power.

A number of waste products can also be converted into energy or fuels:

- used vegetable oil or tallow into bio-diesel.
- straw and forestry waste into heat and power.

In the longer-term, woody waste, straw and other cellulosic material can be converted to bioethanol using enzyme type technology or diesel by partial oxidation—so called advanced or second generation biofuels. Processes for both these options are currently under investigation/development, with ethanol plants likely to be constructed in Germany and Spain. However, they are not yet available commercially.

Bioethanol can also be converted into ETBE (ethyl tertiary butyl ether) and butanol. ETBE is a high octane product, which can be blended into petrol at a refinery without any of the water pick-up and vapour pressure constraints resulting from blending ethanol into petrol, especially in the summer. France and Poland, for example, adopt this approach. Butanol also overcomes some of ethanol's limitations.

One of the reasons for the use of biofuels, is reduction in CO_2 emissions. The two tables below set out the range of reductions from different sources/uses and the CO_2 saved on wells to wheels basis:

Table 1

CARBON DIOXIDE EMISSIONS ABATED BY THE USE OF CURRENT BIOFUELS

Crop	*Carbon dioxide saved*
Bioethanol from sugar beet for blending with petrol	3.8 te/ha
Bioethanol from wheat for blending with petrol	1.3 te/ha
Biodiesel from rapeseed for blending with diesel	2.0 te/ha
Biomass (SRC or miscanthus) used to raise power	16.0/te/ha

Source: Concawe/JRC/EUcar 2005

Table 2

WELLS TO WHEELS GREENHOUSE GAS EMISSIONS

Fuel	*Wells to Wheels Greenhouse Gas Emissions gCO_2 equivalent/km*
Petrol	196
Diesel	164
Ethanol (95/5) from sugar beet	193
Ethanol (95/5) sugar cane (Brazil)	188
Biodiesel (95/5)	160

Source: Concawe/JRC/Eucar 2005

Responses to Questions Posed by the Committee

Q1 *Which member states have been most successful in meeting their bio fuels targets; and how have they achieved this?*

1.1 In general, Member States that have the longest record of policy encouragement and/or have introduced the most generous fiscal incentives or tax allowances, have made the most rapid progress towards targets. However, even the most successful (Germany) has achieved under 4 per cent by volume at end 2005. Several Member States (France, Germany, Poland) have research programmes, mainly biodiesel, experimenting with higher proportion mixes of biofuel/conventional fuel and even 100 per cent. In most countries, biofuel mixes are still below the level currently permitted in Fuel Standards (5 per cent by volume) across the board, and this would mainly appear to be related to lack of capacity rather than the limit acting as a restriction.

1.2 Progress, for example, in some Member States is as follows:

Country	**Target*	*Incentive*	*% of total road fuels*	*Cost*
[1]Austria	2.5% >10/05	5c/ltr FAME	<0.1% 2004	
[2]Denmark	2% 2005	nil CO_2 tax	<0.1% 2004	
[3]France	1.2% 2005	3c/ltr FAME 2c/ltr ethanol 1c/ltr ETBE	<1.0% 2004	€160 million 2004
[4]Germany	1.9% 2005	nil tax on biofuel 2004–09	3.4% 2005	€2 billion 2005e
[5]Poland	1.5% 2006	Plz1.5/ltr <5% Plz 1.8/ltr 5–10% Plz 2.2/ltr >10%	0.3% 2004	Plz 69 million 2004
[6]Sweden	3% >2006	duty & CO_2 tax inc. on fossil fuels, exemption biofuels & biogas	2.3% 2004	aim to be tax neutral 2008
UK	0.3% 2005 2.5% 2008–09 3.75% 2009–10 5% 2010	20p/ltr to 2008–09 Obligation & buy out penalty thereafter	0.3% 2005	

*All aim for 5.75 per cent target by 2010; UK 5 per cent by volume

1. Austria:Largely biodiesel production; excess mostly exported to Germany & Italy. Other biomass accounts for 6.7 per cent of domestic energy consumption, largely for power/heat.

2. Denmark: Tax on biofuel removed 1 January 2005 allied to a range of measures to raise awareness, including pump labelling. Biomass accounted for 11 per cent of domestic energy consumption in 2003.

3. France: Number of retailers including biocomponents in road fuels, either as FAME, bioethanol or ETBE but largely without pump labelling. Number of trials with fixed depot fleets running 30 per cent+ biodiesel blend. Cultivation of rapeseed boosted in the late '90s by fiscal incentives, since reduced in line with EU rules. Excess biodiesel exported to Germany.

4. Germany: Biodiesel production for agriculture use dates back to late 1990s. Grown steadily since 2000 with 29 plants with capacity of 2 million tonnes in 2005 making it the largest producer in the EU. Bioethanol production limited. Removal of duty on biofuels 1 January 2004 boosted uptake and imports of biofuels, although policy indication that fiscal reduction will be curtailed post 2006. Range of research and pilot projects, incl 100 per cent biodiesel trial, E85, synthetic biofuels from biomass. Additional biodiesel and bioethanol capacity being added.

5. Poland: Long history of tax breaks for biofuel production(1993>), largely ethanol which is turned into ETBE. Biodiesel capacity being increased by new plant. Biomass for heat/power also significant at 6 per cent of energy consumption. Research supported into a range of technologies & fuels, including woody wastes into diesel but constrained by budgetary issues.

6. Sweden: Encouraging bioethanol since 2002 through tax exemptions and increased taxes on CO_2. Currently ethanol represents 90 per cent of biofuel use, mostly imported, with 5 per cent blend (moving to 10 per cent subj. to EU appvl) and E85 in larger filling stations. Research projects incl 'black liquor' gasification (wood

pulp waste stream) and diesel from woody waste. Domestic land suitable for energy crop cultivation quite limited.

1.3 The UK has made a slow start in comparison with some other EU countries, largely because a more open market approach has been adopted. Currently, UK sales of biofuels amount to approximately 120 million litres per year, including imported material, particularly ethanol. This is equivalent to less than 0.3 per cent of conventional petrol and diesel use. It is estimated that about 100,000 hectares of land is given over to biofuel crops.

1.4 Meeting the EU Biofuels Directive would create a UK biofuel requirement of approximately 3 million tonnes per year, requiring in the order of 1.9 million hectares of land given over to production of biofuel crops. This is close to the 2 million hectares of available land indicated in a 2002 report from DEFRA without affecting food production. The amount of land required might be reduced if wheat and sugar currently exported was used to produce bioethanol.

1.5 This indicates that domestic production of biofuels could substitute between 5–10 per cent of conventional petrol and diesel, provided only a limited area of land is used to grow crops for power/heat.

1.6 Most Member States are in a similar position in terms of available land mass, except perhaps Sweden where the area for cultivated energy crops is limited but forestry by-products offer potential.

How Have Member States Achieved This?

1.7 It is noticeable, apart from the obvious examples of generous incentives to close the cost gap with conventional fuels, that the most successful Member States are those that have more co-ordinated policies on the wider use of biomass, not just incentives for conversion to liquid fuels. In part, this may be due to greater awareness at an early stage of the value associated with waste streams from, for example, forestry or agriculture, a desire to promote security of energy supply through development of diverse energy sources and support for domestic agriculture.

1.8 In the case of France and Germany, these incentives have been closely aligned to a policy objective of supporting rural communities through the cultivation of energy crops. However, given the available land mass, climatic and other advantages, overseas producers may have a cost advantage (Brazilian ethanol, palm oil from Far East).

1.9 The UK has adopted a more open market approach of modest fiscal stimulus but only comparatively recently (duty reduction 20ppl introduced start of 2005 for ethanol and 2003 for biodiesel). The 'Powering Future Vehicles Strategy', currently under review, promoted a range of alternative grants for low carbon vehicles/fuels and R&D support for low carbon technologies. The policy emphasis has now shifted to CO_2 level as a measure rather than a particular technology or fuel, combined with consumer information and education. In this context, biofuels are seen as making a contribution to reducing CO_2 from road transport, alongside other technology and vehicle efficiency measures.

1.10 In the UK, the fiscal stimulus has had the effect of boosting demand for biodiesel, prompting the construction of a number of new plants, although technical problems with commissioning have delayed start-up in some cases. Demand for bioethanol increased rapidly in 2005 and has been met largely by imports from Brazil, although British Sugar has announced plans for a small scale bioethanol plant at Kings Lynn using sugar beet.

Q2. *What financial instruments or incentives have proven to be most effective in meeting national targets for biofuel market share?*

2.1 In general, alternative fuels (biodiesel, bioethanol, etc) are more expensive than conventional fuels—up to two to three times (UK Energy Review 2003)—and therefore need support either from taxpayers or consumers, to kick-start take up.

2.2 Most Member States have adopted the approach of duty reductions, or in some cases, exemption from duty, for biofuels in order to kick-start the market.

2.3 The use of biofuel obligations on fuel suppliers is starting to be applied in Member States (UK with RTFO) with a view to reducing the level of fiscal incentive or making changes to overall road fuel taxation broadly neutral. This means that some or all of the increased cost not covered by fiscal exemption will be passed on to the consumer.

2.4 However, biofuel producers have expressed concern that an obligation and fiscal incentive may be required in the early stages to ensure that development of the sector is underpinned.

Q3. *To what extent has the imposition of biofuel obligations by Member States reduced the biofuel industry's need for fiscal support?*

3.1 Most Member States are moving towards an obligation rather than tax incentive in order to give long-term market signals and reduce the budgetary impact of substantial tax incentives. In some cases attempts have been made to make the overall effect tax neutral by increasing taxes on fossil fuels or introducing CO_2 emissions tax on vehicles and reducing or eliminating tax on biofuels but most Member States will retain fiscal incentives to varying degrees until new biofuel production facilities are established.

3.2 With the RTFO approach, the UK has adopted a complex scheme even before the proposed carbon accreditation/sustainability of source elements come into effect.

3.3 Sweden expects its tax approach to be broadly neutral by 2008. In the UK with the shift to the RTFO, there will be a progressive move away from duty reduction (starting in 2008–09) to an obligation with buy-out price.

3.4 Generally, the higher cost of producing renewable fuels has prevented their widespread use in the past. With the recent rise in price of petrol and diesel, this cost gap may have narrowed but increased oil prices will inevitably have fed into the cost base of biofuels, through, for example, higher prices for fertilisers and other oil-based products used in their production, manufacture and distribution. In addition, the blending of biofuel with conventional fuel is establishing a link with the fluctuating prices of energy generally.

3.5 It seems probable therefore that fiscal incentives and/or high buy-out price under an obligation regime, will be required in the early years.

Q4. *Which countries have the lowest biofuel production costs and why? What steps have Member States taken in research and development to reduce the production costs of biofuels?*

4.1 Cost of biofuel feedstocks is an important factor in the production of biofuel blends. The AEA Technology Report for the Department for Transport in 2004 indicated that the lowest cost bioethanol was produced from Brazilian sugar cane, followed by USA corn. There are signs that increased demand for these products for export markets is starting to increase domestic prices of ethanol in producing countries, as well as sugar prices. In Brazil 52 per cent of the sugar cane crop is going into ethanol production compared with 48 per cent in 2003 (Source: International Sugar Organisation).

4.2 The reason for the lower costs in Brazil is linked to climatic, land availability and policy factors that have encouraged bioethanol production from sugar cane, in particular, for over three decades. With well established cultivation of sugar cane, allied to substantial efficient, production capacity, Brazilian ethanol has a significant cost advantage over European producers. The waste stream is also incorporated into heat production further improving efficiency and CO_2 reduction.

4.3 The USA is also developing its domestic ethanol production capacity from corn (maize), with added impetus of late because of concerns about security of energy supply, crude oil cost and constrained oil refining capacity. Substantial incentives to producers to offset cost disadvantage are available.

4.4 Most Member States and many oil companies are undertaking or supporting research and development into a range of biofuel/biomass sources and processing technologies. These include "second generation" processes to produce ethanol from the fermentation of wheat or lignocellulose from woody biomass, or diesel from the gasification of biomass use the Fischer-Tropsch process.

4.5 Research also encompasses incorporation of biofuels into refining processes (hydrogenation of biodiesel or conversion of ethanol to ETBE), as well as examining the effects of different fuels and blends with engine and exhaust clean-up technologies.

Q5. *Which Member States import the greatest volume of biofuel and why? What impact have imports of cheap biofuel had on domestic production in the European Union?*

5.1 From the data in answer to Question 1 above, it is apparent that Member States that have introduced the most advantageous tax incentives for biofuels, have stimulated market demand the most, in particular Germany and Sweden.

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5.2 In the case of biodiesel, some of this has come from other EU Member States such as Austria and France, whereas ethanol has largely been imported from Brazil.

5.3 For the reasons outlined in response to Question 4 above, the main impact on EU production is from the lack of a fully developed market in biofuels, particularly bioethanol, and competitive disadvantage associated with climatic and land use factors in comparison to Brazil and the Far East.

5.4 EU producers may be able to close this gap in time but it is important that protective tariff barriers are avoided so that purchasers of biofuels have access to the lowest cost material, subject to other accreditation criteria being satisfied.

5.5 Some Member States, notably the UK, are making poor use of biomass sources generally which could be used in the production of heat and power rather than conversion to liquid fuels.

Q6. *What are the technical requirements that have acted as barriers to the introduction of biofuel into national fuel markets?*

6.1 Under current European Fuel Standards, the maximum limit for blending of biofuels with conventional petrol and diesel is 5 per cent by volume also established an indicative target for biofuels of 5.75 per cent by energy by 2010. A European standard has been developed for biodiesel (EN 14214) to ensure product quality/ stability by requiring vegetable oils be converted to fatty acid methyl ester (FAME). A similar standard for bioethanol is under development.

6.2 The European technical fuel standards body CEN is examining the feasibility of increasing the current 5 per cent limit of biofuel blended with conventional petrol and diesel, possibly to 10 per cent. Fuel standards have to reflect the requirements of all the current car fleet, which could average 15+ years in age, not just the latest models which may be designed to operate on a higher proportion of biofuels.

6.3 As regards bioethanol, as mentioned in the our Background Introduction there are other technical issues relating to water pick up and vapour pressure when bioethanol is blended with petrol, which require resolution. Some of these issues can be overcome by conversion to butanol.

6.4 It follows that biofuels that are fully compatible with conventional fuels and can handled in the same distribution systems present the least technical barriers to assimilation into the overall road fuels pool.

Q7. *Should the European Union take further action to promote biofuel production; and if so what action is required?*

7.1 Conversion of biomass to liquid fuels remains a costly way of reducing CO_2, so policy should be geared towards CO_2 reduction targets rather than particular solutions or technologies.

7.2 Whilst research into technical aspects of biofuels, particularly second generation fuels, and sharing of best practice is valuable, development or incentives for biofuels should not be pursued to the detriment of biomass that can be employed in power/heat production—a more cost effective reduction route- as well as liquid fuels.

7.3 It is apparent that the policy approach of Member States varies considerably and in some cases is distorting the market. Policy should be focused on a move to measures that are geared towards CO_2 targets and the most effective way of achieving them, leaving the market to decide on the appropriate pathway.Thank you for the opportunity to contribute to this important debate.

June 2006

Examination of Witnesses

Witnesses: MR MALCOLM WATSON, Technical Director, and MR NICK VANDERVELL, Communications Director, UK Petroleum Industry Association, examined.

Q204 ***Chairman:*** Thank you so much for coming this morning. I know you have been sitting at the back and you have been hearing what a very easy time we give to our witnesses. It is very, very good of you to find time to come and talk to us today. As you know, we are doing a short inquiry into the EU views about the increase in biofuel use in the European Union. We are an EU scrutiny committee, so we like very much to hear about what you think other EU countries are doing, but you are here as the UK Petroleum Industry Association. Is there anything you would like to say to us before we start firing questions at you?
Mr Vandervell: Good morning, your Lordships. We welcome the opportunity to address this inquiry. As you know, UKPIA represents a range of companies from the smaller end, Petrolplus, who are quite big suppliers of biodiesel blends, to the larger, well-known names like Esso, BP, Texaco and Total. Our member companies essentially have an important role in the transport fuels market. We supply something like 90 per cent of the transport fuels in the UK and we account for about just under 40 per cent of the energy supply to the UK. Our view, and this is shared by the IEA and the Government's own projections, is that oil, particularly for transport fuels, is going to be a major source for at least the next 25 to 30 years. The reasons really are practical, that petrol and diesel and other fuels offer great advantage in terms of ease of use, energy, the familiarity with consumers and they are obviously quite competitive on price. We feel that biofuels and other alternatives will have a role to play, but we feel that in the timescale that we are talking about here they are not likely to substitute conventional petrol and diesel to any extent.
Mr Watson: The other thing we want to make very clear is that the whole oil industry is currently working hard towards meeting the RTFO target of 5 per cent by 2010–11. We are not ducking that target.

Q205 ***Chairman:*** Before we get down to questions particularly relating to yourselves and the EU, I was reading this interesting pamphlet written by the Dutch, *European Biofuel Policies in Retrospect*, which came out about a month ago and in that they say very clearly that the biofuel industry cannot really grow unless both car manufacturers and the major oil companies participate in it. I understand that the major oil companies in this country were pretty hesitant at the start to get involved. Is it now accepted that, for this industry to grow, the major oil companies are going to need to participate fully?
Mr Watson: The reason why we may appear hesitant is that in the UK we produce very cheap petrol and diesel. It is the cheapest in Europe and it is consistently the cheapest in Europe. The consumer wants cheap prices and we have seen the growth in the supermarket share of petrol and diesel sales and that is based entirely on competitive prices. If we introduce biofuels, they are more expensive and, as more expensive products, we would have to put our prices up. That has been the hesitancy behind us doing it. When you introduce subsidies, duty differentials or you introduce an RTFO which enables us to introduce these fuels on a clear, level playing field, we will introduce them.

Q206 ***Chairman:*** But tax in this country makes UK fuel one of the most expensive in Europe.
Mr Watson: That is the Government's choice.

Q207 ***Chairman:*** What you are really saying in answer to my first question is whether the major oil companies and the car manufacturers are really involved or not does depend hugely on the Government?
Mr Watson: Yes. I would also point out that the oil industry as a whole is doing a lot of work to investigate biofuels. For example, we have a process which the oil industry is helping to develop in Canada which will turn straw into ethanol. Elsewhere we are looking at turning biomass by a route called Fischer-Tropsch, which is a gasification route, into biodiesel. Today you will find that BP have just announced a $500 million investment in a research institute which will look at biofuels production and try and help improve it. We are investing in biofuels research because we see biofuels as an area which will grow in the future. If you look at Exxon-Mobil's forecast, for example, to 2030, you will see in there that they include biofuels as a contributor, so to say we are hesitant, yes, we are hesitant if we cannot sell the product, but, if we can sell the product by government intervention, then we will make it available and that is what we are working towards today.

Q208 ***Chairman:*** Well, we will get back to the EU Directive and come back to some of these points, I am sure, in the course of our questions. Do you think that the EU Directive on Biofuels has definitely increased production and consumption above that which the market would otherwise have achieved in any event?

Mr Watson: I am hesitant to say that it has increased it. Where we have seen an increase in biofuel usage in countries like Germany, it is based on the back of generous duty incentives. That is true in Germany, in France and in other countries. What the Biofuels Directive adds on top of that is that it gives a direction that the European governments want to go. It gives a clear indication, a clear signal of what the intention is and in that case it will have an impact on the future, but to date I am not convinced that its impact has been very great.

Q209 ***Lord Lewis of Newnham:*** You in part, if I may say, Mr Watson, touched on this, but what factors have restricted the development of biofuels in the UK? I am very interested in your remarks about the potential research that is going on, the use of, as it were, cellulose to sugars which I presume is done by an enzymatic processing of some form or another.
Mr Watson: Yes.

Q210 ***Lord Lewis of Newnham:*** Fischer-Tropsch, after all, is not a new process and it has been going since World War I, so we are not into a new area from that point of view. Is it the technology of it which is in any way restricting it or is it the economics of it or is it a combination of both?
Mr Watson: To date there are three barriers. The primary barrier is cost. Biofuels are more expensive than conventional fuels and, as I said earlier on, the consumer wants as cheap a fuel as possible and that is what most consumers buy. There are niche consumers who will pay more and they are serviced by a number of our companies, such as Petrolplus who already supply biodiesel, but cost is the primary barrier. The second one is availability. If you want to buy biofuels at the moment, Sean, who was on a few minutes ago, can sell his biofuels into Germany where there is a larger duty incentive. The third barrier is infrastructure. We do not have the infrastructure in place to handle the biofuels yet and that is what we will be doing in the next couple of years, putting the necessary infrastructure in place. There is another potential barrier which is the EU Fuels Directive. The EU Directive on Petrol, 2003/17, limits the amount of ethanol we can put into petrol to 5 per cent. The European standard for diesel, EN590, limits the amount of biodiesel we can put in to 5 per cent again. That is a barrier which, with current UK usage, we have not reached, so it is not a real barrier. We and the motor manufacturers are working in CEN, which is the European standards organisation, the European equivalent to BSI, at the moment to get these limits changed. The process has started and we are working towards probably a 10 per cent limit. In CEN we will see a change in the European standards and we expect that in about 2009 the current 5 per cent limit will be increased.

Q211 ***Lord Lewis of Newnham:*** One of the other features of course of ethanol is that you are putting oxygenated compounds into your fuel which has become a highly desirable alternative. The use of methyl tertiary-butyl ether, for instance, which was recommended is now banned from general use, so you are going to have another alternative reason for putting ethanol into your diesel.
Mr Watson: We will not put ethanol into diesel.

Q212 ***Lord Lewis of Newnham:*** Not into diesel, into petrol, I am sorry.
Mr Watson: In the UK we do not still use very much MTBE. It was used in the States under a mandate where they had to add oxygenated fuels to petrol, but that was largely to reduce carbon monoxide levels. In the UK, carbon monoxide levels are below the level recommended by EPAQS, which is a government medical committee which recommended the standard, so we did not have the same problem. MTBE usage in the UK is low and the oil companies, because of their experience in the States, are in general reluctant to add it, but it is not technically banned yet and it is allowed under the EU Fuels Directive.

Q213 ***Lord Livsey of Talgarth:*** You have covered some of this ground, but what problems have you seen in integrating, firstly, biodiesel and, secondly, bioethanol into the UK fuel chain?
Mr Watson: Integrating biodiesel is relatively straightforward. We do need new infrastructure as we need to be able to get the product into the refinery and then blend it in, but it is a relatively straightforward product to blend in. We can then pump it around through multi-product pipelines and we do not have stability problems. We do not have cold-flow problems which is the other issue with very high levels of biodiesel usage. So for biodiesel it is having a tank in a refinery and being able to pump from that tank as we blend diesel. It is a relatively straightforward operation.

Q214 ***Lord Livsey of Talgarth:*** And bioethanol?
Mr Watson: For bioethanol it is considerably more complex. Ethanol and water tend to like each other and for ethanol what we are trying to do is blend at the terminal, at what we call 'the rack', ie, as the road tanker is loaded with petrol, ethanol will be added at that stage and that will avoid any problems of water getting into jet fuel and all the other concerns we have. That means that we have to build a different infrastructure which will take us longer. What we have to do for each company is to hold a central stock of ethanol somewhere and then from there run

ethanol tankers to the distribution terminals and add ethanol at the distribution terminal, so we have a completely different infrastructure to set up. That will take time which is why, when we look to the future, we see in the first year of the RTFO in 2008–09 the use of biodiesel being the primary way in which we will meet the obligation. In 2009–10 we will be seeing more ethanol coming in.

Q215 ***Lord Livsey of Talgarth:*** You have described the difficulties with ethanol, but does this mean that you need substantially more investment as a result of that?
Mr Watson: We need more investment, yes.

Q216 ***Lord Livsey of Talgarth:*** Than with biodiesel?
Mr Watson: It is more expensive. We also have a problem in that we will displace some petrol from the market. We have a surplus of petrol in the UK and Europe and we will have to ship that petrol to the US which is an extra cost we have to bear, so there are a number of extra costs, but technically it can be done and we are not in any way saying that it cannot.

Q217 ***Chairman:*** I understand that Brazil does not have a problem in blending ethanol, whereas you are emphasising here that you might have a bit of a problem.
Mr Watson: There are two things. Firstly, the limit is set in Europe at 5 per cent and, if we go above that limit, we are in danger of invalidating the vehicle warranty. Brazil does not have multi-product pipelines, as far as I understand. If you go to a refinery, such as Esso's refinery at Fawley, it is linked to a number of terminals by product pipelines which carry jet fuel, diesel, gas oil and petrol in batches. Now, when you put products down the pipeline, there is a tendency for them to mix and what we do not want is water to get into jet fuel and, because of that, all the oil industry has decided that we do not wish to put ethanol and petrol blends down a multi-product pipeline which means we are forced into this other solution.

Q218 ***Lord Haskins:*** What sort of price do you think crude oil has got to be to make biofuel production viable without any subsidies or any sort of artificial support?
Mr Watson: First of all, I cannot answer your question.

Q219 ***Lord Haskins:*** Everybody says the same!
Mr Watson: If you look at the latest statement by the Commission, and there is a report published recently on their biofuel strategy, in there it says that biofuel prices tend to track petrol and diesel prices. If we look back to 2001, the Biofuels Directive was beginning to come in and you will see a little table in the explanatory memorandum issued by the Commission which took a single biodiesel price and effectively predicted that when oil reached $55 a barrel, it would achieve exactly what you wanted. Well, we have now seen oil above $70 a barrel and from the previous witnesses I think you will accept that biodiesel still needs support, so I do not think anyone can do the analysis. Now, the reason of course is that if you take biodiesel, you use fertilisers and fertilisers require energy, and when oil prices go up, energy costs go up and fertiliser prices will follow, so you have a feedback loop that is in there and, equally, when they fall, there will be savings to be made. I do not think that the analysis I have seen ever takes this sort of factor into account.

Q220 ***Lord Haskins:*** And, because of that, there is never a meeting of minds.
Mr Watson: I think there is an expression which says, "Never say 'never'", but I am afraid I cannot answer your question because I cannot predict it because of the feedback loops in there which make it very, very difficult.

Q221 ***Lord Haskins:*** There is an interesting economic issue here of what are we trying to do with biofuels. Are we trying to deal with a potential shortage of oil, and you are saying no because in the next 25 years there will be plenty of it, or are we trying to deal with an environmental issue?
Mr Watson: We believe that biofuels will make a contribution to reducing greenhouse gases and that is why, and it is a question you may come to later on, we would support a measure which ultimately makes carbon reporting and all that goes with it part of the requirements on the oil industry when we use biofuels. We are not in a position yet to do that, I should stress.
Chairman: Thank you, that rather leads on to a question from Lord Cameron.

Q222 ***Lord Cameron of Dillington:*** It is really a question of government drivers; which would you say is the greater driver, the duty reduction or an obligation such as the RTFO?
Mr Watson: From our point of view I must make clear that we see them as equally strong drivers. Fiscal incentives have been used to change the market, for example to introduce low sulphur petrol and diesel in the UK, they are used in Germany, they are very effective and they work. We believe the RTFO will work as well in that it places a requirement on us, with a penalty if we fail to meet it. The real difference is who pays; ultimately it is the consumer who pays. You can either pay the taxman and have a fiscal incentive, or you pay at the petrol pump or some combination of the two which is what we are at now. We do not believe that there is one that

is infinitely better than the other. The RTFO is the way we are going, but if the duty differential was removed completely—which we believe it will be, incidentally—there is still a big incentive for us to use biofuels and we will still continue to use biofuels because what counts is the pump price. The pump price will be lower with the fiscal incentive because you are paying it via your income tax, than it will be if you just go to a straight RTFO where the motorist pays it all.
Chairman: Thank you. Lord Haskins, do you want to say anything further on this?

Q223 ***Lord Haskins:*** I do not entirely understand the question myself, but I will ask it anyway. To what extent will the imposition of biofuel obligations on the industry reduce the need for the industry to have fiscal support? In other words, is it by regulatory interventions that the price of fuel goes up so far that biofuel can stand on its own feet?
Mr Watson: I believe that at the moment biofuels should be treated as though they are going to be more expensive than conventional fuels, over the range of oil prices we are likely to see. As they are more expensive they do need some sort of support. The support can be fiscal support, i.e. you artificially reduce the price, or it can be an obligation where we are told to put it in, there is a penalty if we do not—

Q224 ***Lord Haskins:*** And then you put your prices up.
Mr Watson: We will put the prices up and the consumer will either pay—

Q225 ***Lord Haskins:*** Will have to pay one way or the other.
Mr Watson: Yes. You will still find that the industry needs support.

Q226 ***Lord Haskins:*** That is a very big statement and I agree with it; for the indefinite future taxpayers might have to support biofuels if they are going to become seriously used.
Mr Watson: They are currently more expensive.

Q227 ***Lord Haskins:*** And they will continue to be so.
Mr Watson: We do not see a reduction in cost; we have not seen a reduction in cost. That does not mean to say that the oil industry and others are not looking at ways of reducing costs, because once the market is established the market forces will take over and they will try and reduce costs. The supply chain will be looked at in detail, the amount of fertiliser used will be looked at, the way it is processed will be looked at and the normal efficiency gains will come into these processes, so there will be cost reductions. How big they are, I am sorry, I cannot forecast at this time.

Q228 ***Lord Haskins:*** There is a supplementary question to develop that. With the volatility of oil you guys in the industry hedge and you have a very good time when it is good and when the price is down you probably hedge to cover yourselves and that is the way you get through it. With biofuels the farmer would have to take the pain.
Mr Watson: I do not see that as being true. We will have to establish long term relationships with the farmer, with the biofuels producer—

Q229 ***Earl Peel:*** I have heard that before.
Mr Watson: With our customers, if they want to sell us the product. We will establish a long-term contract and that long-term contract will cover fluctuations in price. It is slightly different from the current way the farmer operates where it tends to be more on the spot market, but in future we will have to establish a long-term relationship with biofuels producers.

Q230 ***Lord Haskins:*** From your own point of view it will be necessary to have long term relationships.
Mr Watson: We are talking of something like two million tonnes of biofuels.

Q231 ***Lord Haskins:*** To be bought on contract at guaranteed minimum prices.
Mr Watson: We need to be able to buy that product to meet our obligation, so we will need to establish contracts with people, with the producers and ultimately they will need contracts with the farmers.

Q232 ***Lord Haskins:*** You will not become the Tesco bogeyman.
Mr Watson: We will use an intermediary, we will be the final customer and Tesco will be the shark.

Q233 ***Chairman:*** If we can pursue this for a moment, Mr Watson, you were 27 years with BP.
Mr Watson: Yes.

Q234 ***Chairman:*** That is a lot of your career, and 40 years in the oil industry; is there not an understandable fear among some smaller, independent companies who are now setting up or seeking to find money to set up a bioethanol factory that at the end of the day they are likely to be frozen out by the large oil companies because they will have the muscle to make long term contracts et cetera and it will be very difficult for some of the smaller independents to find a niche. Is that fair?
Mr Watson: I do not think that is fair. We are seeing for bioethanol, which is your example, a shortage.

Q235 ***Chairman:*** At the moment, which is being met from Brazil.

Mr Watson: At the moment, yes, but Brazil's consumption is going up dramatically. If you look at the situation in Brazil they have introduced what they call a flexible fuel vehicle which I am sure some of your later witnesses will describe in more detail.

Q236 ***Chairman:*** I have even been in one.
Mr Watson: Sorry, I apologise. That vehicle makes it attractive to use ethanol in Brazil. Domestic demand for ethanol in Brazil is growing rapidly; our concern is availability of product, it is not trying to force someone out of business. If someone is in business and it is competitive, there is no reason why they should in any way fear the coming of this, but are they competitive? If they are not competitive then there is a danger that they will suffer.

Q237 ***Earl Peel:*** Good luck to the dairy farmers. Moving on, My Lord Chairman, from that slight deviation, what currently are the cheapest sources of bioethanol and biodiesel and are any of your members able to profit from such imports at current prices and rebates?
Mr Watson: The cheapest source of bioethanol today is undoubtedly Brazil. It has a better climate than we have for growing it, it uses sugar cane and, incidentally, it produces a very good carbon balance, so for bioethanol it is Brazil. There is not a significant UK production of bioethanol today, there are a number of small plants being talked about. For biodiesel there are three main crops used: rape, palm oil and soya. We do not make biodiesel, that is made by independent companies, and it is their choice as to which products are used. My understanding is that you cannot make it from 100 per cent palm oil or 100 per cent soya and meet the current European standards, you do need some rapeseed in there, so they will not be frozen out completely. I am sorry, it is a relatively short answer, but the cheapest of those are palm oil and soya, they are significantly cheaper.

Q238 ***Earl Peel:*** Am I not right in saying that palm oil has, in terms of the environment, rather a bad reputation?
Mr Watson: The palm oil producers have just set up what they call the Roundtable on Sustainable Palm Oil Production to tackle exactly that issue. They are setting themselves some environmental standards that they will adhere to, and that should address that question. In the long term, as I said earlier on, we support carbon standards and we also support environmental standards. We do not want to be producing products that are environmentally unsound and we will support the development of standards which enable us to ensure that our products are environmentally sound, and that will include palm oil and soya.

Q239 ***Lord Plumb:*** My Lord Chairman, potential growers in this country realise the sort of competition they have to face in the future and are well aware of the fact that in countries like Brazil, even though it can be done cheaper, it has still got to be transported and transport costs are likely, I assume, to go on increasing. We talk a lot about food miles but we have also got to concentrate a bit in this case on oil miles. The question automatically follows that whilst we are continually reminded by our Chairman that we are an EU committee, this is worldwide competition as we see the growth. If Brazil is going to expand the consumption is surely going to expand in countries like China and in the Far East generally, as well as in the US. Are those supplies therefore likely to go in that direction rather than in this direction if the demand is there, and how on that basis can we compete?
Mr Watson: If there is global demand there will obviously be bidding for the product and the price will go up, which in normal markets will increase production. It is up to the UK farmer and the UK biofuels producers to make sure they are competitive; whether that means building large-scale plants or using new technology I cannot say, but there is no reason why a UK operation in some form or another, using UK feedstocks, cannot be sustained. It may need Government help in capital grants or whatever, but the market will be there and it is up to the UK farming industry and the UK bioethanol producers such as British Sugar to make sure that they can meet the demand that is there. The oil industry will sign contracts, we will be willing to put contracts in there if the price is right.

Q240 ***Lord Plumb:*** Presumably, My Lord Chairman, the contracts would be signed with co-operatives and with organisations that are representing farmers rather than directly with the growers themselves, so therefore you would be advising UK farmers to get together and work together if they are contemplating growing the products that are required for this market.
Mr Watson: That may well be the best way to do it.

Q241 ***Lord Palmer:*** You did say "may", you obviously have a doubt in your mind.
Mr Watson: The doubt in my mind is that it is not the oil industry's intention to set up bioethanol production. We will support bioethanol production, but it is unlikely that there will be a BP bioethanol production plant, it is likely to be a supplier and the contract will be between the supplier and the co-operative or individual farmers.
Chairman: That is a fairly major policy statement.
Lord Plumb: Absolutely.
Chairman: Lord Lewis, would you like to come back on the biofuels production process?

Q242 ***Lord Lewis of Newnham:*** Yes, could you give me your views as to what are the relative merits of the esterification and refinery hydrogenation as processes for transforming raw vegetable oil into diesel fuel, which you seem to imply is going to be one of your major sources?
Mr Watson: First of all, can I say that for the short term esterification will be the source, there is no doubt about that, and there are two problems with esterification. There is a limit to the amount we can add, as I have said, and the cold flow properties if we add a lot are quite different. One way around this is to take normal vegetable oil, tallow, palm oil or rapeseed oil and you put it through a refinery, a hydrogenation process. There are two ways of doing that: there is using an existing hydrogenation process where you can add, say, five per cent to the feed and that way you turn it into a different product, a product that looks identical to diesel and has good cold flow properties. The other way is to build a dedicated plant and the first dedicated plant is being built in Finland at this moment in time, at a refinery there, and it is costing the oil company concerned €100 million and will produce 170,000 tonnes per annum of biodiesel. To put that in context, to meet the RTFO obligation you need about six of those in the UK, so there would be a considerable investment of something like £400 million.

Q243 ***Lord Lewis of Newnham:*** Does the hydrogenation capacity of vegetable oils become important in this context?
Mr Watson: Yes.

Q244 ***Lord Lewis of Newnham:*** What are the relative merits for domestic rapeseed oil, imported palm and soya oils?
Mr Watson: There has been no published information on the differences between hydrogenating palm, soya, rape and tallow so I cannot answer that question.

Q245 ***Lord Lewis of Newnham:*** Are you saying it is a catalytic process?
Mr Watson: It is a basic catalytic process that takes the oil in. I will send you details as far as I can.
Chairman: That would be very kind, thank you very much. We are just running over time but we will ask Lord Palmer to ask you about energy security.

Q246 ***Lord Palmer:*** In my early days of getting involved in this exciting industry one of the arguments I always used very strongly was the fuel security aspect particularly, the turmoil in the Middle East et cetera. What effect will an increase in biofuel use have on the country's fuel security?
Mr Watson: We believe that fuel security lies in having a diverse range of sources of energy, particularly for transport fuels. We believe it relies on having a strong UK domestic oil refining industry, well-integrated with the European industry. In terms of the two products that we are talking about, I do not believe that bioethanol will contribute to energy security. The reason is that we and Europe produce a surplus of petrol, we are exporting it anyway, so if we have a short term hiccough in supplies we will be able to meet our petrol demands. For diesel we are roughly in balance in the UK but Europe as a whole has a shortage so obviously it will improve our energy security supply in the case of diesel. Does that answer the question?
Lord Palmer: Yes, thank you very much, a very clear answer.

Q247 ***Chairman:*** Thank you very much indeed. This is a new industry, as you have said, Mr Watson and I think, if I may say this genuinely, the UKPIA were very wise to get you as a technical director. It seems to me you are an admirable man for the job.
Mr Watson: Thank you.

Q248 ***Chairman:*** I say that in all sincerity. If there is any point we have not covered that you would like to make to us, do write in. We very much appreciate your time today and your answers, and we all look to the future with great interest.
Mr Watson: So do we, because we are facing what is undoubtedly the largest change in our transport fuels for two or three decades when we started to introduce unleaded petrol.

Q249 ***Chairman:*** A final, perhaps rather frivolous comment from me, I am no expert on these things at all but I do understand that when Henry Ford designed the Model T in 1906/1908 it was actually made to run on alcohol.
Mr Watson: I do not know.

Q250 ***Chairman:*** In fact, we are only going back 90 years.
Mr Watson: Indeed.

Q251 ***Chairman:*** And lead petrol was chosen over ethanol because you could patent it.
Mr Watson: Yes.
Earl Peel: I was just going to add one final thing, My Lord Chairman, in response to Lord Palmer's question and that is that security of supply does not depend exclusively on economics.

Q252 ***Lord Livsey of Talgarth:*** World War III.
Mr Watson: Just to come back, if you look at the IEA statistics you will see the impact on oil supplies over the last few years and the largest interruption we have

had to crude oil supplies was the Iranian Revolution when the initial drop in their oil production was 8.5 per cent of the world's total. We got through that because we have strategic stocks of oil and the strategic stocks of oil enable us to get over a short term hiccough in supplies, as was demonstrated in America during the hurricanes last year when we sent product from Europe to make up the shortfall from a very large loss in US refining capacity. I appreciate it is a lot more than that, but for oil anyway there are emergency stocks.

Chairman: Thank you very much indeed, it is much appreciated.

Present	Haskins, L	Palmer, L
	Lewis of Newnham, L	Plumb, L
	Livsey of Talgarth, L	Renton of Mount Harry, L (Chairman)

Examination of Witnesses

Witnesses: Mr Rob Vierhout, Secretary, European Bioethanol Fuel Association, and Mr Raffaello Garofalo, Secretary, European Biodiesel Board, examined.

Q253 ***Chairman:*** Thank you both very much for coming to talk to us today; we much appreciate it. We are a House of Lords Committee devoted to scrutinising EU draft directives and so forth on the subject of the environment and agriculture. We have just finished writing a report about the nuclear package on two draft directives on nuclear issues. We are doing a short inquiry into the question of biofuels and the e-targets for biofuels and Britain's relative lack of success in this field. Your ability to answer questions about what is happening in other EU countries is very, very helpful to us indeed, and we appreciate you coming. We are being recorded on our website. I am not saying that it will go out to millions of television listeners, but we are being recorded and we will send you a draft transcript of what you say today so that you have an opportunity to correct it in due course. Is there anything you would like to say to us by way of introductory comment before we start?

Mr Vierhout: I would like to thank you very much for giving us the opportunity to address the Committee. We represent the bioethanol fuel sector and represent the majority of the market. We represent the market leaders. We are very happy to give evidence to your Committee.

Q254 ***Chairman:*** This is a large room and the acoustics are not very good, and I am quite deaf! We meet in rooms like this and it is nothing unusual!

Mr Garofalo: Thank you very much for this kind invitation. It is an honour to be invited here to talk about biodiesel and biofuel. What is EBB? You probably already know that it is the European Federation of biodiesel producers. There are 36 member companies today that are affiliated, and we represent the 80 per cent of biodiesel that is produced in Europe today.

Q255 ***Chairman:*** You represent 80 per cent of the biodiesel produced today! How much of the bioethanol?

Mr Garofalo: We do not represent bioethanol producers. Rob is here to represent them.

Q256 ***Chairman:*** That is very helpful. To what extent do you think the EU Directive has been the response on the whole area of biofuels, of increasing production and consumption to a level above that which the market would have achieved in any case? Has the EU Directive had a responsibility and made a difference in this context?

Mr Garofalo: When it was first negotiated in 2001, and then in 2003 adopted, the Biofuels Directive was an extremely visionary policy. It was adopted when Brent was $15 per barrel, and we are now at another level. It was a visionary policy and its impact on the production and on the market for biofuels—as far as biodiesel is concerned—has been, I would say, important if not extremely important. Since 2002 the biodiesel industry has increased every year by 35 per cent—not on average but every year.

Q257 ***Chairman:*** By 35 per cent every year?

Mr Garofalo: Yes. In 2005, when compared to 2004 production, the increase was 65 per cent. I do not want to say that this was only because of the EU Biofuels Directive, but certainly the contribution of the Directive was crucial. Of course, then the high oil price did the rest of the job; also focusing attention on biofuels as an alternative solution.

Mr Vierhout: I fully support what Mr Garofalo has said. This Biofuel Directive was extremely important. If there had not been this Directive, I am quite sure that we would not have had the market as it is showing now. There are only a couple of Member States that have started producing bioethanol without the Directive being in place—France and Sweden. The real growth came about as

soon as we had the Directive in place. This is not a contest of numbers, but we saw too a very big leap forward in production last year. We had a leap forward of 73 per cent, which indicates that Member States believe that this is the way forward and that we need this regulatory framework to boost the market. Let us be real about this: if we did not have this Directive, there would probably not be a very big market. We are simply copying what the Brazilians have been doing for 30 years—supporting their industry—and what the Americans are still doing. Do not forget that in Brazil we have a mandate, so you are obliged to have between 20 and 25 per cent of ethanol in every litre of petrol; so it has created an enormous market. The Americans are simply having a very high import tariff which keeps foreign ethanol from the market. The Biofuels Directive is very important for the industry because it gives them certain confidence that there will be a growing market that will be credible. That is the only way that it will trigger the necessary investments to let this market grow.

Q258 ***Chairman:*** It is perhaps unusual to find an association talking in such terms about an EU Directive. Do you find that all EU countries you deal with have the same feeling about this Directive; that it has been, as you said, really helpful and important—or is that in some countries and not others?

Mr Garofalo: The main impact for sure has been in Germany and in France. It is not by chance that Germany and France are the two major agricultural producers in Europe because the biofuels relationship with the agricultural sector has always been a crucial asset. This, I believe, was something that was very important in the past. It will still be very important for the future but not as crucial as it was in the past. At the moment we are passing from the concept of biofuel as an additional outlet for agriculture to biofuels as a way to tackle the problem of independence of supply. The perspective is changing, and also the volume has changed.

Mr Vierhout: There is of course a difference in attitude amongst the Member States, but if you look at the numbers—which I am happy to provide to members of the secretariat—there was a really slow start, but the numbers are catching up. They understand that they need to do something, and they are doing it. If you look at the targets being set at a national level, a great number of Member States have said they want to achieve the 5.75 per cent by 2010. Of course, there is still a huge gap, but at least there is a clear political understanding that we want to do something. There are Member States that have an entirely different view, but they are limited in number. For instance, Denmark clearly says that you should only use biomass for electricity heating and cooling, and not biofuels. Finland has the same view on this. Nevertheless, even Finland is prepared to set a national target, so there is really a change in attitude, I would say.

Q259 ***Lord Lewis of Newnham:*** To what do you attribute the widely differing levels of biodiesel and bioethanol production in EU Member States?

Mr Vierhout: I think the main explanation for this difference in market development is due to the fact that we have a different excise duty on fuel in the EU and it applies to every Member State. We are happy to give you the table that shows the difference. You will see that diesel is less taxed than petrol, and this has created a bigger demand for diesel engines and has spurred within car manufacturing the idea of providing better engines that are more fuel-efficient. We believe that there should be a level playing-field and that the excise duty should be identical for both fuels so that both fuels have a fair chance to penetrate the market.

Mr Garofalo: On this specific question, I am sorry but I have to contradict partially what my colleague says!

Q260 ***Chairman:*** Do not worry about that. We find it very interesting when you take a different view to each other.

Mr Garofalo: In reality we have to look at what the fuel market will be in Europe, which is extremely long in gasoline and short in diesel. Last year we imported 25 million tonnes of diesel from Russia, and Europe last year exported 19 million tonnes of gasoline to the US. So these are two consequences: first of all, we had better be very polite with Mr Putin because, after what happened with Ukraine and gas, we had better not experience the same with diesel. Secondly, the fuel producers and distributors are obviously much more keen to buy a product that they are missing or where there is a deficit in Europe than to buy something like gasoline of which there is a strong excess. The rationale behind this surplus of gasoline and lack of diesel is because we assist with dieselisation of the car park in Europe. Why is this? Here, I join with what Mr Vierhout has just said; it is because the diesel engine is considered to be more efficient and so is being promoted. This dieselisation is continuing. In most European states gasoline consumption is decreasing every year by 2 per cent to 4 per cent; and diesel consumption is increasing every year by 2 per cent, 4 per cent or even 6 per cent, depending on the economic growth in the Member State. The important point is that if we want to achieve our targets in terms of biofuels, the targets being to support agriculture, to solve the CO_2 problem in transport, but also to tackle the problem of independence of supply, we have to take into account that particular situation in the fuel market.

Q261 ***Lord Lewis of Newnham:*** You mentioned that you thought the targets that were being imposed were reasonable: what do you consider to be reasonable and achievable biofuel targets, say for 2010 and 2020?
Mr Vierhout: I am now talking bioethanol: from availability of raw material I would say that 5.75 per cent by 2010 is achievable. I will give you an example and provide you with the numbers so that you can see them for yourself. In 2005–06 we produced about 252 million tonnes of cereals in the EU. If we want to achieve the target of 5.75 per cent, we would require 25 million tonnes for making ethanol, which is 10 per cent. At present we only use 2 million tonnes. Fifty-five million tonnes is for cattle feed. In Hungary 4 million tonnes is in intervention. From a raw material perspective there would not be any problem whatsoever. The problem could be caused by production capacity: do we have enough production capacity available by then? This is a bit of an egg/chicken problem. You will probably have enough production capacity if there is the right policy framework, but we lack it. There is not a lot of certainty in the market, and investors are reluctant to invest. Again, I will give you all the figures. The present installed production capacity for bioethanol is about 2 billion litres. We only produce half of it. Last year we produced over 900 million litres—and I would be happy to explain why this is. Under construction at this very moment is 1.5 billion litres, and projects have been announced by various people, so companies are good for 5.4 billion litres. If you add up everything, it is about 8 billion litres. Then we would fall short because we would require somewhere around 12 billion litres of ethanol by 2010 to achieve the target. I am not saying we will not get there because what I have provisioned is the project for 2008, so we still have two years to go from there; but it takes time to build a plant and you need to plan it. If we get the right framework at an EU level, which means having an obligation in place and having separate targets for both diesel and petrol, I am confident that we would get the production capacity and achieve the target set in the Biofuel Directive.

Q262 ***Lord Plumb:*** You said that we import 90 million tonnes from Russia.
Mr Garofalo: It is 25 million tonnes of diesel from Russia.

Q263 ***Lord Plumb:*** That is the whole of Europe?
Mr Vierhout: That is right.

Q264 ***Lord Plumb:*** Where does most of that go?
Mr Garofalo: I know the biggest deficit in Europe is in France in terms of diesel. Belgium is a country with 72 per cent new immatriculation of diesel light duty; so France and Belgium and probably also Germany. I should verify for the other Member States. I know Italy is pretty self-sufficient. On the feasibility of the target, that is fine because you had an answer for bioethanol, but as far as the biodiesel industry is concerned, the situation is quite different—I would say very different. You can look at that at three different levels. The first level is agriculture; then the certification, so the biodiesel production capacity; and then the market. Let us start from the middle, biodiesel capacity. Today we already have 6 million tonnes of certification capacity in Europe. If we think that the target would require between 12 and 18 million tonnes of biodiesel, the target is biofuels towards conventional fuels, not biodiesel towards diesel or bioethanol towards gasoline. Therefore, it can be filled in only by using biodiesel or only by using bioethanol. As far as the biodiesel capacity is concerned, the biodiesel industry in Europe will be ready, probably in 2010, to fill the 5.75 per cent target. By 2008 the production capacity should be around 9 million tonnes. On the side of demand, it will depend on the national support schemes. In the UK, if we have a renewable transport fuel obligation, this would clearly contribute to reaching the target in terms of demand. The big question mark relates to agriculture, the availability of agricultural raw materials. There, we have to look to rapeseed crops and some flower seeds and other kinds of crops. In the UK there is huge potential. There is also huge potential in the new Member States in terms of production; but here it will be crucial as well that the famous energy crop scheme, not only should be, in our view, increased in terms of surplus, because the ceiling of 1.5 million hectares is very low; but it should also be increased in terms of the premium. Today the premium is €45 per hectare and it is more or less with the current yield €18 per tonne, and clearly this does not make the difference. A farmer in the UK will not producing rapeseed or oil seeds for energy purposes because it is €18 per tonne. It will need to be substantially increased, if not doubled, as a premium. This is a position that many Member States are actually agreeing in Brussels.
Chairman: In a sense, you are anticipating some of the questions we were about to ask you, particularly those coming from Lord Plumb, who is himself a very serious farmer and is, I am sure, taking very careful note of what you are saying.

Q265 ***Lord Plumb:*** You have made one or two statements which are absolutely clear, and you have both agreed that without a directive, progress would not have been made as it has been made so far. That is absolutely clear. Is this due to some extent to the low cereal prices, to set-aside, which people do not like, and therefore the land is there and available and can be used, and to a considerable amount of diversification because of these factors? We are interested in policy objectives for biofuels, which

have to be quite clear for all to see. I would like to ask how the Member governments prioritise energy security, their prosperity in agriculture, and carbon-dioxide savings, as a reason for biofuel support.

Mr Vierhout: As far as bioethanol is concerned, there are not that many Member States now that have started to produce, but there are some with very outspoken views on what should be the driver for this policy. Obviously, France's is an agricultural driver: they want to make sure that there is new outlet opportunity for their farmers. That is without doubt their main driver. Sweden is also a very big producer of bioethanol. Their main driver is CO_2 savings. They also have issued this plan to be independent from fossil fuel within 15 and 20 years from now. I would say the rest of the countries are not very explicit about what is the main driver for their policy; but it is interesting that last year the shift was going towards security of supply and becoming less dependent on imports of fossil fuel. Everyone is saying this now; this has become the main driver.

Mr Garofalo: It is probably difficult to identify the main driver because in the example of France, yes, it has a powerful agriculture sector behind it, but at the same time France made the strategic decision three years ago to dramatically support biofuels. That is because they realised, as they did in the seventies with nuclear power, that they needed to come out of oil dependency for production of electricity. They want now to do the same; to come out of oil dependency for transport. They saw in biofuels the tool to achieve that. In the past, for sure, the driver has been the agricultural sector. That is not now the main driver; the main driver for biofuels is the combined situation, the win/win situation of CO_2 and independence of supply. I do not know if it would be worth it—and probably it would not—if we only looked to the CO_2 solution because everybody knows that it is much more interesting to buy biomass directly, if we only look to the CO_2 balance. There are many political decisions, but this decision is worth it because it creates advantages and entails advantages in many different areas, not just one.

Chairman: I have totally understood. We have to move on slightly more quickly because other witnesses are coming in and we have quite a lot of other questions.

Q266 ***Lord Palmer:*** Did you say that it was your impression that Sweden hopes to be totally independent of fossil fuels in 15 to 20 years?

Mr Vierhout: Yes, a plan has been announced by the Prime Minister, and they are looking at how to make it happen.

Q267 ***Lord Haskins:*** Coming back to the competitiveness of biofuels against oil, we were told this morning by the representatives from the oil industry that no matter what the crude oil price, biofuels will never be competitive and that they will always require some fiscal support or some regulatory support to make them viable. Do you agree with that? The second point is that this is a European Committee, and we are trying to see what role Europe has in this whole debate. You mentioned taxes, that you would like to see a world where taxes were harmonised, but in my view there is not the remotest possibility of that happening in the next 20 to 30 years; it is not on the agenda. What other regulatory ideas might be appropriate at EU level if the assumption is right that there will never be a free market in biofuels against oil for the next 25 years?

Mr Garofalo: When biofuels will be competitive with mineral oil, without any kind of support? That is the question. It is difficult to answer because the price of biodiesel depends on two unrelated variables: oil and vegetable oil. I cannot predict what the prices of vegetable oils will be in the future; if I could, I would be rich! It is difficult to say. The higher the price of oil, the more probability there is that biofuels and biodiesel would be competitive. Second, the more coherent and efficient agricultural support is for the production of oilseeds and raw material, the better will be the possibility of biofuels being competitive in the future.

Q268 ***Lord Plumb:*** That is an intervention; that is support.

Mr Garofalo: Yes, but we do not have to forget that 80 per cent of the price of biodiesel, for instance, is the price of the raw material; so we can be as clever as we want in ameliorating the processing; but still that 80 per cent we cannot change. This can be changed by agricultural support. Coming to the second point: what is the most suitable way of supporting the taxation? We know what the taxation is. The main limitation of the taxation is that when the quantities go beyond 200,000 tonnes or 300,000 tonnes, that is too much of the state budget. Probably an obligatory system is fine. I would go even further and say that probably the most suitable system is one that shares the burden of the extra costs between the state budget and the final consumers. The policy needs taxation plus obligatory tariffs, and I think you are going pretty well in the UK with the RTFO in that sense.

Mr Vierhout: I would like to comment on this for bioethanol. I do not know what the reasons were for the person saying that we could never be competitive.

Q269 ***Lord Haskins:*** The argument was that artificial fertilisers are oil-based, and if the price goes up then the cost of oilseed rape will go up with the oil price going up.

Mr Vierhout: Yes, unless of course you are able to make the product cheaper in the market. There are several elements to this question. First, we believe

that we can be competitive if the barrel of oil costs around $90, so we are not very far away from that. Secondly, it also depends on the exchange rate, because it is all quoted in dollars and we are doing business in euros, and there are the spot prices. Thirdly, it depends on the market price of ethanol, of petrol. The market price of ethanol is quite high, but that is because there is a shortage in the market; there is simply not enough, and that drives up the price. It is now €630 per cubic metre, and petrol is €480 per cubic metre. This gap needs to be closed. A final element, which is very important, is that we believe that in the future—and we are not talking about 10 years away but closer—five years—we will be able to make more ethanol from the same volume of raw material, because we are going into the next generation of bioethanol production. Therefore, your raw material will become cheaper and your output will grow and your costs will go down. Eventually, we are absolutely convinced that we will be competitive with fossil fuels. As far as your second question is concerned about incentives or what would be the ideal way forward, I agree with Mr Garofalo: first, we need an obligation in Europe. That is absolutely vital—like we have an obligation in Brazil, and in the United States since last year with the Energy Bill. Secondly, we need to have separate targets, which will be identical targets for both diesel and petrol to use biofuels. Thirdly, we would need to combine these with de-taxation measures because if we do not have de-taxation measures pure biofuels will not go into the market, and they are very important because they raise public awareness. If we have 100 per cent biodiesel, or use the car sold very successfully in Sweden, which is 85 per cent petrol and 15 per cent ethanol—it shows that you can drive the fuel. But due to the fact that there is so much ethanol required for such a car, you need to have de-taxation to make it possible. You might want to have additional incentives like no congestion tax. Why not have in London free driving for clean cars?

Chairman: I am going to have to stop you. I like the word "de-taxation"! It is a new way of putting it, but I like it.

Lord Livsey of Talgarth: What are the relative merits of biodiesel and bioethanol in the EU, based on an environmental and economic assessment? Leave the environmental aspect for a minute because we are more than half-way through the economic assessment from the way that you have just been giving your answer. What is the comparison between biodiesel and bioethanol from the economic assessment point of view?

Q270 ***Chairman:*** You two are not going to give the same answer, are you?

Mr Vierhout: Probably not, no.

Mr Garofalo: For biodiesel, maybe I will start from the social assessment because this is also an extremely important economic factor. There are different studies and different calculations. There is PriceWaterhouseCooper's study done in France in 2003, which estimated that every thousand tonnes of biodiesel produced involved the creation of 10 jobs. The Commission has come to a similar conclusion, saying that 1 per cent of biofuels would involve between 45–75,000 jobs. Most of these jobs, which is also important, are in rural areas; so it is agricultural-related employment. This is an important economic impact. We are not talking about the economic impact of the independence of supply because there is no direct cost related to independence of supply; but, clearly, everything we do in terms of security or in the Middle East in terms of security has a cost, and this is partially related to the problem of independence of supply.

Q271 ***Lord Livsey of Talgarth:*** Does that justify a philosophical intervention in the market place to support the production of biodiesel?

Mr Garofalo: I think that since biofuel and biodiesel may contribute to solving marginally the problem—not completely—they deserve to be considered as part of the solution and as a justified way to go through.

Q272 ***Lord Livsey of Talgarth:*** What about bioethanol?

Mr Vierhout: As far as the latter is concerned, we totally agree. As far as economics are concerned, we have somewhat different numbers but they are not that much different. I can provide you with the numbers—what it means if you use 100 hectares in terms of job security; what it means if you produce 100 million litres in terms of creating new jobs. What it means in economic terms that you do not import fossil fuels but spend the money for your own economy.

Q273 ***Lord Livsey of Talgarth:*** Can we get this in writing?

Mr Vierhout: Absolutely.

Q274 ***Lord Livsey of Talgarth:*** What is the environmental impact?

Mr Garofalo: As far as CO_2 reduction is concerned, I have in my office at least 250 different life-cycle analyses. Which one is the good one? It is difficult to say. I can tell you that there is a more serious one for biodiesel in terms of CO_2 reduction and the impact varying between 65 and 75 per cent of reduction. Of course, this is very much a theme today because of sustainability of biodiesel and biofuel as a whole, so do not cut the rain forests to

produce biodiesel. The answer is that today 95 per cent of raw material comes from Europe. If it will stay as well a marginal, it is important; but the marginal important part is very important, to be sure that we are not contributing to cutting down the rain forests. But then to biofuels we have to apply the same sustainability certification that we apply to the fuel industry, because it is the palm oil, the soya bean oil, that we have to care about.

Q275 ***Lord Livsey of Talgarth:*** What about bioethanol?
Mr Vierhout: On the other side, as far as the life-cycle analyses are concerned, we also have plenty of studies which offer different results for the same plans. It depends on the methodology you apply. You could achieve savings up to 70 per cent with the materials you use in Europe nowadays. The big leap forward will be once we have liquid cellulosic material. Again, as I told you, we believe that we will get there in five years' time from now. As an industry, we are prepared to say that we should have a special credit for those companies that make that kind of ethanol, like we have in the United States, where there is a 2.5:1 credit; so if you make liquid cellulosic ethanol you get more credit; and also we believe we should put up a certain volume that should be achieved by the industry. Mr Gameson is going to testify shortly, and he will probably talk about the plant in Spain, which is the first plant in Europe that will produce commercially liquid cellulosic ethanol.

Q276 ***Lord Haskins:*** What proportion of the EU biofuels market will be supplied from indigenous feedstocks and how much will come from imports?
Mr Vierhout: We already gave the answer, at least for the ethanol sector. As far as raw materials are concerned, there is no problem. We would not need to have imports.

Q277 ***Lord Haskins:*** Any at all?
Mr Vierhout: If we had the production capacity in place, obviously. We need to have the factories to make the ethanol; and there we might run into a certain problem. Do not forget that Europe is a very open market. We already give to a huge number of countries under ACP and GSP duty-free access to—

Q278 ***Lord Haskins:*** A friend of mine is negotiating taking 500,000 hectares in Ukraine to supply the German market with oilseed rape.
Mr Vierhout: That is biodiesel.
Mr Garofalo: That is biodiesel. The position of the biodiesel industry on this particular point is very different because the vegetable oil sector, so the crushing industry—even seed production of biodiesel production—is extremely competitive. Europe is the leader in biodiesel production. We produce 80 per cent of the biodiesel produced world-wide; so there is no real fear about biodiesel input. This may come, but the industry we have is extremely competitive and the import duty on biodiesel and on oilseeds—on oilseeds there is no import duty. The import duty on vegetable oil and biodiesel are never over 5 per cent, and 0 per cent with most of the countries—Brazil, Argentina. In that respect we live in a free world and we have to keep it like that in the biodiesel industry.

Q279 ***Lord Palmer:*** So many of our questions are interrelated and in many ways almost incestuous. You have both touched on my next two questions, but to what extent will the imposition of biofuel obligations by the EU Member States reduce the domestic biofuel industry's need for fiscal support?
Mr Vierhout: I said earlier that we believe fiscal support would be very helpful to give some trust to the industry that this sector will continue to exist, and that they will do the investment. Furthermore, we believe that if you have no fiscal incentives, you cannot have a pure biofuel in the market. It will always be low-level lending, and that is not visible. If you want to see this alternative fuel, you would need to have this fiscal measure in place. France is a very good example where you have the two; where you have the obligation; and where you have fiscal incentives, and also the penalty—something like what is being discussed in the UK. Therefore, we believe that we need the obligation and fiscal incentive.

Q280 ***Lord Palmer:*** So our present fiscal support is, in your view, simply not sufficient.
Mr Vierhout: Absolutely not because why do we see hardly any investment in the UK in plants? It is because there is too much uncertainty in the market. We see it in France and in Germany and in Sweden, where they changed something in import law, and immediately there was an announcement of a new factory quadrupling capacity. We are seeing it in the Netherlands. The day that the Dutch Government decided that they would introduce next year an obligation, plus separate targets for both diesel and petrol, plus a certification system in due course, immediately on the same day there was a press release from the major alcohol producer that he was going to build a new plant, doubling his capacity. There is a clear relationship between what the government does and what is happening in the market.
Mr Garofalo: The 20 pence is not enough. The living proof is that in the UK the biodiesel industry so far has not taken off as in the other countries.

Q281 ***Lord Palmer:*** At what level do you think it ought to be set if the Prime Minister or the Chancellor of the Exchequer brought you in tomorrow?

Mr Garofalo: Probably experience proves it should be at least the equivalent of €350–370 per cubic metre. But I do not think this is the point. I think the point is to give you a strong signal that the idea of coupling de-taxation with an obligation is probably the most suitable here, because you have this sharing of the cost burden between the final consumer and the budget of the state. Also, the obligation has been married to apply the principle "polluter pays" because those who use more of the fuel will pay more. When there is only the budget of the state, there is not the obligation. I did not have the opportunity to intervene on the specific point, but my colleague talked a lot about the second-generation biofuels. These are extremely promising, and we have to go for that and we have to go for research, but we have to bear in mind that the words "second generation" are misleading. When we talk about first and second generation, it implies that the first generation should go into retirement, and then the second generation should come. This is not the perspective. It is more a complementary approach that we need to look at. We have to see biofuels as different players of the same team, not as one substituting the other. Then the question mark on the second generation is when it will come, and how far these arguments are not used in order to delay *sine die* real support to the so-called first generation. Sometimes the vector is the enemy of the good, and we should not go that way.

Chairman: Thank you very much indeed. It has been very interesting to hear you two. I realised for the first time that there is competition between bioethanol and biodiesel. Time has been a bit short, but if there is anything that you have not had the opportunity to tell us, do write, because we do not want to leave gaps. Thank you very much indeed.

Memorandum by British Sugar plc

Introduction

British Sugar announced in December 2005 that it would be going ahead with the construction of a £20 million bioethanol plant at its sugar factory site in Wissington, Norfolk. The decision to go ahead with this project is testimony to British Sugar's confidence that the policy environment has improved sufficiently to justify a relatively small investment in UK domestic biofuel production. However, we are not confident that a volume market for bioethanol will be developed in the UK capable of contributing to meeting 5 per cent and more of the UK's transport fuel needs.

Responses to the Committee's Specific Questions

Biofuel Targets

1. *Which Member States have been most successful in meeting their biofuel targets; and how have they achieved this?*

1.1 The EU Biofuels Directive (2003/30/EC), adopted in May 2003, set indicative targets for the market share of biofuels of 2 per cent by the end of 2005 and 5.75 per cent by the end of 2010. Member States were invited to notify their actual targets to the Commission by 1 July 2004 for 2005 and by 1 July 2007 for 2010. Annex 1 (taken from the European Commission's Biofuels Directive Review of April 2006) sets out the targets for 2005 as notified, together with sales achieved by 2004, the latest year for which figures are available. A number of countries have also indicated what they could achieve by 2010. All targets are expressed by energy content rather than by volume.

From these figures it can be seen that only Germany and Sweden had sales in 2004 approaching the level of their 2005 target. We believe that this has been achieved because these countries were at the outset the ones that adopted the most ambitious policies to support biofuels. This included a generous full duty rebate in Germany where biodiesel sales moved very swiftly and a combination of duty rebate and tariff treatment in Sweden which encouraged the uptake of bioethanol in particular. Sweden has gone on to introduce other policies such as free parking, exemption from congestion charging and tax breaks for both drivers and companies which has resulted in a rapidly growing consumer demand for flex fuel cars (cars that run on petrol and up to 85 per cent bioethanol) and the E85 fuel. By the beginning of this year flex-fuel cars had reached a market share of 12 per cent of new cars sold in Sweden. Spain has been the most successful in promoting the domestic production of bioethanol, through a combination of grants and duty rebate.

1.2 The response from the UK Government has been disappointing. The introduction of a 20 pence per litre fuel duty rebate has not been sufficient to stimulate more than niche production from such feedstocks as Used Cooking Oil and tallow. To date there is no UK production of bioethanol.

1.3 The UK is unusual in setting its targets under the Biofuels Directive by volume and not by energy. The Directive sets targets by energy. The UK target for 2005 was very low at 0.3 per cent by volume (or c. 0.2 per cent by energy). The target for 2010 has been announced at 5 per cent by volume (or c. 3.5 per cent by energy) which will fall far short of the indicative target in the Biofuels Directive of 5.75 per cent by energy.

The Government's rationale for the relatively unambitious target for 2010 rests on the 5 per cent (by volume) biofuel inclusion level permitted under EU legislation and fuel specifications (see Para 6.1 below). Nevertheless, other Member States appear not to be deterred by this and recognise that biofuels can be sold in other forms than simply inclusion in fossil fuels, for example as E85 (up to 85 per cent bioethanol) in flex fuel vehicles and as B100 (100 per cent biodiesel) in dedicated fleets.

Economic Instruments

2. *What financial instruments or incentives have proven to be most effective in meeting national targets for biofuel market share?*

2.1 In the EU fuel duty rebates have been granted in a number of Member States. These have been made possible by the Energy Taxation Directive (2003/96/EC) under which Member States are permitted to reduce taxation subject to state aid rules. In general terms the higher the duty rebate, the more effective the instrument. Thus Germany, with the highest rebate, has seen the earliest adoption of biofuels.

2.2 Other economic instruments that have had some effect in the EU have been regional development assistance (particularly in some parts of Germany and Spain) and other forms of capital grants for pilot projects. The UK will introduce Enhanced Capital Allowances from early 2007 for those biofuel plants which can demonstrate the greatest carbon saving. While this is a welcome development, its ability to instigate significant change should not be over-estimated.

2.3 Much the most effective policy instrument for the development of a dynamic biofuels industry has been the adoption of a mandate. This has worked particularly well in Brazil where a mandate in excess of 20 per cent has been in effect for a number of years. This has encouraged the uptake of domestic bioethanol production and now over 60 per cent of new car sales are for E100 flex fuel vehicles. The USA also has a mandate for biofuel use (7.5 billion gallons of renewable fuel to be used in gasoline by 2012—of Energy Policy Act 2005) combined with specific aid for producers and consumers that has led to a significant investment, particularly in bioethanol production.

2.4 The development of the market is also highly relevant. In the absence of a mandate, an obligation may be seen as the best way to encourage fuel suppliers to buy biofuels and place them on the market. The UK's Renewable Transport Fuel Obligation (RTFO) is one such type of obligation. For this to work effectively, fuel suppliers must buy and sell biofuels rather than opt to pay a penalty in the form of a buy-out price, and the targets under the obligation must be sufficiently ambitious to stimulate investment. In our view the buy-out price proposed for 2008–09 in the 2006 Budget at 15 pence per litre is too low. As already noted, the UK biofuels sales target for 2010 is also too low. British Sugar would like to see a target of 8 per cent (by energy) adopted for 2015 in line with the recommendation of the EU Summit of 23–24 March 2006. British Sugar would also like to see separate targets for biofuel use in both petrol and diesel to ensure that biofuels are developed in both markets. Although the independent sector has started to use bioethanol blends in petrol, the oil companies have been reluctant to do so before 2010, because of technical concerns relating to vapour pressure and water miscibility. This has so far limited the rate of investment in UK bioethanol production.

Biofuel Obligations

3. *To what extent has the imposition of biofuel obligations by Member States reduced the biofuel industry's need for fiscal support?*

3.1 The appearance of biofuel obligations is a relatively new policy initiative. To date we believe only Austria and Slovenia have actually implemented obligation at 2.5 per cent and 1.2 per cent (by energy) respectively.

The Netherlands will introduce an obligation of 2 per cent in 2007, and we understand that obligations are under consideration in France, Germany, Czech Republic, Sweden, Slovakia, Italy, Lithuania, Poland and Hungary.

3.2 The UK's RTFO will not come into effect until April 2008. It is unclear how and to what extent this will reduce the need for fiscal support. Nevertheless it is clear that, until the market accepts that the policy driver for the development of a biofuels industry is an obligation, the phasing out of fuel duty rebate must be handled very carefully lest investors take fright and abandon the nascent industry. In the UK for example, the Treasury have accepted that, in the early stages of the RTFO at least, the fuel duty rebate as an incentive must remain, together with the buy-out price as a penalty. The fuel duty rebate can be phased out once the market has adjusted to the new driver.

Production of Biofuel

4. *Which countries have the lowest biofuel production costs and why? What steps have Member States taken in research and development to reduce the production costs of biofuels?*

4.1 British Sugar can offer no specific comment on the biofuel production costs or R&D programmes in other EU Member States. We note that the Commission's EU Strategy for Biofuels suggests that EU produced bioethanol would become cost competitive with oil prices of about $90/barrel. From our perspective this figure would be broadly accurate. Those Member States with the capacity to produce bioethanol at scale from either sugar beet or cereals, such as France and Germany, will be able to introduce early economies of scale to produce relatively cheaper bioethanol.

4.2 Energy costs are also very relevant. Countries with cheaper fuel costs will be more competitive. In this context, the introduction in the UK of mandatory carbon and sustainability reporting under the RTFO will have cost implications. Those countries that can continue to use carbon intensive fuels (such as brown coal in Germany) will be that much more competitive than the UK where the drive will be towards cleaner and more sustainable supply chains, including fuel sources. In addition, in the UK data will have to be collected from all supply chains to fulfil the RTFO mandatory reporting requirement adding cost which will not be faced by our competitors. British Sugar would advocate the adoption of obligations coupled with environmental sustainability standards on an EU-wide basis, as suggested by the European Commission in the EU Strategy for Biofuels and the review of the Biofuels Directive of April 2006, to ensure competitive equality at least throughout the EU.

Trade in Biofuel

5. *Which Member States import the greatest volume of biofuel and why? What impact have imports of cheap biofuel had on domestic production in the European Union?*

5.1 Sweden is currently the largest importer of biofuels, generally of wine alcohol converted to bioethanol, to fuel the growing consumer appetite for flex-fuel vehicles. About half its biofuel consumption is imported. Sweden has taken a clear policy stand to become an oil free economy by 2020. Its capacity to produce biofuels from indigenous feedstocks is currently limited so imports are required to supply increasing demand for bioethanol in particular. Germany and the UK are also significant importers. In the UK, the large-scale introduction of direct ethanol blending (as opposed to bio-ETBE) has been delayed because of the reluctance of oil companies to use it for technical reasons. In contrast, the independent sector, which operates segregated/dedicated supply chains, has introduced ethanol blending using imported bioethanol which benefits from the UK fuel duty rebate. Sales of bioethanol have consequently increased from zero in January 2005 to around 7 million litres per month (70,000 tonnes per year) currently.

5.2 British Sugar believes that imports of biofuels must be part of the mix available in any market but they should not be dominant. In this context, it should be mentioned that the current EU tariffs on imported bioethanol (denatured or undenatured) are relatively modest. To allow the fledgling EU bioethanol industry to develop, these tariffs should be maintained at their current levels and not be subject to erosion either through the WTO Doha Round negotiations or through bilateral deals, such as have been proposed in the recent past for MERCOSUR (which includes Brazil).

5.3 It is debatable whether there will continue to be sources of cheap biofuel to import. The domestic demand for Brazilian bioethanol has increased significantly with the increasing use of flex-fuel vehicles. World bioethanol prices are now beginning to track oil prices and have risen some 35 per cent in the last year. While

Brazilian production can be geared up (although the environmental damage in doing so may be considerable) demand from a number of markets, in particular Japan, will also pick up. With the right policies in place in the EU, there should be space enough on the EU market for competitive domestically produced biofuels.

Technical Barriers

6. *What are the technical requirements that have acted as barriers to the introduction of biofuel into national fuel markets?*

6.1 The EU Fuel Quality Directive (98/70/EC of 13 October 1998), which establishes specifications for petrol and diesel, limits the use of ethanol in petrol to 5 per cent. This has been taken as a standard for the EU vehicle manufacturers who also limit the validity of their warranties to vehicles using biofuel additives under 5 per cent. Vehicle technology has moved on considerably since 1998 and a number of manufacturers (notably Volkswagen) have said that their new vehicles could run on inclusion levels up to 10 per cent. Indeed, we understand that similar vehicles run on 10 per cent in the USA with no technical modification. The legislation in the EU would therefore need amending to permit inclusion levels beyond 5 per cent. The European Commission has acknowledged this in the Strategy for Biofuels and is expected to propose changes to the directive before the end of 2006 to manage the transition to 10 per cent blending in a safe and effective manner. If changes are not agreed then this could become a serious limitation on the development of an EU bioethanol market.

6.2 The Fuel Quality Directive also sets limits on the permitted vapour pressure of petrol—the so-called Reid Vapour Pressure—RVP. Blending petrol and ethanol at certain levels puts the RVP out of specification. Clearly, the introduction of bio-components in petrol should not be to the detriment of fuel quality and other environmental standards. However the European Commission has recently stated that it will review RVP limits. Even if no relaxation were agreed, the RVP level of blended petrol could be kept within limits if the fuel companies were to change their fuel ingredient mix. This has been done successfully by the UK independent sector. Similarly, bioethanol attracts water (hydrophilic) and needs its own handling systems, but these issues have been overcome in the UK independent sector as well as in the large markets in Brazil and the USA.

Looking Ahead

7. *Should the European Union take further action to promote biofuel production; and, if so, what action is required?*

7.1 As indicated above, British Sugar believes that the EU must take further action, not only to promote biofuel production, but also to develop a genuine market. Without the market, biofuels will not be sold and the environmental and fuel security benefits will not be realised. The best way to achieve this would be to have an EU-wide mandate at 8 per cent (by energy) by 2015. This should be accompanied by common sustainability rules. A mandate would ensure fair competition across the EU and enable intra-EU trade to take place more easily. Failing a mandate then an EU-wide obligation, similarly with common sustainability rules, should be introduced.

7.2 The EU's trade policy must support the development of a new biofuels industry by ensuring that the market is not opened up to a flood of imports by the sudden removal of import tariffs. Tariffs should only be progressively reduced as indigenous EU production grows. There should be full interservice consultation within the European Commission to ensure that the policies of DG TREN, Agri and Trade are co-ordinated and consistent.

June 2006

Annex 1

NATIONAL INDICATIVE TARGETS UNDER THE EU BIOFUELS DIRECTIVE 2003

	Consumption (%. energy content)			*Targets (%. energy content)*				
	2003	*2004*	*2005 (ref value: 2%)*	*2006*	*2007*	*2008*	*2009*	*2010 (ref. value: 5.75%)*
Austria	0.06	0.06	2.5	2.5	4.3	5.75	5.75	5.75
Belgium	0	0	2	2.75	3.5	4.25	5	5.75
Cyprus	0	0	1					
Czech Republic	1.09	1		3.7 or 1.52	4.67			5.55
Denmark	0	0	0	0.1				
Estonia	0	0	2	2				
Finland	0.11	0.11	0.1					
France	0.67	0.67	2	2	3	4	5	5.75
Germany	1.21	1.72	2					5.75
Greece	0	na	0.7	2.5	3	4	5	5.75
Hungary	0	0	0.6					4
Ireland	0	0	0.06	1.14	1.75	2.24		
Italy	0.5	na	1					2.5
Latvia	0.21	0.07	2	2.75	3.5	4.25	5	5.75
Lithuania	0	0.02	2					5.75
Luxembourg	0	na	0	2.75				5.75
Malta	0.02	0.10	0.3					
Netherlands	0.03	na	0	2	2			5.75
Poland	0.49	0.3	0.5	1.5				5.75
Portugal	0	0	2					
Slovakia	0.14	0.15	2	2.5	3.2	4	4.9	5.75
Slovenia	0	0.06	0.65	1.2	2	3	4	5
Spain	0.35	0.38	2					
Sweden	1.32	2.28	3					5.75
UK	0.03	0.04	0.2			1.7	2.6	3.5
EU25	**0.5**	**0.6**	**1.4**					

Memorandum by Abengoa Bioenergy

The House of Lords has requested responses to the following set of questions:

Biofuel Targets

Which Member States have been most successful in meeting their biofuel targets; and how have they achieved this?

Technical Barriers

What are the technical requirements that have acted as barriers to the introduction of biofuel into national fuel markets?

Economic Instruments

What financial instruments or incentives have proven to be most effective in meeting national targets for biofuel market share?

Trade in Biofuel

Which Member States import the greatest volume of biofuel and why?

What impact have imports of cheap biofuel had on domestic production in the European Union?

Biofuel Obligation

To what extent has the imposition of biofuel obligations by Member States reduced the biofuel industry's need for fiscal support?

Production of Biofuel

Which countries have the lowest biofuel production costs and why?

What steps have Member States taken in research and development to reduce the production costs of biofuels?

Looking Ahead

Should the European Union take further action to promote biofuel production; and, if so, what action is required?

Abengoa Bioenergy's core business is the production and commercialisation of bioethanol fuel. In responding to these questions our scope is on biofuel as a whole, but we focus on the issues surrounding bioethanol fuel.

Biofuel Targets

Which Member States have been most successful in meeting their biofuel targets; and how have they achieved this?

Technical Barriers

What are the technical requirements that have acted as barriers to the introduction of biofuel into national fuel markets?

At least for bioethanol fuel, the answer to these questions are more or less the two sides of the same coin. Therefore we have addressed them together.

Official statistics have yet to be published that tell us definitively which EU Member States have met their 2005 biofuel target or, indeed, their relative success in substituting petrol and diesel with renewable energy. However, it is clear that the two and a half years between the adoption of the Biofuels Directive[1] and the 2005 target deadline were insufficient to allow biofuel entrants to catch up with the pioneer States that first adopted policies of promotion long ago.

Of the latter, the most successful has been Sweden, having achieved a 2.7 per cent bioenergy share in 2005 of which 2.4 per cent was from bioethanol.[2] Sweden's achievement is due overwhelmingly to blending 5 per cent bioethanol in every litre of petrol. For the other 24 Member States it is not generally possible to blend bioethanol given the way petrol is currently formulated, because it will not meet the specification for summer petrol volatility in the Directive on petrol and diesel quality.[3] Sweden's unique success in overcoming this barrier is due to a combined set of circumstances that do not exist elsewhere in the EU. The fact that Sweden is at the forefront of European biofuel consumption is also due to Swedish public enthusiasm for bioethanol not in petrol but as an alternative fuel.

European RVP Limit Barrier

The Directive on petrol and diesel quality measures summer petrol volatility by a laboratory test called "RVP". Sweden has successfully introduced bioethanol without adapting this RVP limit, firstly, because it, (along with the UK and two other Member States), has been granted a special dispensation to sell summer petrol at a higher RVP. Secondly, Sweden offers relatively high tax concessions for bioethanol. These factors combine to make it economic for oil companies to reduce the RVP of the base petrol before blending in the bioethanol. However, to repeat this practice across most of Europe would be sufficiently costly that the major oil companies will not countenance it, even in Germany where the highest bioethanol tax concessions have been on offer.

A third critical factor in Sweden's success is that the entire national petrol industry has agreed to blend bioethanol. This is crucial because most oil companies share distribution systems to keep down costs. Thus, should a single company opt out nothing can be blended. Otherwise, the resulting mixing of petrols with and without bioethanol would potentially put all the petrol out of specification. None of the other 24 Member States are able to replicate these three key ingredients of Sweden's success. As a result, the potential of bioethanol has remained untapped.

[1] Directive 2003/30/EC of the European Parliament and of the Council, of 8 May 2003 on the promotion of the use of biofuels or other renewable fuels for transport. OJ L 123/42.

[2] Kenneth Werling, 2006. Successful introduction of bioethanol in Sweden. Presentation at World Biofuels Conference, May, 2006.

[3] Directive 2003/17/EC of the European Parliament and of the Council, of 3 March 2003 amending Directive 98/70/EC relating to the quality of petrol and diesel fuels. OJ L 76/10, transposed into the volatility specifications in the European Petrol Standard EN 228.

Drivers of Bioethanol as an Alternative Fuel

Public and media awareness:

In the modern era bioethanol was first made familiar to Sweden by buses running on bioethanol that were introduced in the early 1980s. The first flexfuel cars (American imports) and E85[4] fuel pumps were also introduced more than a decade ago. Today more than 90 per cent of the media is focusing on E85 and flexfuel cars, although it amounts to less than 10 per cent of bioethanol sales. Public awareness has driven political support, and is almost certainly the main reason for oil industry acquiescence of over 5 per cent bioethanol blends in petrol.

Political support:

Has mainly come from road fuel duty concessions adopted over long time frames. This has been vital to the start-up of Sweden's first commercial bioethanol plant, but has also encouraged the grassroots growth of E85 and flexfuel cars, first in captive fleets and later in service stations. (E85 has roughly 30 per cent less energy content than petrol and consequently needs to be sold at a discount. The duty concession provides this discount). Sweden has for many years offered other policy support measures for flexfuels, and include reduced company car taxation and free parking in 16 cities. Last year 50 per cent of all purchased national authority vehicles had to be environmentally friendly. The target for this year is 75 per cent.

Auto constructors:

The pioneer was Scania that has been building bioethanol buses since the 80s. However, the breakthrough came in 2001 when Ford manufactured a flexfuel car in Europe for the first time and it went on sale in Sweden. Today, there are three constructors providing the complete model range of flexfuels cars in Europe, and the new car market is now 10 per cent + flexfuel in Sweden. Ford forecast that within two years 25 per cent of new vehicles in Sweden will be capable of running on E85.

Although the development path has been different, there are clear parallels between these drivers of Sweden's success and those of the two mega bioethanol producers, Brazil and the USA.

Production of Biofuel

Which countries have the lowest biofuel production costs and why?

Biofuel production is capital intensive.

The critical factor controlling costs are industrial scale and stage of development. Both Brazil and the USA stand out as low cost-producers because they have both protected and subsidised their biofuel industries since the 1970s. This has resulted in mature industries ten times greater in size than than that of Europe's biofuel sector, that have been able to lower costs of feedstocks, production and logistics through sheer economies of scale and the passage of time.

An infant European industry has no magic bullet to redress its tiny, fractured scale. However, Europe has the prospect of being the lowest-cost producer in the world, because of technological advancements underway in the processing of cheap lignocellulose feedstock into bioethanol.

The only way to achieve that prospect is to build an industry in Europe, in collaboration with other countries that are interested in the lignocellulose route.

Happily, besides improving our future competitiveness lignocellulose bioethanol delivers on Europe's other principal biofuels objectives. It enhances energy security by diversifying our energy sources and by reducing our dependence on external sources. And it promotes environmental sustainability because it has a positive greenhouse gas balance compared to traditional raw materials and can be made from wastes and from low input silviculture and agriculture.

Hence, those European States that have grasped the imperative of biofuels have realised that the political art of achieving sustainable growth in European biofuel consumption is to build a capital intensive infant industry side by side with mature foreign competitors, whilst allowing imports and market competition to keep down costs and to encourage innovation.

[4] E85 is a fuel made of 85 per cent bioethanol and 15 per cent petrol.

Economic Instruments

What financial instruments or incentives have proven to be most effective in meeting national targets for biofuel market share?

Trade in Biofuel

Which Member States import the greatest volume of biofuel and why? What impact have imports of cheap biofuel had on domestic production in the European Union?

For bioethanol fuel, the European import tariff is both a fundamental economic instrument and key to explaining the impact of imports. Therefore we have addressed these two sets of questions together.

Questions about the efficacy of policy instruments be they economic or regulatory in nature, revolve around how to ensure that the massive biofuel industries in the Americas do not prevent sustainable growth simply with the threat of swamping the proto-market in Europe, and thereby discouraging domestic investment.

Road Fuel Excise Duty Concessions

Until now, road fuel duty concessions have been the principle instrument deployed to meet national targets. They serve a dual purpose. First, they can make biofuels sufficiently competitive that the refineries, fuel blenders and distribution companies find them to be profitable to blend into petrol and diesel in low blends. Secondly, they can encourage new plant investments.

The relative success of this instrument with respect to both drivers depends on:

- the size of the concession;
- the longevity of the concession; and
- its linkage with other policy instruments.

The key question for policy makers has been how to differentiate the impacts of the policy measure between biofuels made in Europe or from duty free countries compared with those from Brazil or the USA. Theoretically, the size of the duty concessions should be subject to the principle of over-compensation, ie, cheaper fuels should receive less state aid. In practice, this has proved too complicated to implement.

Consequently, duty concessions have been most successful in promoting investment when directly linked to one of two other policy measures:

- national production quotas (in France and shortly in Belgium).
- product quality, ie, undenatured ethanol as defined in the European tariff codes (as applied in Austria, Germany and Sweden).

Linking the concession to national production quotas provides the mostly helpful model of state aid to domestic producers. Linking the concession to undenatured ethanol is far less targeted but does provide a more or less robust barrier to competition from the two mature bioethanol producers in Brazil and the USA, as explained below.

European Import Tariffs

The majority of the world is granted duty free access to Europe's biofuels market. The two mega-sized biofuel producers, Brazil and the United States, are obliged to pay tariffs. The European bioethanol industry believes that this is the correct framework for encouraging domestic growth and imports from the least developed countries where biofuel development would do most to rid poverty. Despite this sound framework one of the principal barriers to investment in the production of biofuels in Europe remains the fear of cheap imports from Brazil or the USA via tariff loopholes, or via trade negotiations that lower import tariffs. This problem is exacerbated by the absence of official statistics on biofuel imports.

Sweden provides a perfect example of the problem. Last November, the government closed an import tax loophole that threatened aspiring domestic bioethanol production. By mixing ethanol imports with 20 per cent petrol to reclassify their products as "other chemical goods" non-EU producers were importing their products with low EU import tariffs, whilst at the same time enjoying the Swedish tax exemption on bioethanol fuel.

Effective from January of this year, importers from countries that are obliged to pay the standard EU import duty (notably Brazil and the USA) will have to pay the higher code for undenatured ethanol in order to get access to the duty concession.[5] Consequently, Sweden's premier bioethanol producer, Agroetanol, has announced a fourfold expansion in production capacity due in 2008.

Capital Investment Grants

Biofuel production is capital intensive. Since the adoption of the Biofuels Directive the biggest growth in biofuel production in Europe both for biodiesel and bioethanol has been in Germany, mainly because of the relatively high capital investment grants that it has offered including, for one specific plant national aid worth Euro 43 million. It is rumoured in the trade press that the Czech Republic may soon focus its biofuel state aid on capital grants and avoid duty concessions altogether.

Energy Crop Premium

Raw materials are the major operational cost of biofuel production. As part of the reform of the Common Agricultural Policy, since 2003 the European Union has offered European farmers a 45 Euro per hectare payment when the crop is destined for the biofuels market (up to a limited land allocation of 1.5 million hectares). Abengoa Bioenergy is working with farmers to exploit this new opportunity both with traditional feedstocks and to develop new energy crops such as Jerusalem Artichokes. Even with the high yields of UK wheat Abengoa Bioenergy is now satisfactorily extending this scheme to British farmers. We believe that the European energy crop premium has the potential to soon become one of the foundation stones of the Common Agricultural Policy.

Obligation "Buy Out" Fee

National biofuel obligations are a very recent phenomena and hence their impact on target compliance has been limited. However, if the target is the primary policy consideration, it is clear from discussions in pioneering countries, such as France, that the critical element to their success is to ensure that the incentive to fuel producers to meet their obligation is sufficiently stronger than the cost of opting out.

Biofuel Obligations

To what extent has the imposition of biofuel obligations by Member States reduced the biofuel industry's need for fiscal support?

National obligations are now usurping duty concessions as the principle instrument to deliver the 2010 biofuels target. In principle, an obligation can provide a fuel producer/blender with the same level of incentive to use biofuels as fiscal support. Technically, this incentive could also apply equally in terms of encouraging domestic production. However, they are not mirror policies because one is a carrot and the other a stick. Consequently, the oil industry sees higher cost domestic biofuel differently under these two policy regimes.

We noted in page 4 that as a tool to encourage investment in domestic bioethanol production, duty concessions have worked best when linked to national production quotas, as demonstrated by France. The French Government has linked duty concessions mainly but by no means entirely to licenced domestic production. It offers the duty concession to the fuel suppliers whilst at the same time sanctioning them if they fail to meet their obligation. The elegance of this policy is that it provides both stick and carrot to the market, whilst encouraging both domestic investment and imports at one and the same time.

Road fuel duty concessions have been an attractive tool for policy-makers to encourage innovation and demonstration of new biofuel production processes and alternative fuels. An obligation is not really appropriate for this objective. It is meant more to promote mature technologies, although it is flexible enough to be used also to encourage newly developed commercial technologies over mature ones.

Obligations are certainly not an appropriate tool for promoting either pure biofuels or high-level blends. Biofuels have a lower energy content than fossil fuels. With low blends of biofuels in petrol and diesel this difference is considered to be imperceptible to the driving public (though visible to fleet managers). However, the driving public does notice how much more quickly the fuel tank drains with pure biofuels and high-level

[5] World Ethanol and Biofuels Report, vol 4 no 9/10.01.2006.

blends. Road fuel duty concessions permit price discounting to offset this negative effect. An obligation alone discourages sales of these alternative fuels because the fuel distributor has no economic means or reason to discount prices in line with energy content.

Looking Ahead

Should the European Union take further action to promote biofuel production; and, if so, what action is required?

Abengoa Bioenergy believes that further action now needs to be taken to deliver the 2010 target, and to promote biofuel technology innovation and its diffusion for the decade to come.

Meeting the 2010 Target of the Biofuels Directive

Obligations for petrol and diesel: without new policy measures the level of action at Member State in implementing the Biofuels Directive is forecast to become ever more imbalanced, resulting in the failure of the Directive to meet its 2010 target, with negative knock-on effects on renewable energy policy and the threat of failure to comply with the Union's Kyoto target. The 2010 target is achievable but will require perhaps 10 billion Euros or more of investment over the next four years. This level of activity will only come about if there are European-wide separate obligations for petrol and for diesel (along the lines already promulgated by The Netherlands, Austria, France and Germany), thereby guaranteeing an equal burden sharing amongst motorists, and broad participation of farmers and all market players, whilst limiting friction from potentially affected industries such as the food oil processing sector.

A single European tariff code and tariff: the present Common Customs System makes it possible to import bioethanol for fuel whilst avoiding ethanol import duties. This is discouraging investment in Europe, which in turn discourages imports. (It also reduces the potential for collecting duties). The simple solution is for all bioethanol for fuel entering the Community, in whatever blend, to come under a single tariff code and tariff (applied solely to the minority of countries that are subject to the tariff).

Amendments to the petrol specification in the Fuel Quality Directive.[6] The 2010 target must be met above all with biofuel blends in conventional fuels—petrol and diesel. The Fuel Quality Directive includes the following limits in the petrol specification:

- Volatility ("RVP") limit in the summertime (with no variation for bioethanol blends);
- Ethanol content (5 per cent volume);
- ETBE content (15 per cent volume);
- oxygen content (2.7 per cent mass).

In page 2 we noted that for 24 Member States it is not generally possible to blend bioethanol given the way petrol is currently formulated, because it will not meet the summer volatility specification for summer petrol in the Fuel Quality Directive.

The USA is the biggest bioethanol fuel consumer in the world and its market is growing exponentially. However, back in the early nineties, demand for bioethanol in the US was severely constrained because of exactly the same problem. Consequently, the US Environmental Protection Agency decided to adopt two national RVP limits: maintaining the existing limit for petrol without bioethanol, and introducing another higher limit for 10 per cent blended bioethanol. This so-called "RVP waiver" or dispensation solved the RVP problem and has been retained ever since. We recommend that the EU adopt the US approach with an RVP waiver strictly for bioethanol blends.

The limits for ethanol, ETBE and oxygen were first introduced in European legislation in 1985 for the express reason of promoting bioethanol.[7] With the adoption of the Biofuels Directive they are now a hindrance rather than a help. We therefore recommend that the limits on ethanol content, ETBE content and oxygen content either be removed altogether from the petrol specification of the Fuel Quality Directive or be relaxed to the degree possible.

[6] Directive 2003/17/EC of the European Parliament and of the Council, of 3 March 2003 amending Directive 98/70/EC relating to the quality of petrol and diesel fuels. OJ L 76/10.

[7] Council Directive 85/536/EEC of 5 December 1985 on crude-oil savings through the substitute fuel components in petrol. OJ L 334.

POLICIES NOW FOR THE DECADE TO COME

Given our addiction to oil, it is crucial that policy-makers signal to the market a long term commitment towards rehabilitation. The EU should therefore set ambitious but realistic minimum consumption targets of 10 per cent renewable transport fuel energy by 2015 and 15 per cent by 2020, with enhanced year-on-year targets.

It is also of critical importance that the EU set itself the goal of producing lignocellulosic (so-called "second generation") bioethanol at lower cost than from traditional raw materials. We recommend three policies to encourage this goal.

First, with an obligation lignocellulosic bioethanol should receive a sales credit with respect to sales of biofuels from traditional raw materials. (We recommend a credit of 2.5:1 as adopted by the US Administration).

Second, we recommend an EU sales target of 1 billion litres of lignocellulosic bioethanol in the year 2012.

Third, the sales target and the credit should be accredited by a certificate that demonstrates the source of the biofuel.

June 2006

Examination of Witnesses

Witnesses: MR KARL CARTER, Agricultural Director, MR CHRIS CARTER, Director of Corporate Affairs, British Sugar, and MR THOMAS GAMESON, Project Manager, Bioenergy Business Unit, Abengoa, examined.

Q282 ***Chairman:*** You will have heard our previous witnesses and will know where we are coming from. We are looking at the targets for biofuels and why they are not being met in the UK and why continental countries are doing better. We are on the Web and there will be a transcript of everything you have said so that if you wish to correct anything you may do so. Is there anything that any of you would like to say by way of introduction before we start on our questions?
Mr Karl Carter: Many of you may know British Sugar, but it is a wholly-owned subsidiary of Associated British Foods, which is the largest purchaser of primary agricultural products in the UK. We are presently building the first bioethanol plant in the UK at our sugar factory in Norfolk.

Q283 ***Chairman:*** Can we start on the question of the impact of crude oil prices, which you have heard us have a go at just now. It was very difficult to get our witnesses to give a figure; those this morning were very unwilling to give a figure at all. Let us look at the UK first. At what level of crude oil prices do you think bioethanol production is likely in the UK from sugar beet?
Mr Karl Carter: I will give you the response on what price we think bioethanol could be competitive with oil, and then answer on sugar beet, if you do not mind. Our view is that at around $90 a barrel we would expect bioethanol production to be comparative. In terms of sugar beet, particularly here in the UK we do not see it as the primary crop that would be used for bioethanol production. We see that excess sugars, as we are using in our plant, will be available to us and will be a low-cost option; but the actual contracting of further sugar beet for bioethanol we see as being more expensive in the UK than using feed wheat. We see bioethanol in the UK being produced from feed wheat—a cereal of some sort, but we believe feed wheat to be probably the best.

Q284 ***Lord Haskins:*** What sort of price to—
Mr Karl Carter: The feed wheat price?

Q285 ***Lord Haskins:*** Yes, to measure the $70–90 a barrel?
Mr Karl Carter: We are looking ahead at feed wheat pricing as picking up from third parties in the seventies in terms of pounds per tonne. If you do the economics on that, then you start to see the $90 a barrel being the break-even.
Lord Haskins: You could argue you are a long way away both ways. Lord Brown says the price of oil will be $45 and some farmers around here say the price should be £85.
Lord Plumb: At least!

Q286 ***Chairman:*** There are a lot of very good farmers here! We went to visit Green Spirit the other day in Somerset, and they are planning their factory base with Wessex Grain on feed wheat, and negotiation is going on at the moment as to what the price should be.
Mr Karl Carter: Yes.
Chairman: It would be best if we asked questions of British Sugar first and then switched to Mr Gameson. Do come in if you feel like it.

Q287 ***Lord Lewis of Newnham:*** You talk about the effectiveness of obtaining ethanol from sugar beet, but which countries are likely to be the cheapest producers of the ethanol from sugar beet within the European Union?

Mr Karl Carter: You need a high yield of sugar, and the highest yield of sugar in the EU is France. The production level is around 12 tonnes of sugar per hectare for French production. That compares with the UK's ten; and the French position is that wheat yields are not as good as the UK Basically, you get a swap from where we are here in the UK. Here, we have good wheat and quite good sugar beet but in France you get a switching of that, and it does make the economics for sugar beet available to them. They also have significant processing capacity of sugar beet in France that they can use as well.

Q288 ***Chairman:*** In general terms, sugar cane is a more productive source of bioethanol than sugar beet, is it not?
Mr Karl Carter: It all depends if you are looking at land and how much sugar you are producing per hectare of land. At the top end of sugar beet, it is very comparable to sugar cane, and then it is very dependent on the production costs of either sugar beet or sugar cane. Certainly sugar beet, at its high levels, can be comparative to the yields of sugar cane.
Mr Chris Carter: If I can add to that, in the UK, as Karl said, a typical three-year average yield of sugar per hectare from beet in the UK is 10 tonnes per hectare, and in France it is 12. France is the highest yielder in the whole of the EU. That compares with an average for Brazil of 8 to 9, and an average for Australia of about 10. It is very comparable with the UK, in terms of yield of sugar per area. The cost of production of course is different.

Q289 ***Lord Lewis of Newnham:*** You then have a manpower cost.
Mr Chris Carter: That is exactly right. In countries like Brazil, the manpower cost is extremely low, and other standard costs are relatively low compared to labour and other standard costs here in the UK being relatively high.

Q290 ***Lord Palmer:*** I was fascinated to hear you say you have changed your mind from our previous conversations, that you think wheat might be the most productive use of bioethanol in the future. Therefore, my next two questions are rather irrelevant in a way. In what other EU countries does British Sugar use or plan to use bioethanol, and why is investment proposed there rather than in this country?
Mr Karl Carter: The other area we have expertise in is in Poland, where we also have sugar factories, so we are interested in Poland. Poland is presently looking at going forward on bioethanol. We also think there is a potential in Poland to export bioethanol into Germany, which clearly has given tax incentives to encourage biofuels. Poland is an area we are certainly looking at. Again, there is a comparison there between cereals and sugar beet. The issue with sugar is that if you have sufficient processing capacity, it may work. If you have not got sufficient processing capacity on sugar, then wheat is an easier raw material to handle, and because it is available all the year round it is much easier to store; and we think that the operating costs of producing bioethanol from wheat will generally be lower than those of sugar.

Q291 ***Lord Palmer:*** At the moment, how easily can the new plant in Norfolk be converted from sugar processing to wheat processing for bioethanol?
Mr Karl Carter: We are operating a liquid plant. The main part of that plant could easily be converted. We have not bothered at this point in time putting a front end on cereals, so we are not using starches, we are using pure sugars. That is because we have got an amount of sugar that is in excess to the sugar we can sell in the UK market, and we need to deal with that. It is a marginal production. We could quite easily add a front-end starches part to that plant, if necessary.

Q292 ***Lord Palmer:*** Presumably you are taking sugar from people who have very long contracts with you for years and years and years, and they presumably could not suddenly switch to wheat, could they?
Mr Karl Carter: In the UK there are round about 3 million tonnes of excess wheat, exported every year. That is sufficient to produce in the region of 1 million tonnes of bioethanol. Our position within British Sugar is that we are interested in bioethanol. We have gone to the first plant with marginal amounts of sugar that are available to us, and we see any further expansion by British Sugar as being in wheat.
Mr Chris Carter: If I can clarify, there may be a misunderstanding. The reason that our existing plant is sugar-based is because it is a marginal, relatively small plant backed on to Europe's most efficient sugar-producing unit at our factory at Wissington. What Karl was saying earlier in response to the first question is that any large stand-alone plants in the UK would very likely be grain-based rather than sugar-based, where they are stand-alone single units, not marginal units backed on to very large existing sugar factories.

Q293 ***Lord Palmer:*** Thank you for the clarification. Do you see any other factors that would encourage British Sugar to greatly expand its bioethanol capacity within the United Kingdom?
Mr Karl Carter: We would like to see the market move forward. The present market for bioethanol in the UK is limited to about 150,000 tonnes through independent blenders, and that is the area we have already contracted with for the plant at Wissington. Unless the market expands from that, then there will

not be any bioethanol production over and above our unit, we believe, in the UK. This means engagement with the oil companies, and some certainty that there will be a bioethanol market going forward for investors to invest in that new market. That means knowing what levels of bioethanol would be included, and knowing what the longer-term volumes will be—so seeing commitment from government about the volumes that they are going to put in in the RTFO; and what support they will give within the RTFO is an important factor in us making a decision on further investment.

Q294 ***Lord Palmer:*** Presumably, quite a lot depends on the price of raw material. Twenty years ago wheat was £120 a tonne, as Lord Plumb will remember only too well: but today it is half that rate, twenty years on. This obviously must be a major factor on any reinvestment you are going to have in increasing capacity.
Mr Karl Carter: Very much so. That is a good point that you have made there, because the price of wheat—in the same way as we talked earlier about the raw-material cost of biodiesel—is very significant in terms of production costs of bioethanol. We believe that farmers would be interested in long-term contracts based on knowledge of what the value of bioethanol is likely to be, and whether or not the market has opened up. We believe that contracts could go out at reasonable value, and we would get returns that would make us invest; but it has to be a market for the bioethanol. That is the most important factor.

Q295 ***Chairman:*** Before I call on Lord Haskins, a remark has been made to us that without the participation of both the car manufacturers and the major oil companies you have mentioned, you cannot really expect major growth in the biofuel industry. Are you finding that the attitude of either the car manufacturers or the major oil companies or both is changing, and being more supportive?
Mr Karl Carter: I would say very much so, particularly recently. The oil majors are looking at biofuels. BP has announced something today. There is starting to be some movement and some acceptance of biofuels by the oil majors. We need to make sure that that comes into producing this market. There is support by car manufacturers particularly for bioethanol, particularly from Ford, Saab and General Motors. We are very much encouraged by that support and by some of the work that has been done in trying to boost performance using ethanol cars. Saab has had a big breakthrough with more power and the same economy, using bioethanol in some of their cars. Although diesel has taken the lead in the fuel economy, we see that those manufacturers that still have petrol cars are looking at those again to see if the technology is also changing on those.

Q296 ***Lord Haskins:*** Is not the real problem of basic lift-off in the European context the low level of tax incentives in this country for biofuels generally? As long as that is the situation you are going to be very limited in your capacity to expand. Do you see any prospect of that situation changing? Are you gambling on the situation changing?
Mr Karl Carter: As a would-be producer, we would like to see those incentives stay and, if possible, be slightly larger than the 20 pence that is on the table at the moment. One of the most important factors is the RTFO and what happens with the 20 pence in the RTFO. Our concern would be that if the RTFO came in and the 20 pence was eroded, then that would again make it very difficult for this market to go ahead. If we felt at least that the RTFO came in place, and 20 pence stayed in place for a reasonable length of time, then we would think at least that the Government was serious about pushing the market forward. That, we believe, would start investment. It is also about knowing what volume will be fixed for 2010 and 2015, because the targets at the moment in terms of the RTFO are for volume without energy being put in place. Basically, although the Government is talking about 5 per cent, from an energy point of view it is only 3.5 per cent. This is quite a low amount in comparison to the 5.75 per cent in the Biofuel Directive, and that was energy-based. The RTFO is really only half of what the Biofuel Directive was trying to do. We need those signals. They will clearly move things along in terms of the amount, and to retain the position we are in at the moment to bring the RTFO, that will give us some reassurance going forward.
Mr Chris Carter: We need ambitious obligation levels, coupled with forward visibility for investment.

Q297 ***Lord Palmer:*** What would you have thought, looking ahead to 2012, that the RTFO ought to be?
Mr Karl Carter: I am sorry, I said 2012—in 2015 we would like to be 8 per cent on an energy basis, which would just take you over 10 per cent.

Q298 ***Chairman:*** The last question before switching to Mr Gameson: at what import price for bioethanol from sugar cane can British production from sugar beet compete?
Mr Karl Carter: If you are making from sugar beet in our particular way, because we are using sugars that would have been traded at world markets, we can be cost-comparative. At the moment we are taking contracts that would have been given to Brazilian ethanol because we have this competitive position. That would not be the case if we were having to contract for beet or whether we were actually making

it from wheat. We can be cost-comparative only on a marginal basis from sugar beet.
Mr Chris Carter: The import tariff would be required to protect the introduction of large stand-alone plants—again, the one Karl is mentioning is our marginal plant backed on to Wissington, which is very competitive indeed.
Chairman: Mr Gameson, welcome to you. I will ask Lord Plumb to start off. I am delighted to see that you have joint positions in the National Trust and many other areas.

Q299 ***Lord Plumb:*** The growth in agriculture in Spain is very impressive, and you are heading the field to some extent in the production of bioethanol. What has been the driving force behind the major wheat incentive to bioethanol, and creating an industry?
Mr Gameson: Wheat is obviously the principal raw material for many European countries, but the principal driver, bearing in mind that Spain started off on this business a decade ago when the price of oil was nearer to $25 per barrel—a lot cheaper than today—was a driver that was a vision. It was a vision that said we were addicted to oil and heading towards environmental economic social catastrophe through global warming or through supply failure, or a combination of the two. That vision accepted that sustainable mobility must incorporate to some degree or another physical transportation; and sustainable physical transportation must mean energy efficiency but also renewable energy. When it comes to renewable energy, the choice was for bioethanol perhaps for two reasons. First, bioethanol can be used in today's internal combustion engines. It is also a perfect feedstock for hydrogen, thus by building a bioethanol industry today you can make a bridge to the transportation technology needs of the future. The other thing that we have heard a little about this afternoon is that bioethanol can be made from virtually any kinds of organic matter; so it is a secure form of energy and a long-term relatively cheap form of energy. We are constrained commercially today with growing the kind of crops we can use; they are mostly competing with agricultural crops. My company is vigorously pursuing the development of lignocellulosic raw materials, and we are hoping that by doing that we can improve our position in the future with regard to the sustainability of the product. That is really what the vision was all about.

Q300 ***Lord Plumb:*** You are concentrating, for the reasons you have given, on bioethanol rather than biodiesel. Is there any development in the biodiesel market? We have heard of growth in Germany, and bioethanol also in France. Does it mean that that is the track you are following in the interests of what you call sustainability?
Mr Gameson: I am sorry, I did not quite understand that.

Q301 ***Lord Plumb:*** You are concentrating on bioethanol. You have no development process at the moment in biodiesel. Biodiesel, as we have already heard, is growing in Germany.
Mr Gameson: We are building a biodiesel plant in the south of Spain, but if you are referring to a development process I am not aware of any such development. That is the critical difference.

Q302 ***Chairman:*** What will your new biodiesel plant in southern Spain be using?
Mr Gameson: That is a very interesting question. I believe we are going to be importing palm oil, but I am not certain[1].

Q303 ***Lord Haskins:*** Is Spain not an importer of wheat now?
Mr Gameson: We are importing wheat from the United Kingdom to make bioethanol.

Q304 ***Lord Livsey of Talgarth:*** How could increasing world prices of cane bioethanol impact on Abengoa's development plans?
Mr Gameson: In cane? None whatsoever because, as I mentioned before, our primary driver is to develop lignocellulosic raw material. We are working with other companies and with governments in order to do that. The governments with the greatest interest and perhaps the largest amount of resources available to support that kind of work are the United States and various European states. Consequently the company is working in the United States and Europe. That means that our primary raw material today is cereals. As mentioned earlier, we are building a 5 million-litre per year demonstration plant in southern Spain for converting straw into ethanol.

Q305 ***Chairman:*** It cannot just be a demonstration plant of that size!
Mr Gameson: It is all a question of scale. Five million litres a year is a very, very small plant.

Q306 ***Chairman:*** Litres not tonnes, Mr Gameson.
Mr Gameson: To put that into context, Lord Renton, we are going to put that demonstration plant inside an existing cereals facility of 200 million litres per year, and we are going to integrate it within that existing facility. Our idea of development of this hybrid configuration of cellulose and starch is the way forward for my company.

[1] I have asked colleagues this question and am told that we are presently negotiating contracts with local farmers to purchase oilseed rape. If we are unable to obtain all our feedstock requirements locally we may also purchase soya oil or palm oil.

Q307 ***Lord Livsey of Talgarth:*** Can we sum up by saying that world prices for cane bioethanol because of more demand for it, is not going to impact upon you; you are going ahead with wheat anyway?
Mr Gameson: Exactly.

Q308 ***Lord Palmer:*** I think my question has been answered by Lord Livsey. It is one of the most fascinating things to come out of this afternoon's questioning. What, roughly, is the price of sugar cane as opposed to sugar beet at the moment?
Mr Karl Carter: Interestingly enough, the price of sugar is at a 25-year high—$470 a tonne. You need 2 tonnes of sugar to produce a tonne of ethanol. The bioethanol price in Brazil has increased because it has followed the sugar price.
Lord Haskins: I think there is a view coming through here. I can remember in the late seventies everybody jumping into renewable sources of solar energy and particularly America, because the oil price was where it was. Then the oil price collapsed and the whole momentum went out of it. This could happen again. If the price drops, then where are all you guys? The question I asked therefore is: what confidence is there? You are going to require state or EU intervention in this market to make it viable for the foreseeable future: do you think you can confidently get that and maintain it?

Q309 ***Lord Plumb:*** Can I answer that and give a general answer? What interest are farmers showing around Norfolk, for instance in contracting with you, to take their product?
Mr Karl Carter: We have not gone out with contracts on wheat yet because we are not ready to put a wheat plant up, so from that point of view we are not in the market place. It is interesting that Wessex—

Q310 ***Lord Plumb:*** I would like to know what interest there is.
Mr Karl Carter: There is lots of interest. The number of growers I speak to—and clearly I speak to them about sugar beet rather than wheat—every time I speak I get lots of questions about biofuel. They see this as a further market. I do not think any grower is seeing it as a huge increase in value, but they see it as a new market, which will create some value, especially when we are exporting the volumes we have got. There is particularly the question about long-term. We see that, long-term, this could be a good business, and we believe it will be a good business. Picking up on what you have just heard about liquid cellulosic, we think that you will get more bioethanol by using liquid cellulosic as well as the wheat—if you take what they are doing with straw and the wheat itself. If we start this industry off, and give it support in the early years, I believe that it will stand on its own two feet in years to come.

Lord Haskins: That is not what the oil people believe.

Q311 ***Lord Lewis of Newnham:*** The conversion of cellulose through to ethanol—where exactly do we stand on this? Is it a well-produced operation or is it still very much in the experimental stage?
Mr Gameson: I believe the first cellulose-to-ethanol plant was built some time over a hundred years ago. It has been used throughout the 20th century at odd times, so it is a technology that is proven. The problem is the cost.

Q312 ***Lord Lewis of Newnham:*** That is what I mean—it is the efficiency.
Mr Gameson: Also, it raises a whole set of new questions in terms of the kinds of new technology that are available to us today that were not available 50 years ago, particularly the development in enzyme technology. It is a difficult question to answer. On the one hand, it seems like it has been there for ever, but on the other hand the technological possibilities today are enormous. To put that into some kind of context, today, cellulose to ethanol is incredibly expensive, but we are aiming within the company to make cellulose competitive with traditional raw materials somewhere around 2012–15.

Q313 ***Lord Lewis of Newnham:*** How far is the European Union sponsoring research into the enzymatic conversion factors here? It does seem to me that this is the sort of thing that will not be unique to individual firms or countries; it has a tremendous implication, and cost-effectiveness would be tremendously important.
Mr Gameson: The European Union is part subsidising this new demonstration plant that we are building. For sure, they are interested in this area and the support that we expect to gain from them is increasing.

Q314 ***Chairman:*** Is Abengoa's straw project enzyme-based?
Mr Gameson: It is.

Q315 ***Chairman:*** It seems to me, knowing very little about it, that Abengoa has been surprisingly successful in this field generally. We have a note on European biofuel policies which says about your company in relation to development of bioethanol in Spain: "Due to the leading role played by a private company specialising in energy and environmental projects associated with oil companies, the high level of tax exemption, 100 per cent, granted by the public authorities is motivated by environmental considerations, and the regional policy of the autonomous regions motivated by the importance of the agricultural sector." Is that a fair summary and do you think that that is one of the reasons why

Abengoa seems to have been much more successful in many ways already in this business than any British companies?

Mr Gameson: If you take that vision, and transplant the vision I described into the industrial policy, you can see possibilities. Having spent a couple of years working for the British Government Economic Service over a decade ago, I queried at that moment in time whether there existed an industrial policy within the UK Government, and I am still not certain that I am aware of one today.

Q316 ***Chairman:*** An industrial policy in relation to biofuels?

Mr Gameson: In relation to biofuels. The other thing that you have to bear in mind is that each country has its own strengths and weaknesses. In Spain we had a particular advantage that you do not have here, in as much as that at the turn of the century the vast majority of Spanish refineries had MTBE plants inside them. If you ask any refinery with an MTBE plant what kind of biofuel you would like to use, they will say straight away "bioethanol because we can convert it." The cost of conversion is next to nothing and it is a very simple exercise, and it has no negative impact either on the refinery's day-to-day business or on downstream activities. Ethanol is probably simpler to handle than methanol and ETBE is a better quality fuel additive than MTBE. For the oil industry it was a win/win situation. It really was not that difficult. In the United Kingdom there are only a couple of MTBE plants and only one of them has shown any interest in going into biofuels, so we had a tremendous advantage in Spain than the UK. It is slightly a question of horses for courses.

Chairman: That is very interesting indeed. Thank you all very much. If there is anything you would like to say that you did not have an opportunity to say, do send it to us in writing.

WEDNESDAY 21 JUNE 2006

Present
Cameron of Dillington, L
Haskins, L
Lewis of Newnham, L
Livsey of Talgarth, L
Miller of Chilthorne Domer, B
Palmer, L
Plumb, L
Renton of Mount Harry, L (Chairman)
Sewel, L

Examination of Witness

Witness: Ms Regina Figl, Political Counsellor, Embassy of Austria, examined.

Q317 ***Chairman:*** It is very kind of you to find the time to come and talk to us today. This is our last day of taking oral evidence about our inquiry into the EU Directive's thoughts on biofuels. We much appreciate you finding the time to come. We are on our web site, so you will be on our web site, and we will send you a draft transcript ,so if you wish to make any corrections you have an opportunity to do so. Is there anything you would like to say to us by way of introductory statement before we start asking questions?
Ms Figl: Thank you very much indeed. My introductory statement will be very short but what I would like to say, first of all, is I am presenting here the position of our government and I am not at all an expert in the field of biofuels. I am a political counsellor at the Austrian Embassy in charge of quite a lot of different subjects, mainly EU policy, so this is just one small part of my tasks. I am presenting the position of the Austrian Government and I will do my best to answer all your questions. Please forgive me if I cannot be specific in one or other question but I can arrange for written replies later.

Q318 ***Chairman:*** That is quite understood. Thank you again for coming, and if we ask anything that is too technical do not hesitate to say so. You can arrange for us to have a written reply afterwards. Can I start by stating the obvious fact that we in Britain are rather jealous about the success of Austria in moving towards a good biofuel target. Use in 2005 was set at 2.5 per cent when we in Britain were much, much lower than that. What factors do you think have enabled Austria to set, and perhaps to achieve, targets that are above the EU targets?
Ms Figl: For Austria, environmental policy has always been very important even before the Biofuels Directive came into force. When I say environmental policy, I mean, first of all, we wanted to reduce unsustainable dependence on crude oil used for fuel production, and secondly we also wanted to reduce emissions caused by road transport in connection with reaching the goals of the Kyoto Protocol. Since about 27 per cent of all greenhouse gases in Austria are caused by the transport sector, road transport mainly, we thought it was absolutely necessary to focus our efforts on initiatives in the field of road transport, with the promotion of biofuels being one key issue. As from 2005, for instance, biofuels must make up at least 2.5 per cent of total petrol and diesel consumption—compared to currently only two per cent in the EU—by 2007 the target will be 4.3 per cent; and by 2008, it will be 5.75 per cent (EU Schedule: 2010). It will be difficult for all of us to reach this goal and it is not clear yet, as far as I have understood, how to reach that goal technically but we are working on that.

Q319 ***Chairman:*** Do you think in any way your emphasis in Austria on biofuels is perhaps partly shaped by your determination not to have nuclear power?
Ms Figl: It may have been a factor. I try to think what the answer could be. I think it was not such a decisive factor actually because Austria is very rich in water energy, hydro energy, so we would not be that dependent on nuclear energy in any case.

Q320 ***Lord Haskins:*** Do you think that the EU directives have influenced Austria's biofuel production in any way, or would you have done it anyway?
Ms Figl: There has been a considerable influence certainly, even though the Directive has only come into force in 2004. And, as I have said, like Sweden we have always been pioneers in this field. There is a certain influence but the Directive has only come into force in 2004 so it is a short time. There has also been a significant rise in the production capacity for biofuels, so I would say the answer is yes.

Q321 ***Lord Plumb:*** Since your target is above the EU average, even though you say it may be difficult to achieve, what changes do you think you will be pressing for within the EU to bring others up to the same level?
Ms Figl: Now, according to EU fuel standards, the maximum limit for the volume of ethanol in petrol, as well as the volume for biodiesel in diesel, is 5 per cent. We would recommend an increase of those 5 per cent limits to 10 per cent for easy and quick achievement of the 5.75 per cent target and possible targets above.

In line with the two communications of the Commission, the Biomass Action Plan of December 2005 and the EU Strategy for Biofuels, we welcome the initiative to develop a system, I think we suggested, of certificates to ensure that only biofuels whose cultivation complied with minimum sustainability standards will count towards the envisaged targets.

Q322 ***Lord Plumb:*** Will it be an issue at the Summit? Will it be on the agenda as a matter of importance at the Summit of the Council of Ministers? Austria will be in charge.
Ms Figl: I am sure it will be discussed, yes.

Q323 ***Lord Cameron of Dillington:*** In Austria at the moment, what is the split in your production between bioethanol and biodiesel, or is that too technical?
Ms Figl: Thank you for sticking to the questions. That is very kind of you. We have an association of biofuel producers which was set up only two months ago, a specific association of biofuel producers. According to statistics or reports from this association, the production capacity in 2005 for biodiesel was about 91,000 tonnes. We did not produce any ethanol in 2005. As for the 2006 estimates of the association, their production capacity for biodiesel will rise to approximately 197,000 tonnes, for 2007 to 360,000 tonnes, and for 2008 they envisage 680,000 tonnes. This is quite a steep rise.

Q324 ***Lord Cameron of Dillington:*** Is this from oil seed rape? What is the source, do you know?
Ms Figl: Not only, but mainly oil seed rape. Rape seed oil is the main source of production, however, only a small proportion of rape is grown in Austria, a large part is imported material. There is no ethanol production at all so far but we will start with ethanol production in 2007, with a maximum capacity of 150,000 tonnes per year.

Q325 ***Lord Cameron of Dillington:*** I was going to ask you about your forestry. I have been to Austria and visited your lovely forests and seen how you use it to produce heat and energy in various ways. I was wondering whether there was any use for forestry in this process? Are you researching for the second generation?
Ms Figl: Yes, we are researching. Now it is not the big issue yet but we are researching, definitely, and we are very much interested in the second generation biofuels.

Q326 ***Baroness Miller of Chilthorne Domer:*** What proportion of biodiesel is sold as a blend with traditional oil-based fuel and what proportion is sold as 100 per cent biodiesel?
Ms Figl: First of all, the pure biodiesel sold plays only a very secondary role in Austria; it is a very small proportion. The large part is a blend for us. Due to financial incentives in Austria, mainly tax incentives—and I am talking about the Mineral Oil Tax here—nearly all diesel is sold as a blend with about 4.7 per cent volume content of biodiesel, but that was not your question.

Q327 ***Baroness Miller of Chilthorne Domer:*** I think you answered it when you said it was only a very small proportion.
Ms Figl: Yes, it was only a very small proportion.

Q328 ***Lord Sewel:*** What financial incentives for biodiesel, because you are not doing bioethanol, have been most successful in encouraging the Austrian level of production?
Ms Figl: It was mainly tax incentives, as I have said before. The Mineral Oil Tax Law of 2004 was amended by the Tax Amendment Law of 30 December 2004 with the following rates of tax laid down for fuels: for petrol, for instance, from 31 December 2004 to 1 October 2007, with a sulphur content not exceeding 10 milligrams per kilogram, the tax incentive is 417 EUR per 1,000 litres produced; with a sulphur content in excess of 10 milligrams per kilogram it is 432 EUR per 1,000 litres; after 30 September 2007 containing a minimum of 44 litres of biogenic substances and with a sulphur content not exceeding 10 milligrams per kilogram, the tax incentive will be 412 EUR per 1,000 litres, otherwise 445 EUR per 1,000 litres. For diesel, in the period 31 December 2004 to 1 October 2005, the tax incentive with a sulphur content not exceeding 10 milligrams per kilogram will be 302 EUR per 1,000 litres; with a sulphur content in excess of 10 milligrams per kilogram it will be 317 EUR per 1,000 litres; after 30 September 2005, containing a minimum of 44 litres of biogenic substances with a sulphur content not exceeding 10 milligrams per kilogram, the tax incentive will be 297 EUR per 1,000 litres and otherwise 325 EUR per 1,000 litres. Pure biofuels are completely exempt from Mineral Oil Tax.
Lord Lewis of Newnham: Would it be possible for you to give us those figures? It is very difficult to actually put these down. No disrespect at all, I think I understood what you are saying, but it would be a help.

Q329 ***Lord Sewel:*** Is there a general recognition that gives an incentive regime that is effective?
Ms Figl: Yes, the tax incentive regime is very, very effective and that is the main reason why it runs so well.

Q330 ***Lord Lewis of Newnham:*** I take it that this tax regime is a relatively recent one. What role have imports played in the past? I realise you are not producing bioethanol but have you been importing bioethanol, and what is the expected future for such biofuel importation?
Ms Figl: As you have just said, we are not yet producing any bioethanol. The first production plant for bioethanol will begin to operate only in 2007. Our production capacity for rape is limited due to climatic reasons and we, therefore, have to import plant oil, especially rape oil, for production of biodiesel. According to our estimates, there will be enough domestic production together with imported plant oil to process rape oil into biodiesel for the Austrian market in 2007.

Q331 ***Lord Palmer:*** Is it a tiny percentage of palm oil that you are currently importing?
Ms Figl: Yes, it is only a tiny percentage.

Q332 ***Lord Palmer:*** Would you able to discover that?
Ms Figl: Yes, I will come back to that.

Q333 ***Chairman:*** We have just a minute or two more of your time. Would you, as a political counsellor, like to tell us briefly whether in Austria this an issue that people care very much about? Are they worked up about climate change, carbon dioxide emissions, and do they feel a need to co-operate in this biofuel programme? Is it an important issue in Austria?
Ms Figl: I will try to answer this question as best I can. For instance, when I was still living in Austria I remember that 10 or 15 years ago I saw a documentary on TV on renewable energy resources, biofuels, so for quite a long time it has been an issue in Austria. It could be the fact that we do not produce nuclear energy we have tried, at a very early point, to diversify as much as possible, and this is one part of the diversification strategy.

Q334 ***Chairman:*** There is still a determination not to have nuclear energy?
Ms Figl: Not as far as I know. We have only one power plant and it is not in operation.

Q335 ***Lord Livsey of Talgarth:*** I do apologise for not being here at the start because I had to be in another meeting. There has been no mention of what we call biomass, matters like straw which is basic waste material. Do you produce any biofuels from that or do you have any plans to do so?
Ms Figl: From waste, yes, we do. You have mentioned research. We are very interested, and there is quite a lot of research going on. It is really a genuine interest we have had for quite a long time already. Domestic waste does play a certain role. About 15 per cent of biodiesel produced in Austria is made of domestic waste, for instance cooking oil and animal fat. We do not yet use forestry by-products as the Swedes, but it will be a topic for the future and we are already investing in research.

Q336 ***Chairman:*** Thank you very much for coming to talk to us today and for your willingness to stray into these difficult technical questions; we do appreciate it. If there is anything further you want to say in writing, please do so. Thank you very much.
Ms Figl: Thank you from my side, and thank you for your kindness. I am very happy to come back to you in written form if you have more questions. I took notes of the questions you asked me already.

Memorandum by the Sustainable Development Commission

The Sustainable Development Commission (SDC) welcomes the invitation from the House of Lords European Union Committee on Environment and Agriculture to submit evidence to the Inquiry on the EU Strategy for Biofuels and to appear before the Committee.

We include a copy of our submission and a separate SDC report (*not printed*) to the Department for Transport on Biofuels and the Renewable Transport Fuels Obligation. Our submission focuses on the challenges and safeguards that are required to make sure that an increased role for biofuels in the fuel mix for transport is compatible with sustainable development.

A primary reason for expanding the market for biofuels is to reduce greenhouse gas emissions from the transport sector. But greenhouse gas emission savings from biofuels are not automatic: they must be won through carefully designed measures to minimise the greenhouse gas emissions in crop management, subsequent processing and transport to the point of use. The savings must be properly validated and steps taken to ensure deforestation, direct or indirect, does not occur. The take up of lower carbon biofuels must be incentivised. This must be the primary filter through which current and future technologies are assessed.

Other key issues raised include:

— The need for an overall assessment of the role of biofuels in the portfolio of measures for energy and climate change security. Behaviour change, not just technologies and fuels, must be at the centre of these measures.

— Much greater consideration must be given to the potential environmental and social impacts associated with the production of biofuels.

1. The Sustainable Development Commission

1.1 The SDC is the UK government's independent advisory body on sustainable development issues. Biofuels are a key area for the European Commission. We therefore welcome the opportunity to contribute to this call for evidence.

2. Biofuels—Policy Context

2.1 In the UK and internationally there is an interest in increasing the production and use of biofuels for three main reasons:to reduce greenhouse gas emissions compared with conventional transport fuel; to improve energy security and to diversify rural employment opportunities.

2.2 The EU Biofuels Directive requires Member States to set targets for the substitution of petrol and diesel with biofuels. The Directive gives indicative targets of 2.00 per cent in 2005 and 5.75 per cent in 2010. The targets refer to energy content: biofuels contain less energy content than the same volume of conventional fuels so sales volumes may need to be higher.

2.3 The EU Biofuels Directive is expected to be reviewed by the European Commission by the end of 2006. Targets for the post 2010 period will be considered, as will the assessment and monitoring of the full environmental impact of biofuels.

2.4 A recent report from the European Environment Agency[1] suggests that the EU could meet and surpass these targets using environmentally compatible bioenergy from agricultural, forest and waste feedstocks from within the EU 25. Around 85 per cent of the potential total of environmentally compatible bioenergy in the EU is considered to lie in seven member states (Spain, France, Germany, Italy, UK, Lithuania and Poland).

2.5 The UK has a target of 5 per cent of fuel sales from renewable resources by 2010–11, to be achieved through a Renewables Transport Fuels Obligation (RTFO), and this was announced in November 2005. Budget 2006 set targets of 2.50 per cent for the 2008–09 period and 3.75 per cent for the 2009–10 period. These are significant increases from the 2005 target of 0.3 per cent. UK Budget 2006 also mentions that targets should rise above 5 per cent after 2010–11, provided technical, infrastructure and costs issues are acceptable.

2.6 A SDC report on Biofuels (enclosed) forms the basis of our response to the questions identified by the Committee. From our report it is clear that a number of safeguards are required to make sure that the use of biofuels are environmentally, socially and economically beneficial. These challenges are also touched upon in the EU Biofuels strategy and the environmental aspects are considered in some detail in the recent EEA report[17]. Our focus is, therefore, on the Committee's final question:

— Should the European Union take further action to promote biofuel production: and, if so, what action is required?

Many of the points we make here are relevant to the issues raised by the Committee's other questions.

3. Challenges

3.1 The challenges and safeguards that are required to make sure that an increased role for biofuels in the fuel mix for transport is compatible with sustainable development are considered below, covering:

— Overarching issues.

— Social and environmental concerns.

— Greenhouse gas emissions.

— Verification.

— Take up of lower carbon fuels.

[1] EEA (2006) How much bioenergy can Europe produce without harming the environment?

Overarching issues

3.2 A clearer understanding of the key drivers for increased use of biofuels is necessary:

- What reductions in greenhouse gasemissions are anticipated?
- What is the expected contribution to energy security?
- What contribution could they make to rural diversification?

Some of these questions are addressed in this paper—but an overall assessment of the role of biofuels in the portfolio of measures for energy security and climate security is required. This assessment should be on the basis of a whole life cycle analysis of biofuel and other bioenergy production. It should include competing end uses in electricity, heat and transport fuels because different conversions strongly affect the amount of greenhouse gases avoided and air pollution emissions.

3.3 Biofuels must be seen alongside alternative uses of biomass and land. A strategic view of the role that biomass and biofuels will play in meeting future energy needs is essential. This should contribute to a wider assessment of land uses, including the role of food and non-food crops and land for building. This assessment needs to take account of changing climate and the intensity and frequency of severe weather events such as floods and drought, and changing patterns of pest behaviour and disease. Depending on what crops are planted and the way that they are managed, biofuel crops could intensify these problems or could be a useful management tool to ameliorate them.

3.4 Behaviour change is the key to a low carbon, energy secure transport sector. Measures at the European level must focus primarily on traffic reduction, by reducing the need to travel and facilitating travel by more sustainable modes, particularly walking and cycling. The current focus on vehicle technologies and fuels is not sufficient to address the climate change challenge.

Social and Environmental concerns

3.5 In general limited consideration is being given to the social and (non-greenhouse gas) environmental issues associated with the production of biofuels. Where primary crops are used as the main feedstock for biofuels, domestic production must be considered alongside production world-wide including developing countries, because of the difficulties of discrimination in increasingly liberalised world markets. This generates a complex range of issues to factor into the promotion of biofuels in the EU and in the UK.

3.6 Safeguards are required to make sure that the social impacts of biofuels are positive. A study on the growing of oil palm[2], for example, found a number of side-effects, including:

- health—women reported significant increases in birth defects;
- poor treatment of workers—plantation wages are typically below the minimum wage; and
- social conflict—there are extensive issues over land rights, equity issues and the distribution of costs and benefits associated with land use and land use change.

3.7 There are many policy measures that could be used to stimulate the increased use of biofuels, including fiscal incentives, and, as in the UK, a Renewable Transport Fuel Obligation. In all cases it is currently difficult to include accreditation on social issues[3]. Until social standards have been developed by an acceptable international body such as ISO (International Organisation for Standardisation) acceptance by the World Trade Organisation is unlikely. ISO are planning standard guidelines for Social Responsibility (ISO 26000) which is expected in late 2008.

3.8 Safeguards are required to make sure that the introduction of biofuel crops has positive environmental impacts. These impacts relate to what crops are used, where they are planted and the way that they are managed, eg:

- domestic crops could have negative impacts on biodiversity. In the UK this includes biofuel crops grown on set-aside land and elsewhere in the EU could result in loss of biodiversity if previously extensively managed land is given over to more intensive management for biofuel crops. Positive impacts could accrue from the use of perennial crops and bioenergy could provide a commercial value for appropriate cropping of some permanent grasslands;

[2] Friends of the Earth (2003) Greasy Palms—the Social and Ecological Inputs of Large Scale Oil Palm Plantation Development in South East Asia.

[3] E4Tech, Edinburgh Centre for Carbon Management Ltd, Imperial Centre for Energy Policy and Technology (2005) Feasibility Study on Certification for a Renewable Transport Fuel Obligation.

— certain biofuel crops require high volumes of water which could divert resources and put increased stress on local ecosystems. These problems are serious in low rainfall areas. The impacts of climate change are likely to intensify water stress in current dry areas, and expand the areas prone to water stress. In dry areas fire risk is likely to be increasingly important and the use of crops with low fire spreading fire characteristics will be important; and

— increases in the demand for feedstock and fuels imported from abroad may result in deforestation and other habitat change, leading to biodiversity loss, water stress and changes in ecosystems. The addition of new cash crops in some countries may exacerbate water stress issues, particularly where the crops require significant volumes of water relative to local supply and where the economic incentive may override an adequate assessment of the environmental and social impacts associated with the change in land use. We expand on some of these issues below (paragraphs 3.13–3.16).

A comprehensive description of potential impacts and benefits is given in the EEA report for bioenergy crops throughout the EU. The report suggests that low impact bioenergy crops, using a mix of crops grown and managed to suit local environmental conditions could, for example, help to increase biodiversity, improve water quality and help to mitigate flood risk. Increasing use of agricultural, forest and other wastes could help to address waste policy objectives. But, equally, greater production of bioenergy could have the opposite effect by setting incentives for more intensive use of farmland and forests, conflicting with current agricultural and forestry policy objectives. Inappropriate incentives for biofuels could also counteract waste policy objectives.

Validity of greenhouse gas emission savings

3.9 Biofuels can lead to a substantial reduction in emissions of greenhouse gases. But these reductions are not automatic and must be won through carefully designed measures to minimise the greenhouse gas emissions in crop management, subsequent processing and transport to the point of use.

Nitrous oxide

3.10 The application of fertiliser adds nitrogen to the soil. Not all of this is used by the crop and the excess is transformed by soil microbes into nitrous oxide (N_2O). The emissions of nitrous oxide associated with nitrogen addition are strongly influenced by complex interactions between soil type, climate, plant growth and farming methods. A new database model[4] is available to calculate the impact of N_2O on field emissions for European soils. However, N_2O emissions from areas outside of Europe (with different soil, climate, plant growth and farming methods) are potentially contentious and further research is necessary. N_2O has a global warming potential of 310 times CO_2.

Soil methane oxidation

3.11 Atmospheric methane is broken down by bacterially enabled oxidation processes in the soil. The application of synthetic fertilisers impacts on the oxidation process and can lead to enhanced methane emissions. Methane has a global warming potential of 21 times CO_2.

Application of lime

3.12 Fertilisers acidify the soil, which requires the regular application of lime, the production of which produces carbon dioxide.

3.13 The above issues must be addressed and where possible quantified in order for the greenhouse gas emission savings associated with biofuels to be verified. Clarification is required on the whole-life emissions of greenhouse gases before further promotion beyond current EU targets for biofuels in the transport fuel mix.

[4] Developed by the soils and waste unit of the Institute of Environment and Sustainability of DG-Joint Resaerch Centre (Ispra). The database model is called Greenhouse Emissions from Agricultural Soils in Europe (GREASE).

Deforestation

3.14 If growing crops for biofuels results in deforestation, or land use changes from other high carbon density ecosystems such as grasslands, then the impact on greenhouse gas emissions could be substantial. Such changes could offset potential greenhouse gas emission savings for at least 50 years. Steps must be taken to minimise the risk of deforestation, and suggestions have been made that this could be tracked by using satellite imagery to determine where forests have been cleared to make way for biofuel crops.

3.15 However, it is often difficult to establish a direct relationship between deforestation and other land use changes and the growth of biofuel crops. After land is deforested it may be used for a number of different purposes eg coffee production before use for biofuel crops. Furthermore, land use change as a result of biofuel crops could be less direct.

3.16 Patterns of land use change in developing countries are complex. There are many well-documented cases[5] where cash crops have displaced domestic food crops onto marginal land (including deforested land) and away from prime agricultural land. In some cases these changes are associated with social breakdown and land degradation. The rapid expansion in global markets for biofuels as a new cash crop could exacerbate these trends. The associated land use changes, especially if such crops are water intensive, could threaten the delivery of Millennium Development Goals.

3.17 Measures to ensure that either direct or indirect deforestation does not occur should be an essential component of current and future biofuel targets.

Second generation biofuels

3.18 Second generation biofuels offer substantial carbon savings and can make use of products which are currently treated as waste, including waste vegetable oils, forest and farm residues and animal wastes. Making full use of this potential relies on:

- new processing technologies, which could become available in the short to medium term to extract the full energy value from these products;
- establishing markets;
- making sure that costs are competitive, based on whole-life costs, including social and environmental costs; and
- clarifying the relative energy use and carbon saving potential associated with different end uses of products (heat or biofuel—see also paragraphs 3.1–3.2).

3.19 Given the substantial differences in the greenhouse gas emission reductions offered by different biofuels, one option to secure maximum savings would be to design measures, such as the RTFO in the UK, with graduated incentives for lower carbon fuels from the outset. This would stimulate the development of second generation biofuels, which offer substantial carbon savings and make use of products which are currently non-productive. A volume-based RTFO, or similar measure, is unlikely to incentivise carbon savings.

4. Conclusions

4.1 Until the issues raised in this paper are addressed, we caution against further promotion of biofuels by the EU. In the absence of the safeguards and measures we outline here, there is a real risk that further promotion of biofuels could lead to an overall increase in greenhouse gas emissions compared to the use of fossil fuel equivalents.

4.2 Markets work best when participants have access to all the relevant data. To overcome the challenges outlined above, promotion of biofuels now and in the future should require that information is available to allow road transport fuel suppliers and the motoring public to make informed choices about the source of the biofuels that they use.

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[5] Eg in Kenya, Sudan, Thailand, Vietnam, Brazil, Central America, Indonesia, Malaysia.

Examination of Witnesses

Witnesses: Dr Clive Mitchell, Team Leader, Energy and Transport, Sustainable Development Commission and Ms Alison Pridmore, Policy Analyst, Transport, Sustainable Development Commission, examined.

Q337 ***Chairman:*** It is very nice to see you both, and thank you for finding the time to come and talk to us. This is the last day of our taking oral evidence for our report on the EU targets for biofuels. We are on the web, so it will be on our web site. We will send you a draft transcript so if there is anything you want to correct, any inaccuracy or whatever, you will have a chance to do so. Is there anything you would like to say to us before we start asking you questions?
Dr Mitchell: If I may, yes. I suppose the first thing we would like to say is that biofuels can make a substantial contribution to reducing greenhouse gas emissions and could deliver wider environmental benefits too, but there are four "buts" that follow that. The first "but" is that the greenhouse gas savings are not automatic; they must be won through carefully designed incentives and markets based on whole-life analysis of the costs of greenhouse gas emissions, and those emissions must be properly validated. This must be the primarily filter through which current and future technologies are assessed and promoted. The second "but" is that for primary crops we must make sure we have environmentally compatible crop mixes in the EU and in developing countries, and this includes biodiversity, water quality, water quantity, especially associated with water stress issues, and environmental ecosystem services associated with land use. The third "but" is addressing social impacts, especially in distribution issues in developing countries associated with land use and land use change. The fourth "but" is that the climate security and energy security benefits that can be won through promoting biofuels must work alongside other measures to reduce the emissions in transport, especially on the demand side.
Chairman: Thank you very much. You obviously do not believe in the old saying "but me no buts". You may, in part, have answered the question that Lord Haskins will ask.

Q338 ***Lord Haskins:*** You almost answered in such a way that these "buts" sound pretty overwhelming.
Dr Mitchell: I do not think they are necessarily. They are serious concerns, as it were, and there are ways of promoting biofuels which could be promoted to deliver all of those potential benefits.

Q339 ***Lord Haskins:*** Have you learnt any lessons between the different types of biofuels? The "buts" are different.
Dr Mitchell: The biggest potential for us lies in the use of waste feed stocks, because that obviously gets away from any of the potential environmental damage that could be caused by promoting certain crop mixes, but there are technological advances that are required to bring on those technologies. We have suggested, for example, in the UK that the Renewable Transport Fuel Obligation could have graduated incentives for carbon so you get better terms depending on how much carbon you are saving which could provide a incentive to bring on those technologies to deliver second generation feed stocks.

Q340 ***Lord Haskins:*** Have you attempted to define sustainable development in the context of biofuels?
Dr Mitchell: When we were looking at the more detailed submission that we sent through to you, Biofuels in the UK Context and the Renewable Transport Fuel Obligation, we looked at the issue through the five principles of sustainable development that we use as set out in the UK Strategy for Sustainable Development, so, yes, which is where all of our potential concerns emerged from.

Q341 ***Chairman:*** What does that mean, what you just said?
Dr Mitchell: The five principles are that the two goals of sustainable development are living with environmental limits and ensuring a healthy and just society. The three ways to those goals are by promoting a sustainable economy, using good governance and using sound science reasonably. When we were looking at biofuels through those filters, if you like, it enabled us to see where the key issues lay for us.

Q342 ***Chairman:*** Are you a scientist?
Dr Mitchell: By training a geologist.

Q343 ***Chairman:*** How long have you been with the Sustainable Development Commission?
Dr Mitchell: About eight months.

Q344 ***Chairman:*** Is it challenging?
Dr Mitchell: Interesting, challenging and stimulating.

Q345 ***Chairman:*** Is it worthwhile?
Dr Mitchell: Hugely.

Q346 ***Lord Palmer:*** Following on from that challenge, how do you go about trying to ensure that government departments do adopt a sustainability policy in regard to biofuels bearing in mind the four big "buts"?
Dr Mitchell: The report that we did, which we recently sent to the Department for Transport, sets out all of our key concerns and recommendations, and each case tries to find a way through all of the issues that I identified at the outset. We have also

been working with the low Carbon Vehicle Partnership which has been designing proformas for validating greenhouse gas emissions associated with primary crops from the land use change: the crops that are planted, the way they are managed, fuel processing to final use, and so on. They have come up with about seven or eight proformas to cover the main biofuel crops that could be grown within the EU, so there are mechanisms already to address many of the concerns we have outlined.

Q347 ***Lord Palmer:*** How important do you think this research is that one might be able to have alternative crops or higher yielding existing crops?
Dr Mitchell: The research is very important provided it addresses all of the concerns that we have outlined, particularly the whole-life costings of the greenhouse gas emissions associated with the land use change and the way those crops could affect other environmental services, particularly if the farming methods are more intensive to produce those higher yields you suggest.

Q348 ***Lord Cameron of Dillington:*** We have not seen your submission to the Department of Transport. Could you paraphrase it?
Dr Mitchell: The paraphrase is actually the submission we sent to you. The submission to the Department for Transport outlined the current state of the markets, the different feed stocks that could be used, and the potential greenhouse gas savings to be derived from them, noting that most of those calculations do not take into account the emissions associated with land use and land use change and the management of the crops. That obviously is a concern for us and that needs to be taken into account because there can be quite substantial emissions associated with that. Then we went on to look at the environmental limits, discussing the greenhouse gas issues in more detail, including different feed stocks from different countries, sugar cane from Brazil, and so forth; then looking at some of the other environmental change issues associated with the growth of biofuel crops, potential to use waste feed stocks, technical problems associated with that and potential benefits; and then some of the evidence for social change associated with biofuel crops in different countries, in Malaysia palm oil plantations and social change associated with that; and the potential jobs in rural economies, mainly in the UK obviously because it was a DfT focused report, but a lot of the issues we flagged up were quite general.

Q349 ***Lord Lewis of Newnham:*** I am slightly concerned about the approach you are talking about. You give the impression that you are getting absolute answers from these particular techniques. If you look at life-cycle analysis, we have had people in front of us who have given us vastly different figures over vast ranges. How can you be as precise in your advice as you seem to be? It does seem to me a lot of this has as an element of subjectivity associated with it. That is where the real trouble comes in so much of this particular type of analysis.
Dr Mitchell: I think you are right, particularly with trying to validate the emissions from land use and land use change. That has been a hugely contentious area for the last 10 to 15 years with the United Nations Framework and the Kyoto Protocol, and so on. Over time there are some aspects of land use and land use change where we can be fairly sure of the greenhouse gas emissions, and there are models that have been developed that are more regionally specific that do quite a good job for Europe, but there are issues about taking that model and applying it to other countries which have different soils, different farming methods, et cetera, where the results may not be applicable. We need to have regionally specific analysis for each of the places that biofuel crops are grown in any significant way. I take your point entirely.

Q350 ***Baroness Miller of Chilthorne Domer:*** To follow on from that, obviously you can geographically make those differences between water and soil availability and so on. If you took a country like Brazil that has hopes of exporting vast quantities of all sorts of feed stocks, as we heard, particularly sugar cane, are you going to be taking into account social issues like poverty levels there, and, if so, is that within the SDC's ability and remit?
Dr Mitchell: A lot of the issues we deal with in SDC are global, like climate change and the social and environmental impact of trade in goods and services across the world. Our advice is primarily to the UK Government. I think in this context of biofuels, particularly where we are at a point where we could be vastly expanding the market for developing countries for a new cash crop, then it is important that if markets are going to work, and work effectively, then customers and consumers generally are able to make informed choices about where their fuel is coming from and the social and environmental impacts of that. That is the sort of context in which we would present that advice. We could not be blind to the issues that could arise in developing countries as a result of promoting biofuels in the UK or Europe.

Q351 ***Baroness Miller of Chilthorne Domer:*** To follow that up, you are putting the emphasis on the customers making the informed choices?
Dr Mitchell: No. That is an important part of the promotion of biofuels, but initially the design of the markets and the incentives for promoting biofuels have to try to address those issues at source so they

do not arise in the first place, leaving the consumer with a complex array of stimulus for their choices at the end of the day.

Q352 ***Lord Sewel:*** The Sustainable Development Commission has the advantage—I suppose you must call it an advantage—of working with a very wide range of government departments, not only down here in Whitehall but in Scotland and Wales as well. On that basis, and on your experience, does the Government have a sound biofuels policy and are there any glaring gaps or weaknesses?
Dr Mitchell: In the UK in our discussions with the DfT it appears that they are aware of all of the issues that we are bringing to their attention and they are working hard to try to find ways to make sure that they are designed into the Renewable Transport Fuel Obligation from the outset. My understanding is that those discussions are carrying across north of the border as well as England; they are looking at Scotland as well. It seems to be moving in the right direction.

Q353 ***Lord Sewel:*** Do you think biofuels is integrated across Government?
Dr Mitchell: It could be better in terms of relationships between DfT and Defra and DTI promoting these.

Q354 ***Lord Sewel:*** One of the critical things is why are we going down the biofuels route. If you have it very clear in your mind what the priorities are in terms of policy delivery, are we going down it in order to reduce CO_2 emissions are we going down it to reduce dependency on fossil fuels? Are we going down it to enhance energy security? What would be the order of priority that you would put, and do you see that reflected in government policy?
Dr Mitchell: We would put reducing carbon emissions probably at the top of that list. The extent to which biofuels can play their role in delivering wider climate and energy security objectives really depends on the extent to which biofuels are seen as part of wider measures within the transport sector to encourage modal shift and reduce the amount of traffic on roads, so on the demand side. The DfT have been relatively weak on that aspect I would say.

Q355 ***Lord Lewis of Newnham:*** Could I ask, as a supplementary to that, if you are putting CO_2 as your primary aim in the use of the biofuels, where do you place biofuels relative to other renewable sources?
Dr Mitchell: Everyone looking at the potential carbon savings from biomass generally would agree that the greatest carbon savings come from their use in static applications for electricity and heat production, for example. Where they come into play in transport is because of perceived expense of other measures, and biofuels look relatively good value in the transport sector itself. As I say, they have to work alongside a raft the other measures. We simply do not have enough land to grow all of the food we need as well as non-food crops. It really has to be seen within that broader mix of measures, and assessed amongst those measures, to make sure it is actually delivering on all of those objectives. I am not convinced at this stage that that analysis has been done.

Q356 ***Chairman:*** We must move on in a moment to the question of EU, we are an EU Scrutiny Committee, but, Dr Mitchell, according to the note I have the Sustainable Development Commission is funded by seven different government departments, including the Welsh Assembly but not by the Department of Transport. You told us you have only been there eight months. Lord Sewel asked you about it, and it is a bit unfair but one has to ask it. Do you really think that there is joined-up thought in your Commission between all these different government departments? Do you get a feeling your Commission is knitting together all the different areas in which government is involved?
Dr Mitchell: That is the joy of working in sustainable development, if you like.

Q357 ***Chairman:*** You used the word "joy".
Dr Mitchell: With some irony perhaps. That is the stimulus and the stimulation of working in sustainable development. We are looking to see how government policy is joined across all of its departments and across the devolved administrations, as Lord Sewel said. We obviously have to make sure that our own advice is joined up in that way as well, and we have various internal mechanisms to make sure that our individual work is informed by the work that everyone else is doing in the Commission and vice versa. Obviously our credibility hangs on the extent to which we are able to provide that, so there is comprehensive advice across government departments UK-wide.

Q358 ***Chairman:*** Lord Sewel and Lord Palmer have both caught my eye, but before calling on them can I ask, and this is not intended to be an unkind question, if crude oil prices rose to a figure which made biofuels directly and sustainably competitive with fossil fuels, would the Commission's work then be irrelevant?
Dr Mitchell: No, I do not think it would because we do not have enough land to grow all of the biofuel crops we would need to supply transport, so at some point you would be looking at intensification.

Q359 ***Chairman:*** Yet transport is not one of your funding departments.

Dr Mitchell: I see what you are driving at. Our core funding comes from Defra, and we have a number of other smaller pots of money that come in from different departments that are usually dedicated to funding a particular post or a particular work stream, including funds from the devolved administrations. Our role is to take all of that government money and make sure that we are providing advice across the whole of government. Our relationships and the advice we give to the DfT are as important as the relationships and advice that we give to all of the other government departments even if there is not a direct funding stream from them to us.

Q360 ***Lord Sewel:*** Is the Sustainable Development Commission in a position to answer the question where would you spend your marginal pound in order to get the greatest return in reducing CO_2 emissions?
Dr Mitchell: Are we in that position? Often we rely on government departments to provide that analysis and we would scrutinise it and assess the extent to which we think that assessment has been carried out properly, factoring in all the relevant costs and benefits. The simple answer now is I cannot offer you anything, off the top of my head.

Q361 ***Lord Sewel:*** I was thinking broadly. Where should we spend the marginal pound to get the greatest return in reducing CO_2 emissions? It seems to be a fundamental question.
Dr Mitchell: It is a fundamental question and that is what the Stern Review is looking at, and we are looking at that. We will not have a definitive answer to that question until the Stern Review emerges.

Q362 ***Lord Palmer:*** You mentioned twice there is not enough land in the United Kingdom and yet we have half a million hectares set aside. Does that not therefore mean you ought to be strongly advising Defra, the Scottish Executive, and indeed the Welsh Assembly, that there ought no longer to be any set aside?
Dr Mitchell: A recent report from the European Environment Agency was looking at the extent to which the EU could produce biomass in an environmentally compatible way across all 25 Member States. They came up with the conclusion that about 85 per cent of the potential lies in seven countries, one of which is the UK as you say. Our concern about using set aside in the way you describe is that much of that land has acquired, largely because it has been set aside, a large amount of biodiversity value and it would be a shame to unpick those policies as a result of stimulating new markets in biofuels. I think we prefer to see an assessment carried out and the extent to which existing agricultural land can meet our biofuel objectives in an environmentally compatible way without necessarily eating into the set aside land which has acquired that biodiversity value.
Chairman: We have to move on to imports and the EU directives, but Baroness Miller wants to ask something.

Q363 ***Baroness Miller of Chilthorne Domer:*** I did want to talk about the amount of land needed for biofuel feed stocks. You talked about life-cycle analysis. In your reply just then you were worrying about biodiversity loss and so on. I am interested to know how the countries from which we might be importing feed stocks will develop the capacity even to do the analysis or have the will to actually protect biodiversity as opposed to develop their economics. I know you will probably tell me that with good governance you can do both but sometimes there may be hard choices to make. Who is going to develop the capacity for them to even do their life-cycle analysis of what they are producing and of what they may lose?
Dr Mitchell: I accept that point entirely, and it was one of the points we made in the paper to the DfT that often in developing countries the temptation to maximise income from exploiting new markets for biofuel crops could outweigh the social and environmental objectives that those countries might have. One of the ways we suggested to address that in the UK and the Renewal Transport Fuel Obligation was that the verification process would be on the suppliers to demonstrate where their biofuels are coming from and the associated greenhouse gas emissions with that. It could be built into the incentive within the UK for the suppliers to put those mechanisms in place to make sure that the greenhouse gas emissions from biofuel crops in developing countries are validated through that process without placing the burden on the developing country.

Q364 ***Baroness Miller of Chilthorne Domer:*** Have you talked with any of the people who have experience in accreditation like the FSC to know if that is possible?
Dr Mitchell: We had some discussions with the Low Carbon Vehicle Partnership, who have been doing a lot of this work on behalf of the Department of the Transport, and they indicated it could be possible to do it that way.

Q365 ***Lord Plumb:*** I wonder whether Dr Mitchell would expand in a paper to us on land use, because I could argue with him for a long time on this whole question. I was brought up as a young farmer on the four-course crop rotation and that meant more about sustainability, although we did not need use the word in those days, than anything else. We had the balance

there, an environmental friendly balance, that we were accustomed to. There is stacks of land out there to produce a lot more than we produce at the moment from existing crops, from development, from set aside, and so on. I could argue the case but I would love to see a paper expanding some of the points you have made which would be of interest us to.
Dr Mitchell: Of course.

Q366 ***Lord Cameron of Dillington:*** Like you, I think that biofuels has great potential in the renewable energy debate, but like you I also share some of your "buts". You may have answered this question but how do you think we can ensure the sustainability credentials of imported biofuels or imported biofuel feed stocks? We had someone from Sweden here a couple of weeks ago and they import a huge amount of their biofuels from Brazil. Is this is a sustainable method?
Dr Mitchell: We need to find ways of making sure those verification processes are in place and applicable to the countries and fields or regions where those biofuel crops are coming from. The work that has been done by the Low Carbon Vehicle Partnership, the models that have been developed for assessing those emissions from land use change at the European level, could be applied for developing countries, but I accept the point earlier that has been a very contentious area.

Q367 ***Lord Cameron of Dillington:*** Sweden has a drive to make biofuels in its fuel mix which it has to import, and the biggest and cheapest producer is Brazil. How does it impose its qualifications?
Dr Mitchell: Until we can be reasonably sure that some of those scientific uncertainties that were mentioned earlier are addressed, we should probably err on the side of caution and only use feed stocks that we know are delivering the objectives that biofuels are put in place to deliver.

Q368 ***Lord Cameron of Dillington:*** Coming back to the home country, we have an embryonic industry. We do not produce any bioethanol as yet in this country and we have to balance the question of promoting and encouraging this industry to get somewhere. Do we come in heavily with your "buts" at an early stage and perhaps kill the industry, or do we let it develop and then clean it up afterwards?
Dr Mitchell: From our point of view, having "buts" in at the outset sets a clear direction for where the industry should be going in the future. The difficulty of building the "buts" in later, so to speak, is that it becomes very difficult to change the course of a tanker that has already set off on its merry way. We would advise that those "buts" are built in at the outset to set a clear direction for the future development of the industry.

Q369 ***Lord Cameron of Dillington:*** How would you do that? Would you use the RTFO with conditions?
Dr Mitchell: Yes, that is why we advise putting graduated incentives for carbon savings, and as long as they are properly validated you could stimulate the market to pursue waste streams over and above primary crops.
Lord Cameron of Dillington: Creating a whole new industry in validation.

Q370 ***Lord Lewis of Newnham:*** Could I ask you the direct question? How would you like to see the current EU Biofuels Directive modified to satisfy some of these needs?
Dr Mitchell: I would like to see it assessed alongside the other measures coming out at the EU level on managing emissions from transport downwards to be clear about what role biofuels can play in that process alongside demand-side measures. I would like to see guidance issued on what would be environmentally compatible crop mixes in different parts of the EU at least as a starting point. There is plenty of land within the EU for biofuels, but people will need guidance on what would be environmentally compatible mixes of crops in different parts of the EU. They would be the two main planks of my answer to your question.

Q371 ***Lord Lewis of Newnham:*** What about the actual CO_2 saving? Do you want to see it a mandatory requirement?
Dr Mitchell: Ideally, yes. If a principal objective of biofuels is to save greenhouse gas emissions, then we have to be sure that they are actually delivering those benefits.

Q372 ***Lord Lewis of Newnham:*** It is a very difficult figure to assess with any reliability. Do you agree with that?
Dr Mitchell: I think I would. At this stage we could probably use generic default values that might err on the pessimistic side and the validation that would follow through after that could be using specific data from the process chain from farm to tank, if you like. It would be possible to set up the policy incentives so that the terms under the obligation would be better for using the actual specific data than the generic default values. That might be one way of covering some of those uncertainties that you have outlined.

Q373 ***Lord Lewis of Newnham:*** Forgive me for putting it this way but I get the impression that what you are saying is that you see a future in biofuels but you do not see the future at present and that really what we require is a more effective method of generating biofuel technologies in time from cellulose and things of this particular sort. The present situation, as far as this country is concerned, you see

in a rather limited way. Would that be a fair statement?
Mr Mitchell: Yes, there are significant uncertainties and potentially adverse outcomes.
Ms Pridmore: The Low Carbon Vehicle Partnership used a consultancy to do some work which basically informed us why there is a very wide range of carbon emission savings. Work has been done in an attempt to study the UK. It might be useful for me to email that through to you as it covers why there are such large discrepancies in the carbon emissions figures.

Q374 ***Lord Haskins:*** Are you talking about the UK having a mandatory system, the national governments, or EU-based? Is there any role for Europe in all this?
Mr Mitchell: I think there is. If there is going to be a European market, then, yes, I think there is probably a role for Europe in validating and regulating the market, in effect.

Q375 ***Chairman:*** Thank you both very much. If there is anything that you feel you have not had a chance to say and you would like to have said, do put it in writing for us.
Mr Mitchell: Yes. We will drop you a note about the land use chain issues, probably on the parameters that need to be assessed. I am not sure we have all the answers, but we know the issues that need to be factored into that assertion.

Q376 ***Chairman:*** Lord Cameron reminds me that we would like, if we could, to see your submission to the Department for Transport. We would be interested in seeing that.
Mr Mitchell: That was sent with the cover letter to your inquiry. Our advice to DfT was attached. It should all be together in the package that we sent through.

Memorandum by National Farmers' Union of Scotland (NFUS)

Summary

1. Thank you for the opportunity to submit evidence for consideration by the Committee. In summary, the views of NFUS are that:

- development of a domestic biofuels industry is important to meet environmental aims;
- supplying demand for biofuels through domestic crop production offers opportunities to improve fuel security and the economics of the EU arable sector;
- biofuels obligations and economic instruments are both vital to the increased use of biofuels;
- Member States that have provided more generous support have seen a quicker uptake of biofuel use and more rapid development of their biofuels industry;
- care should be taken in consideration of changes in trade rules to avoid an EU biofuels market largely supplied by imports;
- importation into the EU of biofuels produced through environmentally unfriendly methods should not be permitted;
- regulation (negative economic instruments) should not be allowed to put EU production at a competitive disadvantage;
- EU vehicle and fuel specifications should be used to encourage uptake of biofuels, especially of blends higher than 5 per cent; and
- the requirement to set-aside land should be removed to increase availability of land for biofuel crops.

General

2. NFUS strongly supports the development of the biofuels industry for the benefits that it will bring to the environment and the public at large. Participation by farmers in the supply chain for sustainable road fuels should provide long term security to the arable sector and help to demonstrate that farming is good for the environment.

Biofuel Targets

3. In many Member States the setting of targets is new, while others have not yet set targets. The lag of statistical reports makes it is too soon to accurately assess success against them across Europe.

4. There is a very significant variation in the ambitiousness of the targets that have been set; the levels of biofuel use achieved are more important. The UK Government set a target of 0.3 per cent for 2005. In the first 5 months of 2005 UK sales of biodiesel and bioethanol were around 0.05 per cent of annual consumption, so extrapolated annual sales could have reached 0.13 per cent. Sweden's target was 3 per cent for 2005; it achieved 2.3 per cent in 2004. In Germany sales reached 1.8 per cent in 2004, just short of its 2 per cent target but increases are expected that could allow it to meet the EU target for 2010 of 5.75 per cent as early as this year. In 2005 France and Spain are estimated to have achieved sales of 1.2 per cent and 1.1 per cent respectively against their targets of 2 per cent.

5. How these sales levels have been achieved is a complex question. Economic instruments are needed to encourage indigenous production but we regard compulsory inclusion targets as being of key importance to the further development of the UK biofuels industry.

Economic Instruments

6. As above, it is too soon to reach conclusions as to which economic instruments have been the most effective in reaching new targets. Combined with obligations, negative economic instruments could be sufficient to force fuel companies to meet targets but such a simplistic approach would neither encourage the market to exceed targets nor would indigenous biofuel production be encouraged.

7. Ignoring targets, conclusions can be made on what has caused the marked differences in the development of the biofuels industry in different Member States. We believe that the effective use of positive economic instruments has allowed countries such as Germany and Spain to gain a lead in biofuels production while delay in their use in the UK has held back development.

8. German economic instruments have included full exemption for pure biodiesel since 1999 and full tax exemption for biofuels blended with mineral fuels since the beginning of 2004. This includes exemption for pure plant oil and Ethyl Tertiary Butyl Ether (further processed bioethanol) which are both treated as fossil fuels under UK tax rules. In addition generous national aid to projects, eg €43 million towards a €182.5 million bioethanol plant have been given. As a result Germany has become the largest EU producer of biodiesel.

9. The tax regime in Spain has helped it to become Europe's largest bioethanol producer. From 1994 bioethanol projects were given tax exemptions. At the end of 2002 this was extended to all biofuels plants, to last until 2012. From that time biofuels were also zero-rated for tax. The provision of tax exemption for Ethyl Tertiary Butyl Ether (ETBE) was important as it was the petrol additive preferred by the Spanish fuel industry. This combination of measures has encouraged indigenous production, with barley as a raw material. This is in contrast to the UK situation. Here, the lack of tax exemption for ETBE, relatively low excise duty exemptions for biofuels, and limited availability to other economic support has meant that bioethanol requirements have been filled by imports, mostly from Brazil. Despite surplus production and relatively low grain prices UK production of bioethanol/ETBE from barley is not considered to be viable.

10. In Sweden zero-rating of biofuel from environmental taxes has stimulated demand but this is mostly filled by imports. Bioethanol has made up 90 per cent of biofuel sales and 80 per cent of it has been imported, mostly from South America.

11. A common factor in the rapid increase in biofuel sales, even pre-dating targets, has been the effective application of economic instruments. Even where obligations are imposed, the marginal profitability of biofuel production will make availability of such instruments necessary to encourage targets to be met and exceeded. Stability in the use of economic instruments is also important, to give confidence to investors in production facilitates.

Biofuel Obligations

12. NFUS has welcomed the imposition of biofuel obligations by the UK Government. We believe that this effectively puts a floor in the level of biofuel use and has already helped stimulate growth in production facilities. In contrast, voluntary targets are of limited value as the bulk of the fuel market is dominated by price. World oil price volatility and uncertainty over fiscal support are disincentives to investment, particularly if low cost imports are available.

13. We do not however believe that it logically follows that the biofuels industry's need for fiscal support is reduced by obligations. If the correct economic conditions are not provided in the UK then we may not have a healthy biofuels industry. If the most cost-effective way for fuel companies to meet their obligations is to simply import biofuels this will have implications for our balance of trade. It will also reduce the benefits that would otherwise be felt by UK rural communities and will encourage environmentally unfriendly production elsewhere such as palm oil.

14. We believe that the provision of fiscal support in the UK is important as an impetus to fuel companies to go beyond the compulsory targets and to source biofuels locally. In turn this will stimulate investment in processing facilities and the use of home-grown raw materials.

Production of Biofuel

15. The world bioethanol market is dominated by non-EU countries, such as Brazil, Pakistan and the USA. The "EU Strategy for Biofuels" explains the background to development in those countries. In Brazil bioethanol costs are very low due to cheap raw material and labour, economies of scale and subsidies. Like Brazil, development of the US bioethanol sector began 30 years ago and has been encouraged by means of a range of fiscal measures at Federal and State level.

16. A March 2004 report by the European alcohol producers organisation (UEPA), estimated Brazilian bioethanol production costs at around $0.2 US (£0.11) per litre, significantly below the US production cost of $0.3 US (£0.16) per litre. In contrast, the Home-Grown Cereals Authority has estimated the UK refinery cost for bioethanol at £0.35–0.40 per litre. Other studies in 2004 by the International Energy Agency (IEA) and the Biomass Technology Group have indicated a similar range of production costs in Europe, from £0.26-0.36 per litre. The IEA study of German Bioethanol plants also showed that a 200 million litre plant could produce bioethanol for 3.8p per litre less than a 50 million litre plant—so scale of production is important.

17. Europe as a whole is disadvantaged by not being able to grow sugar cane or palm oil, the cheapest raw materials for ethanol and biodiesel. The viability of biofuel production in regions of the EU varies not just because of differing fiscal regimes but also because of local cost of raw materials and agronomics. Scotland is not well suited to maize production, has no sugar beet production and the demand for wheat outstrips production. Resulting wheat prices are too high for competitive first generation bioethanol production from wheat. The potential of Scotland as a bioethanol provider could change if production from barley could be made competitive (see paragraph 9 above), especially given its well developed distilling industry. Subsequent generation processes permitting woody material to be used for ethanol production could also favour regions such as Scotland, with high proportions of woodland. Scotland is much better placed for competitive biodiesel production due to its high average yields of oil per hectare. Currently it lacks the processing facilities to capitalise on this agronomic advantage.

Trade in Biofuel

18. The trade in biofuels is changing rapidly as a result of increased demand and the opening of new production facilities. Making the situation more complex is the use in Member States of raw materials grown elsewhere to produce biofuels. Examples of this are UK grain exported to Spain for bioethanol production and the importation by Germany and Sweden of oilseed rape to produce biodiesel. Latvia is also building biodiesel capacity to utilise imported oilseed rape.

19. As highlighted above, Sweden is a significant importer of bioethanol. The UK also meets much of its bioethanol demand through imports. In both cases the economic instruments that have been put in place have not been designed to differentiate between home-produced and imported raw materials. Italy and the Netherlands (which has no bioethanol production facilities) are also major EU importers of bioethanol.

20. Total EU production of bioethanol was just over 490 thousand tonnes in 2004, utilising less than one per cent of the cereals and sugar beet crops. Ethanol imports to the EU were over 150 thousand tonnes in the first five months of 2005, up 68 per cent from the previous year. Road fuel demand in the EU is predicted to reach 320–330 million tonnes per year by 2010 with the ratio of petrol to diesel continuing to fall from its current 40:60 market share. This implies a demand of around 7 million tonnes of bioethanol/ETBE per year to meet the 5.75 per cent inclusion target but some have estimated an even higher demand of 8–10 million tonnes per year. So while significant expansion of processing capacity is needed, raw materials requirements could largely be met through use of grain surpluses and the greater utilisation of set-aside land. Reduced dependence on

imports could however be put at risk if import duties on alcohol, under discussion with the Mercosur countries including Brazil, are lowered, disadvantaging EU production.

21. For biodiesel there is likely to be a continuing need for imports into the EU of vegetable oil or oilseed crops for processing. EU biodiesel production capacity will have doubled from 2004 to mid-2006 to over 4 million tonnes per year but following the same calculation as in the paragraph above, the 2010 demand for biodiesel would be more than 12 million tonnes per year. This would require over 30 million tonnes of oilseed rape. Combined with the food use of oilseeds (mainly soybeans), expected to rise to around 38 million tonnes by 2012, this makes a total annual requirement of 68 million tonnes. Against this EU oilseed production is only expected to rise marginally to around 20 million tonnes by 2012. Improvements in oilseed yields, including through genetic modification could offer some potential to reduce this deficit.

22. There are however regional differences in the capacity to increase production. In Sweden oilseed production went up by 40 per cent in 2005 in anticipation of increased demand. Scottish production of oilseed rape fell by a third following the Agenda 2000 reforms of the Common Agricultural Policy. Increased demand for oilseeds could reverse this decline, allowing production to increase by 50 per cent.

Technical Barriers

23. The technology of liquid biofuels is very well known with the first internal combustion engines in cars having been fuelled by ethanol or vegetable oil. The main problem with their use in recent times has been that motor manufacturers have been reluctant to make the modifications necessary to allow vehicles to run on biofuels due to cost and lack of demand. Most engine manufacturers have however been working to make their engines work on blends of mineral and biofuels. Some have made more progress than others and already allow higher inclusion rates. Progress has also been accelerated in some countries, such as Brazil where "petrol" vehicles run either on 20–25 per cent blends of ethanol or pure ethanol. There is a need for more "flexible fuel" vehicles in Europe to allow consumers to choose fuels with higher proportions of biofuels.

24. There is some experience in Germany and elsewhere on the use of pure plant oil as a diesel substitute. Avoiding some of the processing normally required to convert plant oil into biodiesel has cost and carbon saving advantages. There is however a need for EU standards for pure plant oil to encourage greater use of it.

Looking Ahead

25. EU action, permitting the use of economic instruments has been important, allowing those Member States that have made wide use of them gain early investment in production facilities and retail availability of biofuels. More recently, setting targets for biofuel inclusion has been key to providing the moral lead to Member States that have been lagging behind in the use of biofuels. It is vitally important that these two forms of encouragement should be built upon. It is also important that the burden of regulation, ie negative economic instruments, should be reduced to avoid disadvantaging domestic production for the domestic market.

26. To maximise benefits to the economies of the EU and to help reverse growing dependence on imported fuels, requirements for inclusion of biofuels in road fuels must not simply met from imported raw material or finished product. Capital grants for biofuels related investments are particularly important to help achieve this.

27. It is even more important that the environmental aims of using biofuels should not undermined. The "carbon footprint" of imported raw materials or biofuels should be considered, including the carbon used to transport them to Europe. The EU should not permit the importation of biofuels produced through environmentally unfriendly methods and environmentally sensitive areas should not be damaged to provide plant material for biofuels used in the EU.

28. The EU should ensure that vehicle and fuel specifications both act as an encouragement to the uptake of biofuels, especially of blends higher than 5 per cent. A separate specification is needed for pure plant oil.

29. Energy crops can be grown on set-aside land but they are not currently eligible for the EU energy crop payment of €45/ha. This is a disincentive to production. In addition up to half of the value of the payment is charged by merchants/processors to cover administrative costs, removing the incentive to grow these crops.

30. Extra administrative checks aimed at preventing circumvention of set-aside rules generally delay support payments to those who grow non-food crops. Prior to the introduction of the Single Farm Payment Scheme this was less critical as it only delayed payments relating to set-aside land. Since 2005 the delays affect the

complete payment, to which entitlement may mostly have been gained through livestock production. This unintended result of the reform is discouraging the planting of energy crops on set-aside.

31. To increase the availability of land for biofuel crops the EU should consider whether there is a need to maintain requirements to set-aside arable land. NFUS believes that set-aside is incompatible with de-coupling of agricultural support.

19 June 2006

Examination of Witnesses

Witnesses: Mr Martin Haworth, Head of Policy, National Farmers' Union of England and Wales, Mr Bob Howat, Vice President, National Farmers' Union of Scotland, Mr Kenneth Sharkey, President, Ulster Farmers' Union, and Mr Matthew Ware, Policy Analyst, National Farmers' Union of England and Wales, examined.

Q377 ***Chairman:*** Good afternoon. We are very grateful to you all for coming to talk to us today. This is the last day of us taking oral evidence in terms of our inquiry into the EU targets for biofuels. I would like to say that we are an EU scrutiny committee and therefore we will be gearing our questions to you and you will tell us what you think about how other EU countries are doing, how the UK can do better *vis-à-vis* France or Germany, for example, because really that is at the heart of what we are trying to find out. For example, do you think that the EU suggestion should be mandatory or not? Is there anything that you would like to say by way of introduction? Mr Haworth, do you want to introduce your colleagues? It is up to you. Then we will start questions.
Mr Haworth: Thank you, my Lord Chairman. I will be very brief as I know time is pressing. To introduce my colleagues, Matt Ware is our expert on this subject; Bob Howat is the Vice President of the NFU of Scotland; and Kenneth Sharkey is the President of the Ulster Farmers' Union. By way of introduction, may I say that this is a subject we take extremely seriously. We think that biofuels have a triple benefit: benefit in terms of the environment and being carbon-neutral; benefit in terms of fuel security and reducing our dependence on imported oil; and benefit to the farming community by providing an important new market. For those reasons, we do take this very seriously.

Q378 ***Chairman:*** I will pick you up on that. You do see it as a potential new market, an area that could provide new agricultural jobs?
Mr Haworth: Yes, indeed.

Q379 ***Chairman:*** What conditions do you think are necessary for a profitable domestic liquid biofuel industry in the UK? Are we getting there or not?
Mr Haworth: I think we are much further along that road than we were. Essentially, we feel we need long-term security because this is an industry that requires a lot of investment, and the investment takes place over a long period of time. Essentially, we would like to see the commitment to the reduced tax to be maintained over a longer period of time than the three years that it is given at the moment. Obviously ideally we would like to see a bigger tax rebate, but realistically we do not expect to see that. We would like a commitment that that would stay for a longer period of time. We would like to see the target on the renewable transport fuel obligation increased. We would like to see enhanced capital allowances for the development of some of the production facilities that are going to be necessary in this country if we are to develop a domestic industry. We would like to see an accreditation scheme. I think you are going to ask about that in further questions.

Q380 ***Chairman:*** People always want to see subsidies increased, do they not?
Mr Haworth: Yes, people always do want to see subsidies increased. The issue here is one of capital grants for setting up the production facilities in the first instance. As for the effect of subsidy in terms of a tax break, we would see ultimately that that could go. If the renewable transport fuel obligation is in place and working, ultimately it will not be necessary to grant a tax break. In the short-term, it is necessary to ensure the development of the industry. We certainly do not see this as an industry in the long term that would only survive on the basis of subsidy.
Mr Howat: The industry is crying out for stability and some long-term vision so that people can invest with confidence knowing that there will be a market and that government policy is not suddenly going to change down the line. That is overriding. There is huge potential. People are trying to embrace this but there are so many imponderables at the moment. If you make steps in the right direction, people would see a bit of stability and vision so that they can invest for the future.

Q381 ***Lord Lewis of Newnham:*** Can we take a slight variation on that particular point, which I accept? Why do you think that the UK performance to date has been so poor compared with other European

Member States, and I am thinking in particular of France and Germany? Do you think there is any association with the Government here?
Mr Howat: If you look at those countries, they have fiscal measures in place and capital grants. They have actively encouraged the industry to develop and grow. People have grasped that opportunity because they saw stability and the opportunity. We have had to compete with that and we have not had the same tools to do that.

Q382 ***Lord Lewis of Newnham:*** You would put it down partly to a fiscal relationship?
Mr Howat: They got off the blocks more quickly and we are catching up. We are concerned that if we do not catch up quickly enough, somebody else will have this market instead of us, and it would be a real shame if something we could do here is delivered by imports.
Mr Haworth: There is another point that was made by the EFRA Select Committee in the House of Commons a few years ago. The Government has not had a very coherent strategy for developing this. The responsibility has been spread across various government departments. There has not been a clear focus on developing it in the past.

Q383 ***Lord Lewis of Newnham:*** Who do you think should be the leader in taking this responsibility?
Mr Haworth: We do not particularly mind who is the leader, as long as there is a leader. There are many government departments involved at the moment.
Mr Howat: We have the same problem in Scotland that this is split over three departments and nobody really knows who is meant to lead. We have said to the First Minister that somebody needs to bang heads and tell them, "You are in charge. You lead it".

Q384 ***Chairman:*** When you talk to your European counterparts, getting back to our job as an EU committee, do you find that they are more confident and there is more joined-up thinking in France and Germany on this subject than here?
Mr Howat: Undoubtedly.
Mr Haworth: In those countries, there is a strategic commitment to increase the production and use of biofuels, and from that has flowed a better government focus on the issue. In this country, until recently, there has not been that focus.

Q385 ***Lord Haskins:*** What you are really saying is that this has been handled at national Member State level rather than the EU. Do you think there is any role for the much maligned CAP to address these issues more vigorously than it has done?
Mr Ware: There definitely is a role for the European Union biofuels strategy in the UK's own production. I would allude to last year when the European Commission actually started infringement proceedings against the UK Government because our levels of production were so low at 0.3 per cent against the 2 per cent target. That seemed to galvanise the UK Government into action, which resulted in the Renewable Transport Fuel Obligation last November. Brussels has a lead role to play in encouraging us and gaining good practice. The countries that have gained from the highest development have had a long-term strategy and commitment, but they have also been forced into it more through fuel security issues. We have to remember that the UK has been very fortunate in that we have been cushioned by the North Sea oil reserves until relatively recently. Those are in rapid decline and we really need to get our act together now. I do not think historically we should necessarily be so harsh on ourselves, but we really do need to get things sorted now.

Q386 ***Lord Livsey of Talgarth:*** Do you think that there are market distortions created by the fiscal measures in the rest of the EU over which you cannot complete?
Mr Haworth: I do not think so. Obviously some countries have made use of the 100 per cent fiscal rebate and we have not. We have stopped at 20 pence per litre. I do not think that that has caused a distortion between countries. Obviously it has been of help but we do not see that as the key to what has happened in the past or what will happen in the future.

Q387 ***Lord Livsey of Talgarth:*** It is really the strategy that is needed?
Mr Haworth: I think that is the more important issue.
Mr Ware: We have had the perverse situation of industrial cropping of energy crops in the UK, crops that have had certificate transfers to Spain and Germany where they have been used as industrial energy crops. That is a double whammy because our industrial crops are then sold as food crops in the UK, increasing the surplus of food in the UK, and they gain the added value of refining that product into an energy product and selling it on as a biofuel. There has been some trade distortion but that is not huge. It is something that we should be concerned about. Now that we have the government commitment for the Renewable Transport Fuel Obligation, that should be negated post-2008.

Q388 ***Lord Plumb:*** Farm cost structure is obviously variable right across the board in all European countries. At what price do you think fuel oil should

be? Where is the balance here? Where is the striking point to really spark off increased production of biofuels?
Mr Haworth: We do not have a precise figure; various different bodies have come forward with different figures. One thing that is clear is that the current price of $70 is well above the tipping point and it does make biofuels a valid competitor.

Q389 ***Chairman:*** It is of the order of $70 per tonne with present incentives?
Mr Haworth: I think it is probably below that. It is not so much the spot price that is important here; the prospect of that price being maintained is important.

Q390 ***Lord Plumb:*** Where would it be with no rebate? We have a 20 pence rebate at the moment.
Mr Haworth: The importance of the rebate is that it is there as a stimulus in the short term to the investment which is going to be needed to create this. In a steady state, once you had a viable industry up and running, you probably would not need the 20 pence per litre. At the moment, we do.
Mr Howat: It is fair to say that we all recognise that this is a commodity product. We are keen that farmers become involved downstream so that not only do they sell the rape but maybe they should actually sell the oil and have a stake in the crushers. That is where the extra value would be, once you have the oil to sell on to the petrol companies or the people who are going to make biodiesel oil. There are two stages. There is raising the basic price so that it makes some money for the farmer. We all accept that, as a commodity, there will not be huge added value. The real value is if industry can be involved and take some ownership further down the chain and get some of the real added value. We think that is where other measures could help the farming industry.

Q391 ***Lord Plumb:*** That is your view and your opinion. Is it COREPER's position?
Mr Ware: Basically the 20 pence duty support and the duty support across Europe all becomes more academic as we all go towards obligations. There is a lot of interest across Europe in obligations, including in Germany that has full fiscal support and a 100 per cent rebate. As the targets go up, it becomes increasingly apparent that the various Member States' treasuries cannot afford to subsidise at those levels if they are going for 10–15 per cent biofuels. They are looking at obligation under—and I use this term loosely—a polluter pays principle whereby the industry effectively is paying for the support through a high buy-out price. It is not a Treasury support. The Renewable Transport Fuel Obligation has finally been sold to the UK Government because the Treasury see a get-out clause. They can reduce their 20p to 18p to 15p and so on as the renewable obligation bites, but the critical thing is that the buy-out price has to be set high so that oil companies do not just say, "We are not going to bother producing biofuels; we will just buy out".

Q392 ***Lord Plumb:*** Is 15p enough?
Mr Ware: No. We are also concerned that in the latest developments under the state aid rules, the Department for Transport announced last week that they are putting in government time next session to amend the Energy Bill to remove the recycle fund from the Renewable Transport Fuel Obligation, which they say may be required under the European state aid rules. If they remove the recycle fund, that removes a further source of development money for the biofuel industry in the UK. We feel that there has been some pressure from oil companies to remove the recycle fund because they do not want their buy-out money to be given to their new competitors in the biofuel industry.

Q393 ***Chairman:*** Can I take up that point before we move on? What buy-out price does the NFU wish for?
Mr Ware: We have been asking for 30p. The Department for Transport and the Treasury have come up with a combination where they use the 20p duty rate, plus 10p buy-out to come up with 30p, whereas we would seek 30p in the first instance and then the duty rate to be scaled back as time goes on, so that the market has a consistency of policy: the duty rate is there; people understand 20p per litre; and we accept that that can be scaled back. They want to start off at 20p plus 10p on top. A 10p buy-out is very low, and there is a high risk of oil majors just buying out. Then, if the recycling mechanism is removed, there is even more incentive for them to buy out.

Q394 ***Lord Haskins:*** The nub of what you are saying is that, on the one hand, there has to be permanent intervention of some sort—regulatory intervention, tax incentives or whatever—to make this viable. The question I want answered is: is that going to remain as it is at the moment essentially a national issue or at some time does that have to become a European issue?
Mr Ware: The European Commission under the directive have given Member States quite a lot of leeway, and so we have seen various updates and the two per cent target last year. However, interestingly, and as demonstrated by the infringement proceedings to the UK, they are taking it more seriously now. You are taking evidence from the Minister this afternoon. The Department has said that they really are looking at implementing the

targets more. To that extent, it will be a European-set target and the Europeans driving it forward. On the first point you made, we do not see it as a subsidy all the way through because the 20p will be reduced over time. The obligation will mean that there is not a cost other than an administrative cost to Government. It will be the industry that is paying for itself through the obligation and the way the moneys flow and the buy-out price being redistributed.

Q395 ***Lord Haskins:*** It will be through regulation rather than tax?
Mr Ware: Yes.

Q396 ***Lord Lewis of Newnham:*** What do you believe is the driving force for the use of the biofuels? You have pointed out, quite correctly, that in certain parts of Europe the driving force was security. On the other hand, we have the CO_2 climate change problem. Where do you prioritise these various alternatives?
Mr Ware: It is interesting that biofuels instigators in Brazil were driven by the OPEC oil crisis in the 1970s. The Americans have almost a 3 per cent inclusion and they have been driven by fuel security, too. The rest of Europe is driven by fuel security, including places like Sweden where we thought it was an environmental reason, but it is pure security first and foremost. The rest of Europe tends to fuel security first and then rural economy second. In the UK we are peculiar in that it is environmental first and foremost, then security of supply and the rural economy is a little bit down the list. What we are trying to encourage is for Government to look at it little more holistically and say, "We have an amazing oil industry in the UK, which is in decline. We should be transferring those jobs and skills into biofuels from North Sea oil refining" and that could help the wider economy as well as the rural economy.

Q397 ***Lord Palmer:*** It is only fair to remind you, Mr Haworth, that I am one of your members. Ever since I have been involved in this subject, my biggest fear has always really been imports, whereas I originally became involved hoping one could help UK agriculture. What impact do you think imports of biofuels could have on UK production? Given the current market conditions, do you think imports of biofuels or feedstocks are in fact likely to increase?
Mr Howat: There is no doubt that in the short term they will increase because the demand is growing and that demand has to be met and we are not quite ready to meet that demand. What we would call for on imports is that we are treated like-for-like and that you put some real carbon footprint on those imports so that, to use this horrible expression, we are on a level playing field, that it brings them up to the standards that we have to compete with. We believe if that was there, then we could compete. There are huge challenges and it is about putting all these pieces together to give us a fighting chance. If we do not do that, then I think it will just be boats going into Grangemouth, to use the Scottish example, bringing in biofuels. That would be a huge tragedy for something that we could have done at home and all the jobs and everything that goes with that. Hopefully, that is what this debate is all about.

Q398 ***Lord Haskins:*** If we have a single market, if the Germans, for example, with their own action put more oil seed rape into biofuels, indirectly that must help you because it takes that off the market?
Mr Howat: It does. To expand a little further, there are other uses for this vegetable oil, perhaps more lucrative uses. The biofuels are here and now and what we are dealing with and that is where we are going to start. I think we will see the market develop. The real driver on the price will be these other markets that have more value in them. When they come on stream, they will push the price up and the biofuel industry will have to follow.

Q399 ***Chairman:*** Could I come back to something that you have said, Mr Ware, which is about the EU? Do you think that this is an area in which the EU should be trying to put out mandatory targets, targets that have to be in force and, if so, how would they be enforced?
Mr Ware: The current situation is preferable in that it is a directive and we have indicative targets, but they need to be coupled with quite stringent infringement proceedings. Some Member States would take issue with mandatory targets, but if we have a directive as it stands with indicative targets, as long as those are accompanied by quite stringent infringement proceedings that everyone takes seriously, then I think we would be happy with that. I think there would be an issue amongst some Member States having mandates from Brussels on this issue.

Q400 ***Chairman:*** The history of that, though, is not very good, is it? When countries, such as France, exceeded their 3 per cent deficit, they were able to tax them and they said, "We are just not going to pay the tax". Why would it be any different in this case?
Mr Ware: The National Farmers Union is always talking about gold-plating of EU legislation. For once, it has actually worked in our favour. Because the EU infringement proceedings were taken extremely seriously by the UK Government last July, that galvanised the Government into instigating the Renewable Transport Fuel Obligation in November. For once, the fact that our civil servants and Government do fulfil the letter of the EU law to the exact limit, it has actually worked in our favour. We

were finding that we were knocking on all sorts of different government department doors in Westminster trying to get direct flow through but, by going to Europe and circumnavigating them, we managed to get it through via the back door.
Chairman: That is a very interesting example.

Q401 ***Baroness Miller of Chilthorne Domer:*** Both in the UK and across other EU Member States, if there is a developing market for feedstocks, what is going to be the effect on competition for land between food and feedstock?
Mr Haworth: We feel very firmly on this point that there is an adequate amount of land to fulfil both markets, certainly in the short term and certainly at the level of obligation that we have at the moment. I know that there are some people who say that we cannot do it and that it will create an unbearable tension between the food market and fuel market, but those people are ignoring the fact that at the moment we have a big exportable surplus of cereals, 3 million tonnes, which we could easily switch to biofuel use. We also have a large amount of land which is set aside under current compulsory set-aside arrangements in the European Union. We feel that that obligation is unnecessary and that is another half million hectares of land, which clearly could be used. Looking forward, the development of productivity in the cereals and oil seed sectors is such that there is potential for producing far more from the same amount of land looking forward. We do not see any conceivable problem in the next 10 years. We have done some figures on this which we would be very happy to let you have.
Chairman: We would be very interested in seeing those.

Q402 ***Lord Sewel:*** There is a bit of a tension, is there not, in some ways in terms of objectives and drivers in that the Commission and the UK Government tend to look upon biofuels as answering the CO_2 issue, whereas what you have indicated is that for those Member States that have really pushed forward biofuels, the real driver has been energy security. That must make, I would have thought, for some possible tensions in terms of the policy mechanisms and the financial incentives that are put in place. I am really teasing you out. Have you thought what are the possible difficulties and differences that arise when you have quite different objectives behind the same policy?
Mr Haworth: We do not think there is a tension in the policy objectives. We think there is a big synergy here between the fuel security issue and the environmental issue. As Matt Ware has said, our Government is very keen on the environmental side of this. The important thing there is that that means that there has to be a proper scheme in place to ensure that fuel that is produced is genuinely environmentally beneficial, and it is not causing other kinds of environmental problems. I think that is very helpful to us in this country because it enables us, as Bob Howat has said, to be on a fairer footing *vis-à-vis* the competition. That is also of course true about fuel security. If you are worried about fuel security, partly that is a concern about oil coming from parts of the world that are politically unstable, but if we are importing bioethanol in large quantities from Brazil, that is not necessarily providing you with a great deal of security either. It may be more than currently.

Q403 ***Lord Sewel:*** If you are driven by fuel energy security, you might be well prepared to pay something of the national environmental price?
Mr Haworth: Yes, you might. Having the two drivers going hand-in-hand is actually helpful in this. I do not see a problem.

Q404 ***Lord Lewis of Newnham:*** Really we are talking about biofuels in this round but in fact we have bioethanol and biodiesel. There really are two different problems associated with them. Biodiesel is in some ways very much more straightforward to deal with than is bioethanol, where, after all, we are now progressing in new research technology, which is going to give us higher yields from different types of products. You were saying earlier that one of the primary interests you would see would be investment in these areas, but there must be a hesitation, certainly in the bioethanol area, for major investment if, round the corner, there are going to be very much more effective technologies or techniques in order to get the bioethanol from various sources. Where do you stand as far as the UK is concerned? Is your primary interest in the diesel or the ethanol side of the coin or both?
Mr Ware: We are very fortunate in the UK that we have a comparative advantage in the production of both main feedstocks and so we have a huge exportable surplus of cereals, but we also have very good growing conditions for oil seed rape. We can produce those and not have the skewering that they have in Germany where they have a huge amount of biodiesel but very little bioethanol. We would like to see things going very much down the bioethanol route in that we have a huge surplus in that, but we can go down the biodiesel route as well. Obviously, as diesel is short in Europe, it is attractive to produce that as well, but that would involve not so much a surplus but using some of the set-aside land, as Martin Haworth has already laid out. As for technological advance, having been to Brazil and North America, it is very obvious that the advance comes on the back of the current industry. So we have

proven technology out there, first generation biofuels, and now they are looking into second generation (lignocelosive) technology, enhanced catalysts and so on, but that investment in research, knowledge and efficiency comes based on first generation. We cannot just wait around for second generation to be invented because it will not be invented without the practical day-to-day running of first generation. That is a very clear message that we have seen from around the world.

Chairman: I see why you are Policy Adviser to the NFU, Mr Ware.

Q405 ***Lord Cameron of Dillington:*** You mentioned earlier, Mr Haworth, about the possibility of sustainability conditions. These are of great interest to me. Do you think there should be such conditions and (a) how would apply them, starting with the home industry; (b) how would you leverage out the sustainability; and (c) do you think they should be applied from the beginning of this industry, bearing in mind it is trying to establish itself and get going, or should we get the industry going and then apply such conditions at a later stage?

Mr Howat: The reality would be to develop as it goes. I think you want to do it at the very start. We are very keen to show that this is a sustainable development and that it is carbon neutral and that it does deliver. We want the imports that come against us to be measured against the same criteria. That is all we ask. The how and where is really up to those that have to regulate it. As long as that is the principle, we would be quite content.

Mr Haworth: We feel equally that this needs to be applied from the start. We already have a system more or less readily in place, which is the farm assurance system. A very high percentage of crops in this country are accredited. It is independently inspected. It probably does not need a great deal, if any, improvement or change in the farm assurance conditions to make this a readily available tool. That is the route we want to go down. We do not see the need to develop an entirely new and independent set-up.

Q406 ***Lord Cameron of Dillington:*** Should there be a differential either rebate or some sort of awards for carbon saving? Bear in mind that the whole cycle of production is perhaps under suspicion in some way.

Mr Haworth: You could tie in the Renewable Transport Fuel Obligation with a requirement that this is met by farm-assured grain. That is a simple way of doing it.

Mr Ware: The Central Science Laboratory work last year shows that all UK feedstocks have a 60-70 per cent Co_2 saving based on complete life-cycle analysis from drilling right the way through to drying and haulage. Coupling that up with the assured providable crop scheme, which covers 85 per cent of our UK crops, we can say that all those farms are independently checked and are saving that much CO_2. To add to that, there are certain farms that are using lower input farming, less fertilizer and so on. They can use such tools that are being developed by the HGCA, a carbon calculator, to prove that they are saving even more carbon. There is movement within the obligation where they could receive enhanced obligation certificates for more carbon saved.

Q407 ***Lord Cameron of Dillington:*** Moving on to some of the imports which is perhaps a more crucial question, how should the EU or the UK leverage a sustainable cycle in that respect?

Mr Ware: We are extremely concerned at the moment because there seems to be a great deal of work being done right the way down to field level on duplicating assurance schemes in the UK, and very little work being done on imported product. It seems to be that the consultants out there say, "It is easy to do it in the UK because we already have some figures, so let us do even more involved figures". They are taking at face value the carbon figures from third countries coming in. Just to highlight this quickly, there is a palm oil directive for assurance that has been set in place and last week the Department for Transport was setting this up as an example of what we should be doing in the UK. I said, "Well, 85 per cent of our farmers are assured. How many palm oil producers are assured under this scheme that you are highlighting?" I was thinking that they would say 10 or 20 per cent. They said, "Oh, the scheme is not up and running yet". We have 85 per cent of our farmers assured already and this scheme is not even running. They should be putting their efforts into those schemes.

Mr Haworth: We would like equivalent accreditation schemes operating there, which should be transparently the same level of standards and independently verified. That would be sufficient.

Q408 ***Lord Haskins:*** We do not even have European standards. We keep coming back to this question and everybody is nodding. Ultimately, this has got to be dealt with by the European Union.

Mr Howat: They have a role to play certainly in setting the overall framework to set a base.

Q409 ***Chairman:*** One of you said that it was the attitude of the NFU that you wanted to gold-plate EU ideas in legislation. Do you really think that is a possibility in this issue?

Mr Howat: We certainly do not want gold plating. We are constantly fighting against that. This comes back to the very start; it is to bring some stability and long-term vision, some joined-up policy across Europe. It is a single market. This will be a commodity that is traded, and so we need some kind of strategy that loosely joins it together without gold plating. We would jump up and down on that if it comes. That would be helpful. As I said earlier, this is a fledgling industry, particularly in this country. It just needs some guidance and a steer as to where it is going to end.

Mr Sharkey: From Northern Ireland's point of view, we are quite excited about this whole GP. We see it as an alternative. We would not want to not get into the situation as a food chain. We believe very strongly that we want to add as much value to our products at farm level as possible. We do not really want to go down the route of producing commodities where somebody else down the chain reaps all the reward. We are excited about it but we would be going down the route, or trying to go down the route, of adding value at farm level and maintaining as much of the margin at the farm level as alternative crops for Northern Ireland farmers.

Q410 ***Lord Plumb:*** I wonder whether Martin Haworth in particular and the NFU could give us a response on rural development funding. I am not asking for a response now but a response to the Clerk's paper of which I know they have a copy. It is a very important issue.

Mr Haworth: We are extremely worried about that, Lord Plumb. If you want a memorandum, I would be happy to give you one.

Lord Plumb: We would like that.

Chairman: Thank you all very much indeed. If there is any point that you feel you did not have an opportunity of making and you would like to, please send us it in writing. We much appreciate your spending the time with us today.

Memorandum by the Country Land and Business Association (CLA)

The EU Biofuels Directive

1. The CLA welcomes the opportunity to contribute evidence to the Committee's Enquiry into EU biofuels policy. We represent some 38,000 members. Between them they own and manage about half the rural land in England and Wales. The CLA is a founding member of the European Landowners Association, based in Brussels. Biofuels are a significant concern for our members both for their business interests in the alternative markets which biofuel use will deliver for first generation fuels and opportunities for rural development alongside their real and abiding concerns in delivery of policy to reduce climate change.

2. We are closely involved in the UK policy process on the EU biofuel action plan in several ways, for example, through:

(a) Contributions to the DfT stakeholder forum on the Renewable Transport Fuel Obligation (RTFO).

(b) Significant work with the Biofuels Alliance to help persuade Government of the merits of biofuels, including a major postcard campaign.

(c) Help to members engaged in biofuel production.

(d) Promoting biofuels through the CLA magazine.

3. In these ways—and in our general contacts with members and in the advice which we give them—we support the EU aspirations to deliver biofuels, and in particular the EU biofuels directive, which we see as a valuable tool in delivering a better fuel policy for the UK.

4. We remain disappointed by the UK Government's timidity in bringing forward biofuels. The CLA has argued for a more timely and ambitious policy, and whilst welcoming the Renewable Transport Fuel Obligation announced in November 2005, has grave reservations on the details of what is proposed.

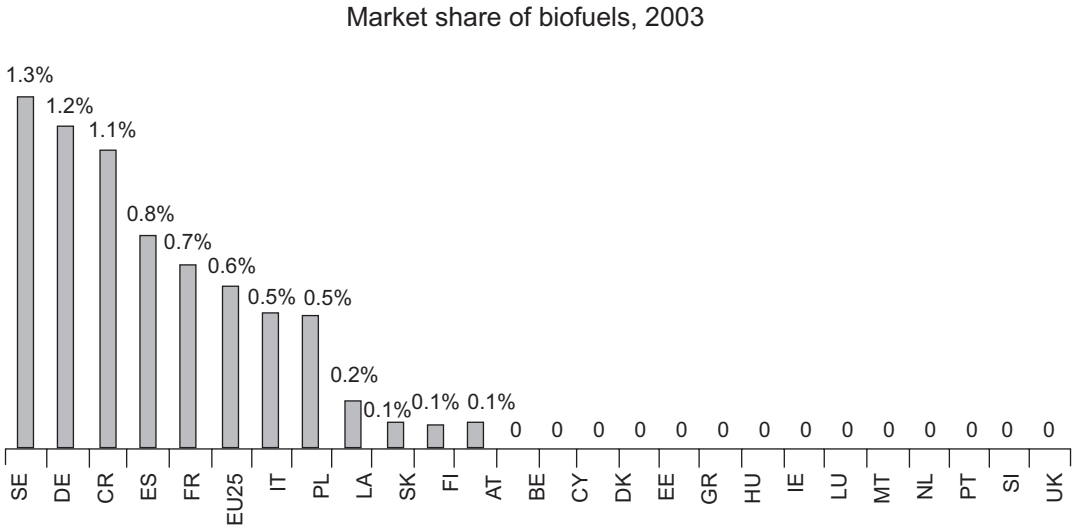
5. We have also had cause to raise member's concerns over the application of fuel duty relief as applied by HM Revenue and Customs in respect of vegetable oil.

6. While we recognise that a proportion of biofuel feedstocks will be imported, we share the widespread concerns raised by environmental organisations that a large scale development of new crops for feedstocks may if badly managed have disproportionate effects on habitat and greenhouse gas balances in exporting countries and en route to the EU market. It clearly makes no sense to release very large quantities of greenhouse gases by destroying carbon sinks in other countries in order to provide feedstocks to reduce transport emissions in the UK.

Specific Comments

Biofuel Targets

1. *Which Member States have been most successful in meeting their biofuel targets; and how have they achieved this?*



Source: European Commission estimates based on national reportsunder biofuels directive. Revised 9.7.5

We are pleased to provide a copy of a graph drawn from the EU Commission's report from July 2005.

This demonstrates the clear lead that those countries which have offered fuel duty relief have developed.

However, the leading Member States not only provide zero fuel duty for biofuels, but have provided grant aid to processing facilities.

Sweden in particular has a very strong political leadership in all renewable technologies, and has a National Plan to be fossil fuel free by 2025. This has incentivised many investments in biofuels, including the development of the SAAB E 85 (a car designed to be switchable to run on either lead free petrol or a mix of 15 per cent petrol and 85 per cent bio-ethanol) and a fleet of buses running on bio-gas.

Germany has invested in bio-diesel processing, and has a number of refineries running on Oilseed Rape.

Spain has a number of very large bio-ethanol refineries running on wheat stocks, as does Italy, running on maize.

Economic Instruments

2. *What financial instruments or incentives have proven to be most effective in meeting national targets for biofuel market share?*

The support measures used by Member States are set out below:

2.1 Fuel duty exemption (EU directive 2003/96):

Support is permissible under the Directive in the range of €310–€650/1,000 litres. This is widely agreed to be the most important measure used to date. Fuel duty support is limited by quotas (eg in France, Czech Republic).

Duty support is unlimited so far in Germany, but the new Government has expressed concerns over the cost to their Exchequer, and may now be moving in the direction of an Obligation mechanism.

2.2 Subsidies for processing plant:

European Regional Development Fund.

Significant grant aid support has helped develop processing and refining capacity across the EU, notably in Sweden, Germany, Spain and Italy.

2.3 Common Agricultural Policy (CAP) energy crops credit:

The CAP energy crops scheme has broadly had a disappointing take-up. It was introduced in 2005, but the relatively low level of payment does not seem to have influenced farmers' planting patterns to date. Of much greater significance, at least in the UK, is the derogation that allows crops destined for an energy end use to be grown on set-aside land.

2.4 Biofuels Obligations:

EU countries are only now beginning to move to Obligation based measures. Austria and France commenced in 2005. Slovenia has proposed an Obligation for 2006, whilst the Czech Republic and Netherlands will adopt one in 2007. The UK, in advance of only Greece, has announced it will adopt an Obligation in 2008.

Biofuel Obligations

3. *To what extent has the imposition of biofuel obligations by Member States reduced the biofuel industry's need for fiscal support?*

The CLA regards it as too early to say what effect the imposition of new Obligations may have had in fact on the need for fiscal support. This is for two reasons:

3.1 A very large increase in the price of conventional fossil fuels has taken place at the same time as the introduction and/or announcement of Obligations. This increase makes biofuels much more competitive regardless of the level of support (either by duty reduction or Obligation) than previously.

3.2 It is unclear whether an Obligation mechanism will provide markets for the very large numbers of micro-businesses which are now in the business of producing renewable fuels at farm level, and whose business models are based on a reduced fuel duty level. It may be that a complete withdrawal of fuel duty relief will destroy a number of environmentally sustainable producers, particularly those who are supplying reprocessed waste vegetable oil locally.

Production of Biofuel

4. *Which countries have the lowest biofuel production costs and why? What steps have Member States taken in research and development to reduce the production costs of biofuels?*

The current range of biofuel facilities are known as "first generation". This refers to the feedstocks they are designed to process. First generation feedstocks are generally derived from arable crops, either starchy, sugary or oil bearing.

There is some hope and expectation that in time "second generation" feedstocks, based on woody or cellulosic biomass, may be economic to process into biofuels for transport. However, there are, as yet, no commercial production facilities.

The costs of refining the same feedstocks into biofuels are relatively standard wherever they take place across the world, save only that outside the EU, costs of processing are generally lower owing to lower labour and regulatory cost burdens.

Indeed, amongst first generation biofuels, the design and technology of the various bio-refineries is relatively standard, whether the plant is located in the USA, Spain or Sweden, although the economies of scale mean that refining costs may be as much as 30 per cent lower in the largest plants (generally in the USA).

However, the cost of processing different first generation feedstocks varies very widely, both in energy terms and in financial costs.

Within the EU, wheat to ethanol offers a direct route, whereas Oilseed rape to biodiesel requires crushing to extract the oils first. Thus the processing costs (and energy balance) are potentially better for ethanol.

Outside the EU, the Brazilian sugar industry is highly developed, as well as enjoying the advantages of a lower regulatory burden and cheap labour. Brazilian sugar processing plants are adapted to produce cheap ethanol and/or sugar, with a very good energy balance where the sugar cane waste (bagasse) is used in a Combined Heat and Power plant to provide the process energy.

The costs of feedstock vary widely across the world. Within the EU, the UK is competitive at growing all the common "first generation" feedstocks, including wheat, sugar beet, maize and oilseed rape.

Outside the EU, there are a very wide range of biofuel feedstocks available, notably, in tropical countries, sugar cane and palm oil. These are significantly cheaper to produce than EU arable crops, both on an energy and financial basis. Sugar cane is a more efficient converter of sunlight to sugar than sugar beet, making use of high levels of sunlight and relatively high temperatures to produce large quantities of sugar in the cane. Likewise, palm oil produces a significantly greater quantity of oil than oilseed rape on a per hectare basis, largely for the same climatic reasons. When added to the availability of very cheap land and labour, tropical countries have a significant competitive advantage in biofuel production.

However, as previously mentioned, where tropical rainforest is displaced by biofuel crops, the range of effects may be such as to wholly negate the environmental advantages of the use of the biofuels produced.

Most EU MS are undertaking research and development in the area of second generation biofuels, but CLA is not aware of any significant research that is likely to affect the price of first generation biofuels.

Trade in Biofuel

5. *Which Member States import the greatest volume of biofuel and why? What impact have imports of cheap biofuel had on domestic production in the European Union?*

The CLA is aware that the UK is becoming a major importer of processed biofuels, both Brazilian bio-ethanol now being imported and sold in Tesco forecourts in the East and South of England (interestingly, without branding as bioethanol) and biodiesel, imported from Germany.

At the same time, UK producers are growing and selling growing quantities of wheat and oilseed rape for processing into biofuels in Spain and Germany.

We do not have National or EU figures for these trade movements, though we are aware that Sweden imports a large percentage of the biofuels it uses.

Technical Barriers

6. *What are the technical requirements that have acted as barriers to the introduction of biofuel into national fuel markets?*

The CLA regards the requirements that biofuels meet accepted standards as necessary to ensure consumer confidence in the product. Thus, while they may be seen as barriers we support the adoption of fuel quality standards.

We have, however argued strongly with HM Revenue and Customs (HMRC) that straight vegetable oil that meets accepted standards should qualify for the reduced rate of fuel duty. This has been an uphill task, as a recent change in HMRC procedures sought to deny the relief to vegetable oil producers.

We have also been seeking clarification on the very high charges raised by the Environment Agency on small scale biofuel producers. The application fee for a low impact PPC installation is £2,559. Thereafter the annual fee to cover inspection is £403. Whilst these costs are applied across all sectors undertaking low impact installation processes, we have argued that the Environment Agency could employ a graduate for say £40 an hour, who would have 64 hours at this price to inspect the plant initially, and 10 hours a year thereafter.

If the EA employed a technician, at £20 an hour he would have more than three working weeks to inspect the plant.

At a profit margin of say 10p per litre, including the retail margin, the producer would need to sell 6,760 gallons just to pay the start up regulatory costs. This is equivalent to the production expected for a year in a micro-plant.

21 June 2006

Looking Ahead

7. *Should the European Union take further action to promote biofuel production; and, if so, what action is required?*

The CLA accepts that fuel duty reductions funded by the general exchequer is not the best support mechanism for developing a large scale biofuels industry in the UK, and that a well designed Obligation combined with grant aid for biofuel processing facilities is more likely to deliver the objective.

However, as mentioned previously, we have grave concerns at the direction of travel evidenced by the Government's approach to the UK Renewable Transport Fuel Obligation (RTFO).

We have urged DfT to double the proposed buy-out price under the RTFO. Government has proposed 15p/litre as a penalty for oil companies that do not use 5 per cent biofuel from 2008. Their own advisers recommended it should be 25–30p/litre.[1]

With too small a penalty, the risk to an oil major is marginal (less than 1p per litre across their output) and there is thus potentially a high risk they will not invest in the necessary blending capacity, thus cutting the legs off "green spirit fuels"[2] and other UK suppliers. A higher buy out price reduces financial risk and makes the whole investment required cheaper.

We have argued that the RTFO should be made for the same period as the Renewable Obligation for electricity, to 2026. This will provide long term investment stability, thus reducing risks and the costs of investment.

We have argued that the RTFO should start at the highest feasible percentage possible, at least 3 per cent in 2008, and should be set at a rising scale to at least 10 per cent over the next few years. We note that the current UK proposal of 5 per cent by volume does not meet the EU target of 5.75 per cent by energy content.

We support the EU biofuels Directive, and will be looking to the EU Commission to bring the UK Government to book. We will be arguing for binding obligations backed by penalties.

We will be pressing the UK Government and the EU Commission to do more to secure motor industry buy-in to a rising per cent use of biofuels, backed by manufacturers' guarantees. We note that the motor industry was initially resistant to the introduction of lead free petrol, but in the end it was found not to harm engines. We suspect that the current 5 per cent limit for biofuel use in conventional engines lies well within safety tolerances, and could be extended significantly.

Perhaps most significantly, we will be calling on UK Government and the EU to ensure that imported biofuels are fully traceable, and can be demonstrated to deliver a net carbon saving in order to qualify for inclusion in the RTFO, and vigorously to defend this principle against any challenge under WTO rules.

We regard the potential for biofuels to substitute for fossil fuels to be very large. In 2005 the Öko-Institut estimated on a conservative basis that up to 10 per cent EU fuels could be derived from domestic production with sustainable agriculture[3].

We agree with the EU Commission that the key factors that are required to develop biofuels across the EU include:

- Political will.
- Oil price.
- Attitudes of oil and vehicle industries.
- Standards:
  direct blending of ethanol in petrol;
  review of fuel quality directive (directive 98/70);
  diesel and biodiesel standards (EN590, EN14214).
- A mechanism to regulate the environmental impacts of imports.
- Economies of scale:
  US ethanol production costs 30 per cent lower.
- New technologies for ligno-cellulosic feedstocks (wood and wastes):
  diluted acid and/or enzyme hydrolysis;
  gasification.

30 May 2006

[1] "Optimising the design of the RTFO: a study for the Department of Transport by Climate Change Capital Ltd, July 2005. See in particular para 12.4.1 "These complementary analyses suggest that the level of support for renewable transport fuels afforded by the RTFO should lie in the range of 25–30 ppl. It follows that the optimum buy-out price for the RTFO should also fall in this range." http://www.dft.gov.uk/stellent/groups/dft_roads/documents/page/dft_roads_610365.pdf

[2] http://www.greenspiritfuels.com/

[3] OKO—Institut ev : Material Flow Analysis of Sustainable Biomass Use for Energy.
Number: 2004–025–de
Author(s): Fritsche, U, Dehoust, G, Jenseit, W, Hünecke, K, Rausch, L, Schüler, D, Wiegmann, K, *et al.*

Examination of Witnesses

Witnesses: MR HENRY ROBINSON, Chairman, Committee for Business and Rural Economy, and MR OLIVER HARWOOD, Chief Surveyor, Country Land and Business Association, examined.

Q411 ***Chairman:*** Good afternoon. Thank you both very much indeed for coming and finding time to talk to us today. This is the last day on which we are taking oral evidence in our short inquiry in to the EU targets on biofuels. Before we start the questioning, is there any introductory statement that either of you would like to make?
Mr Robinson: Perhaps I could introduce myself and my colleague? I am Henry Robinson. I chair the Business and Rural Economy Committee for the CLA. Oliver Harwood is our Chief Surveyor. He has been working on renewable energy for many years. We are grateful obviously to your Lordships for giving us the chance to give evidence today. We believe that home-produced transport fuels are a vital part of greenhouse gas emission saving. This area has attracted nothing like the publicity, let alone the money, that electricity production—that is to say wind turbines in particular—has attracted. With the impending RTFO and the modest tax breaks, it has made more progress than biomass for heating, which contributes 40 per cent in the area of greenhouse gas emissions. Your Lordships, I am not an expert in biofuels, but I did drive to the station today in a car running on 100 per cent biofuel; better than that, it is running on 100 per cent UK biofuel.

Q412 ***Chairman:*** What is its make?
Mr Robinson: It is a Nissan.

Q413 ***Chairman:*** A very British name!
Mr Robinson: The fuel in it, I am pleased to say, was all Cotswold biofuel. It is a diesel. When I am not being captured by the CLA, I am a farmer and spend the rest of my time working on a project to use oilseed rape oil to fuel generators to back up the National Grid.

Q414 ***Chairman:*** You are obviously a very good witness for us to have today.
Mr Harwood: I am a chartered surveyor with a background in land economy. For 10 years I have been working for the CLA and one of my portfolios within the CLA is exactly this: renewable energy and all the alternative land uses and enterprises that our members might be able to get into. I was a part of the team that drafted and produced the CLA's head-up warning note that we wrote, more than five years ago now, called *Climate Change in the Rural Economy*. Long before national government or Sir David King had in fact really flagged up climate change, our members were telling us, and we were investigating, together with the Climate Change Unit at the University of East Anglia, the deep and potentially harmful impacts that climate change could make to our members and to the UK economy as a whole. We see renewable energy as part of wider fight to get better policies for our members and for the country as a whole.

Q415 ***Chairman:*** Thank you. We are an EU scrutiny committee. We are in existence, above all, to look at EU targets, draft legislation and so forth. Many of our questions to you should have a bit of an EU twist to them and if you can give us a bit of an EU twist in answer, so much the better. I start by asking you: to what extent and in what areas do you think the UK Government could provide grant aid to biofuel producers that would be within current EU state aid legislation? What level of assistance would be necessary to get us to the 5.75 per cent target by 2010?
Mr Harwood: Can I preface this answer with a very clear steer? We would much prefer that this industry go forward drawn from market demand rather than pushed from grant aid. We are aware, although we do not have details, of the types of grant aid that our friends and neighbours in Sweden and Germany have, and it tends to be under the regional assistance programmes. I was in Sweden a few weeks ago where I heard that a biogas road fuel facility had gained access to a range of regional selective assistance grant together with leader grant, and this had helped them with the capital costs of their project. This was biogas for road transport from anaerobic digestion. We are aware that the Global Corporation in Teesside has been offered up to £2 million from one North-East regional development assistance, but, at the same time, friends and members are telling us that actually the current state aid rules and the grant aid availability for major processing facilities are less likely to be of interest to them, simply because they can do it harder faster, quicker and with less interference if they can do it pulled by the market than if they are driven by a whole range of other interferences. I would make a very strong differentiation between that large-scale major bio refinery kind of investment and what members might do for themselves at farm level or at farm co-operative level. Many of our members over the last few years have benefited from grants under the England Rural Development Plan, which fall within in Pillar II of the CAP, with which your Lordships are very familiar. These have been used in various renewable energy businesses to assist them with capital start-up and to overcome the hurdles that they face. We would be very strongly supportive of that continuing within the new England Rural Development Plan. We have already responded to

Defra on that point. The state aid rules are difficult, though.

Q416 ***Lord Palmer:*** I am sure we were all intrigued about the Cotswold 100 per cent biodiesel that you used to get here today. I have always been fussed about imports, particularly now we have an RTFO in operation. What do you think of the comparative environmental costs and benefits of importing biofuel feedstock as compared to anything that we can actually produce in this country?
Mr Robinson: There is a perverse illogicality to cutting down large chunks of the rain forest to grow palm nut oil in order to save our greenhouse gas emissions over here. We should not be doing it. What we have to get to is a stage where ground which was not producing renewable energy or not producing corps before 1990, or the start of the Kyoto Protocol, is not producing renewable energy now.
Mr Harwood: The Low Carbon Vehicle Partnership is working on accreditation of feedstocks and fuels on a life cycle basis. The oil industry calls it "well to wheel", but of course "plough to plate" would be closer to where we are in England. This life cycle accreditation needs to take account of land use change. Land use change within the UK accounting for climate change emissions is a fairly significant factor of the overall carbon emissions across the country. Of course, land use change in other countries is equally significant. Tropical rain forest acts as a carbon sink and burning it or logging it and then burning it and then ploughing it, because it is largely peat soils, leads to very significant carbon emissions, so much so that any potential benefit from growing cheaper renewable feedstocks on such cleared rain forest would never repay the carbon debt that you had built up by clearing it in the first place, or not within any rational timescale. The proposal that we have been trying to sell to the Low Carbon Vehicle Partnership and have been discussing with our colleagues in other organisations is that if you take land use as at 1990, the start of the Kyoto Protocol, if that was rain forest then, no biofuel produced from that piece of land should qualify for a green certificate under the RTFO in the UK. That way you can be assured that the exporting country is not increasing its GHG in order to export fuels.

Q417 ***Lord Lewis of Newnham:*** You are essentially saying you want to ban the importation of bioethanol from somewhere like Brazil?
Mr Harwood: Absolutely not, no, seriously not. There is an awful lot of land in Brazil that is not rain forest. I am not going to quote figures, but we have certainly had presentations from the Brazilian chargé d'affaires asking us to advertise to members that there are huge opportunities for them to go farming in Brazil on pampas land, which is by no means rain forest. We are perfectly willing to meet fair competition, providing that the standards that that fuel is produced to, or that feedstock is produced to, are no lower than the standards to which the UK and the EU biofuels feedstocks would be produced to.

Q418 ***Lord Haskins:*** You said earlier on that you felt you would like ideally for this to be market-led. We have been told that it would never be for the foreseeable future, that there would always have to be intervention, either tax intervention, which is done by national Member States, or regulatory intervention through the RTFO. Is there not a case at some point that the RTFO, a European type regulation, is going to make any sense long term?
Mr Harwood: I think with a climate change hat, yes, eventually we would welcome it heading in that way. We have some challenges to overcome at home first. We do not have a good record in this country on climate change emissions. The dash-for-gas and the closing down of a lot of heavy industry gave the Government a one-off hit in the reduction of GHGs. That is not a replicable hit and we are now increasing emissions at 1.5 per cent per annum compound. I think, to address your point more accurately, what Professor Buckwell has long argued, and I know before your Lordships' House, is that there are externalities that the market will never capture and if an externality is the cost of carbon, then no market on earth is going to show the wider public and global benefit of saving carbon. Therefore, it is appropriate in those circumstances to introduce regulations to internalise the external costs of the emissions of carbon. The Government has its own figure; it is £70 per tonne for carbon emitted. There are many ways of internalising costs. What we have suggested, and what the CLA argues, is that if you can provide a regulation that works with market mechanisms, it is more likely to deliver lower cost carbon savings than if you simply give everyone a tax break or provide grant aid or do the other mechanisms. An obligation mechanism with tradable certificates is closer to a market approach.

Q419 ***Lord Haskins:*** Does that have to be European rather than national?
Mr Harwood: It works at a national level. It works better at a European level, but we are not in the position to influence the European Union upon that basis. There are certainly many European countries that are still wedded to fuel duty reductions. We know that Germany is now in the process of coming away from the idea that fuel duty reductions are the way forward. I was in contact with the German Attaché from their Embassy yesterday. Ms Busenkell was saying that there is now a Coalition party agreement as to the adoption of a renewable transport fuel obligation in Germany, interestingly enough from

2007, a year sooner than we will be doing it, and at a higher rate.

Q420 ***Chairman:*** At what rate?
Mr Harwood: Six per cent, but differentiated: 4.4 per cent from biodiesel and 2 per cent from ethanol. So they have differentiated their obligation.

Q421 ***Baroness Miller of Chilthorne Domer:*** I have just come back from South America. The Government and their advisers spent some time telling us, and I think this goes for a number of the countries there, that they are having enormous problems just regulating things of immediate concern to them like water pollution and so on. Do you not think it is fairly overoptimistic to imagine that they can create an accreditation scheme of the sort that we would like them to, when actually they have tremendous problems of capacity regulating anything, even the stuff that is very critical to them?
Mr Harwood: I think that is a very fair question and one better addressed to Malaysia than it is to Brazil. I was searching the web yesterday, in advance of our meeting, and I found a report from the BBC where the BBC Borneo correspondent, and I quote, says that Malaysia has one of the most notoriously corrupt governments on earth.

Q422 ***Chairman:*** That is down on the record here.
Mr Harwood: Yes. This is BBC saying that, not I, sir. The point you make is a valid one and it is an important one. I do not think we envisage that it would be down to the Brazilian Government to certify crops grown in Brazil. We think that the importer would need to be assured and to provide their own assurance themselves. On that basis, the economic pressure is on the importer to demonstrate that what they are seeking to land at Tilbury or Teesside is of a standard. If they cannot provide the bill of lading with a relevant certificate that is satisfactory to the UK authorities, then it should not qualify for the RTFO.

Q423 ***Lord Sewel:*** This might help us to get back to other EU Member States. I think there is a paradox here somewhere in that we talk about biofuels very much in terms of reducing emissions. The directive is basically an emissions-couched directive, but in the cool light of day, those Member States that have made the greatest progress on biofuels appear to be those Member States whose main priority is energy security.
Mr Harwood: Yes, that is true.

Q424 ***Lord Sewel:*** So really the environmental argument is not a strong enough policy driver?
Mr Harwood: I would defer to your judgment on the politics of other Member States. I do not claim an expertise on what drives German MPs.
Lord Sewel: They have a massive substitution.

Q425 ***Chairman:*** There is a lot of grievance there and in Scandinavia.
Mr Robinson: Sweden has said that they intend not to be reliant on fossil fuels by 2025.

Q426 ***Lord Sewel:*** The interesting thing is that Sweden, going down the biofuels route, is having to import and devastating the rain forest in order to do that, according to your argument.
Mr Harwood: Oh, no, I do not necessarily think that they are. I think our Swedish friends are very careful about what they do.
Lord Sewel: You have accepted that when they are importing from Brazil, Brazil is not in a position actually to certify the environmental credentials of the product. Here we have the possibility that Sweden may well be, through its importation policy, contributing very significantly to the destruction of the rain forest, and they are prepared to do that because their concern is energy security and not going down the nuclear route.

Q427 ***Lord Haskins:*** I think we are being a bit unfair on Brazil. Brazil does regulation and we can get GM-free corps from Brazil if we choose to get them. Clearly, the Government can do that. I agree with you that if you put the onus on the importer, then this problem will be overcome.
Mr Harwood: I would hope so, sir. Thank you. I do not want to waste your Lordships' time talking about the Swedish accreditation scheme because I simply know nothing about it.

Q428 ***Lord Sewel:*** I accept that.
Mr Harwood: There is a wider point that I have observed on my travels, which I think is very important from the point of view of political support and bringing people along the route that we recommend we should be going. I think it works in other European countries, and I am not quite sure why it has not been adopted here. That is that the joining up of policy and delivery is much better and much closer both in Sweden and in Germany. What I have found in my investigations, going back to Sweden, is that they have this policy of a low or zero fuel duty rate, but that is, if you like, a transport fuel policy and that does not necessarily affect the motorist. They seek to influence the motorist's charges so that local authorities, of their own volition, as part of this overall joined-up thinking, exempt biofuel E85 cars from their congestion charging and give them free parking spaces. The national government leans very heavily on its own indigenous motor manufacturer, SAAB, in order to design and build E85 cars. There are all sorts of other, if you like, efforts being made to break down the inhibitions and to persuade people to switch and to

change their habits and to go down more sustainable routes. In the UK there is this defraction between the different departments of state. You find that the Department for Transport was late to adopt any idea that biofuels might be good, that the Department for Environment, Food and Rural Affairs has its own agenda on climate change, and that the dead hand of the Treasury sits overall. I think we would argue strongly that we want more leadership. Maybe if that leadership was to come from the EU Biofuels Directive being made binding, then that is the only route to take.

Q429 ***Chairman:*** How would that work? How would that be effective?
Mr Harwood: There would have to be a new directive, I think.

Q430 ***Chairman:*** If people were fined for not meeting the targets, would they pay up?
Mr Harwood: Ah! A profound question. I am not aware that the French have yet paid their court fines for excluding British beef.

Q431 ***Chairman:*** Let us be specific on this. Would the CLA like to see these targets made mandatory by the EU and do you think that would work?
Mr Harwood: Yes, we would; it is part of our established policy, as approved by our policy committees. Yes, it would work in Britain because we tend to be very law-abiding.

Q432 ***Chairman:*** That almost infers that the inverse of that is that you are accepting it would not work for some of the continental countries, in which case there is not much point in having a mandatory target, is there?
Mr Harwood: My Lord Chairman, I am an optimist. I prefer to believe that the vessel would be more than half-full rather than that there might be some countries that were slower at coming to the point. I know for certain, for example, that a number of our northern European Member States have already set their own binding targets nationally that are higher than the EU target, unlike us. We are well behind, as I am sure you have already been told; 5 per cent by 2010 is 3.5 per cent by energy content.

Q433 ***Chairman:*** That is one reason why we are having this inquiry. Mr Robinson, what do you think? Take mandatory targets first.
Mr Robinson: I am afraid I really cannot guide your Lordship about whether it should be made mandatory. It is part of CLA policy. I understand entirely that that would have a much better chance of working in the UK. I really cannot tell you whether it would work abroad all over, EU rules or not.

Q434 ***Chairman:*** If you were the Minister, what is the one thing you would do first as most important to see that the UK met these targets?
Mr Robinson: I would double the buy-out price.
Mr Harwood: May I have three things?

Q435 ***Chairman:*** To help us, from what to what?
Mr Harwood: The single most important thing, as we stand here today, is to make sure that the RTFO is properly designed and matches the expert advice that was provided to Her Majesty's Government by Climate Change Capital. They commissioned a report and the Government has ignored the advice they have been given. Climate Change Capital recommended that there should be at least 15 years of binding obligation, and we only have an obligation target to 2010, but with a ministerial statement that of course we will not forget it after 2010.

Q436 ***Chairman:*** It will certainly be a different Minister by then.
Mr Harwood: A renewable obligation for electricity runs to 31 March 2027 and will not fall below 15.4 per cent of electricity on any year to 2027 in binding statute law. You can bank that; you can borrow against it; bankers will lend you money against that. A statement from the Chancellor in the Budget speech that we will of course look to increase the percentage rate after 2010 might or might not be bankable, might or not be security against the loan. I would leave it to many of you to make your own minds up about that, but the devil will lie in the detail. We will not achieve the target of 5 per cent unless the Renewable Transport Fuel Obligation actually works on the ground and works for businesses that need to invest in order to deliver the processing capacity, crushing capacity, blending capacity and fuel delivery capacity. We are not comfortable that where the Department for Transport stands at the moment is in the right place to make sure that this will happen. Henry Robinson has referred to the buy-out price, which is approximately half what was recommended by the consultants. We have a three-year binding commitment instead of a 15 year one, and we now hear that they are proposing to drop recycling of certificates so that if you over-achieve, you do not get any benefit from over-achieving. How does that then incentivise the industry as it should be?

Q437 ***Chairman:*** Fortunately, we always end up in this committee by reforming the British methods without perhaps getting too deeply into the EU

position. On the Climate Change Capital report, on what other grounds do you know it has not accepted or is it just in a drawer and it is not being talked about? Is it available to the public?
Mr Harwood: Yes, it is on the Department for Transport's website under the RTFO page. It is one of the annexes to the Department's own feasibility study. Why is it not being accepted 100 per cent? Very few consultants' reports ever are, but that being said, there has certainly been a certain amount of discussion between the Department for Transport and Her Majesty's Treasury about the risks to the consumer. In the Chancellor's speech we saw this "provided the costs to the consumer are acceptable" phrase being brought in again, which is a mantra that we have seen repeated across a number of other things. If I may, I make no apology for concentrating on UK policy in the context of the EU Biofuels Directive because, as we provided in our initial evidence to your committee, we are the laggards here. The other European Member States are streets ahead of us and it is quite right in that context for your committee to concentrate on what we can do to catch up.
Chairman: I take your point about catching up.

Q438 ***Lord Lewis of Newnham:*** In fairness, that may be related to motivation, just as you were saying. What you really are saying is that we have been fortunate enough to have an oil resource, which the other countries have not had, and that has allowed us to take a different view on this particular issue.
Mr Harwood: But not the right view from the climate change debate.

Q439 ***Lord Lewis of Newnham:*** Yes, but the implication of your statement was that they were being motivated by the right motivation, and I do not think they are being motivated by your right motivation, which is the climate change motivation.
Mr Harwood: I think many people make decisions based on mixed motives. I am quite sure there are mixed motives in most parliaments making these sorts of decisions.

Q440 ***Lord Livsey of Talgarth:*** In summation of what you have just said, would it be true to say that the only way really to accelerate the process is to make the EU Biofuels Directive mandatory?
Mr Harwood: I would not say it is the only way. If your Lordships' House can exercise any influence on Dr Stephen Ladyman, who will be here this afternoon, and if Dr Stephen Ladyman can exercise any influence on his friend the Chancellor, then maybe we can do it without a binding EU directive. We remain to see that. The devil will lie in the detail.
Chairman: Thank you both very much. If there is anything that you feel later you would like to have said but we did not give you the opportunity, do put that in writing to us. We much appreciate the time you have given us this morning and your frankness. It has been very interesting.

Present: Cameron of Dillington, L; Haskins, L; Lewis of Newnham, L; Livsey of Talgarth, L; Miller of Chilthorne Domer, B; Palmer, L; Plumb, L; Renton of Mount Harry, L (Chairman); Sewel, L

Examination of Witness

Witness: Mr Svend Friis, Chief Advisor, EU Co-ordination, Ministry of Transport and Energy, Denmark, examined.

Q441 ***Chairman:*** Mr Friis, it is very kind of you to come and find time to talk to us.
Mr Friis: I am very please to have been invited.

Q442 ***Chairman:*** Thank you very much. This is our last day of taking oral evidence for our report on the EU targets for biofuels and obviously we are particularly interested in hearing your views. Before we go into questions, could I mention that this is all going out on our website. We will send you a draft transcript in due course, so if there is anything you wish to correct you will have an opportunity to do so. In the meantime, is there any introductory statement you would like to make to us before we get going with questions?
Mr Friis: Only a very brief one, my Lord Chairman. My job in the Danish Ministry of Transport and Energy is to be the coordinator of EU matters. All the more important EU dossiers pass my table and I make sure that the individual experts in the administration take proper care of the dossiers. By way of giving you a flavour of what the Danish Government thinks about biofuels, I can only recommend you very warmly to read today's *Financial Times* because there is an interesting article today, which in may ways reflects how we look at biofuels in Denmark, at government level I

must stress, because it is an issue which is very hotly debated in Denmark.

Q443 ***Chairman:*** What is the heading? I have not had time to read it yet. "Elusive cornucopia: why it will be hard to reap the benefit of biofuel." That is a fair way to start our questions of you, is it not? Clearly, I suppose, you in Denmark do not agree with the European Commission's assessment of biofuels?
Mr Friis: Not entirely, no. The Commission has three arguments in favour of biofuels, three reasons why we should support biofuels. The first one is climate policy or the reduction of CO_2 emissions. The second is maintaining employment in rural areas, as they put it, and the third is security of supply for transport fuels. Regarding the first issue, CO_2 reduction, it is clear that biofuels is not a cost-effective instrument, at least when we are talking about the present first generation biofuels technology. My Government's point of view is that you should not insist on reducing CO_2 from transport when you can get much more reduction elsewhere for the same money. We have a very tough target in Denmark for CO_2 reduction, as a result of the climate policy in Europe. We must reduce by 21 per cent, and that is a very high percentage.

Q444 ***Chairman:*** By what date?
Mr Friis: By 2008 to 2012. It is a very heavy burden and we must look for the most cost-effective instrument to do that. CO_2 reduction through biofuels is one of the most expensive ways of reducing CO_2 emissions, so seen from this point of view it is a bad idea to support biofuels. Maintaining employment in rural areas is fine with the Danish Government as long as it does not lead to policies which create the same problems as we believe we have in the EU with the CAP, the Common Agricultural Policy. The Danish Government's policy in that area is that we should seek to abolish the aid to agriculture generally. This is our policy, and we should not replace the agricultural aid by a new instrument with the same problems. We fear that this policy advocated by the Commission on the biofuels, the way the Commission advocates biofuels, can only be realised through subsidisation and only through the creation of new trade barriers to protect the EU production of biofuels, which is currently very dependent upon the available first generation technology. We would prefer a policy which focused much more on research and development in the so-called second generation of biofuels, which have the prospects of increasing the production potential for biofuels and hopefully also to become more cost-effective, at least in the longer run. Furthermore, our analysis suggests that the environmental sustainability performance of first generation biofuels is poorer than that of the second generation biofuels. So much for employment in rural areas. This is not in itself a policy which the Danish Government will favour at any cost, it depends on the cost really, and we should not, to sum up, replace the CAP with a new system with the same negative consequences. The third argument, security of supply, is an argument which merits more consideration, but the acreage requirement of first generation technologies seems to restrict the availability of this alternative. Second generation technologies increase, as I said before, the potential for producing biofuels and also in a more cost-effective and environmentally sustainable manner, so we think that this may in time be an option which could contribute in a sensible way to the EU's overall security of supply. That would be my reply to the three reasons the Commission has given for promoting biofuels.

Q445 ***Chairman:*** Before we go on to ask more questions about the European Commission, are you perhaps, though, sailing against the wind in this in your general view, your first statement about biofuels? Are you perhaps aware that BP and Dupont have just put out a press release saying that they are combining together with, at the start, British Sugar in order to produce biobutanol? Both Dupont and BP in this circular, which only came out yesterday, are very strong about the potential importance of biofuels. You are taking an adverse line, an opposite position, and obviously you will have to speak for your government, but do you actually think that position is sustainable? Are not actually science and the market going to go against you?
Mr Friis: Politically there is a lot of pressure against the government in Denmark, I am not hiding that, but one thing which has been a very positive development very recently is that one of the oil companies in Denmark in fact decided to introduce bioethanol, a five percent blend, on its own without any subsidies or aid, or obligation from the government in any way, no obligation for blending this 5 per cent. It did so simply because it expected this to give it a commercial advantage. Obviously, they were correct. They have been quite successful and hopefully the other companies will follow suit, and that is okay with the Danish Government. We are not against bioethanols—

Q446 ***Lord Haskins:*** Are they charging a premium?
Mr Friis: No, they are selling it at the same price as unleaded petrol.

Q447 ***Lord Haskins:*** So who is carrying the cost?
Mr Friis: The company.

Q448 ***Chairman:*** We will come back to your biofuels policy in a moment, but could I just ask you, before we move on, a question on subsidiarity. You are putting forward a target of nought per cent for the biofuel market share. Is it because you may regard the approach of the European Commission towards enforcing its indicative biofuel targets as being against the principle of subsidiarity in Member States, that this is something the Member States should decide, not the EU?
Mr Friis: Indicative targets *per se* do, of course, respect the principle of subsidiarity as long as they are really indicative, that is obvious, but if you start interpreting indicative targets as being essentially mandatory then you are approaching the limits of the principle of subsidiarity. I just want to remind you of the Energy Council's conclusion on biomass just two weeks ago in Luxembourg. I quote from the conclusions text: "The principle of subsidiarity should be respected, giving flexibility to Member States to develop their own specific policy approach and determine individual goals. Secondly, choose the types of biomass and energy crops and the sectors in which biomass is used." We think this is a sound policy and we think the Commission is going very close to where we believe the limits of subsidiarity should be placed.

Q449 ***Lord Plumb:*** Biomass, or is that biodiesel? Are you including everything in biofuels? We are speaking about two different things.
Mr Friis: What I was quoting from here was the Council's conclusions on biomass, but biofuels is part of biomass. Biomass can be used for three energy purposes—to produce biofuels, to produce electricity and to produce heat. These are the three ordinary ways of exploiting biomass for energy. As the Council's conclusions state, Member States should be given the flexibility to choose which way to exploit biomass for energy, and we agree with that. This is a text which we have put our own fingerprints on, so it is not so strange in fact. Any attempt to interpret the indicative biofuels as being essentially mandatory is, I think, violating this policy line of the Council. As you will know, perhaps, Denmark has received a letter of formal notice from the Commission.

Q450 ***Chairman:*** Yes.
Mr Friis: This is because of our indicative national target of 0.1 per cent. Formally our quarrel with the Commission concerns the validity of the motivation we have given for differentiating from the reference value of 2 per cent from the Biofuels Directive and the main reason we gave to the Commission when we submitted our national target was that in Denmark biomass is used for the production of heat and electricity instead of biofuels. So now I am going back to the Council's conclusion policy line. In fact in Denmark very considerable resources are allocated to achieve a record 11 per cent share of biomass in our primary energy supply (the EU average being only 4 per cent) and according to the Biofuels Directive a valid motivation for differentiating from the 2 per cent is, "the amount of resources allocated to the production of biomass for energy uses other than transport," (Article IV, paragraph 1(b) of the Biofuels Directive). This is the argument we have used to motivate our differentiation from the 2 per cent reference value. In reality the Commission is probably worried by our less than lukewarm support for the policy part advocated by the Commission, that is the introduction of subsidies or obligations in order to develop an EU production of first generation biofuels. This is probably the real reason why the Commission is negative towards us and has given us this letter of formal notice.

Q451 ***Lord Haskins:*** Is there general political support for the government's position, or is this a political issue between the parties?
Mr Friis: It is a political issue among the parties in Denmark. The government is being criticised for its position, yes, that is correct.

Q452 ***Lord Cameron of Dillington:*** You may have answered this really by your last statement, but I am just wondering, if you were in charge of the EU Directive, first of all would you do anything to try to encourage this embryonic industry, bearing in mind what you say about the possibility of second generation biofuels? What would you do to encourage the biofuel industry in Europe, and therefore what changes might you make to the current EU directive?
Mr Friis: The government has not made up its mind entirely on how we should advise the Commission on the process that will take place before the end of the year, when the Commission must put forward a report on the possible revision of the directive. We are talking about an instrument which has, as one of its very central aims, the reduction of CO_2 emissions, and to my government it does not really matter if the CO_2 reduction seen from a climate perspective, the production of biofuels, takes place in Denmark or in Brazil. We are happy to import the biofuels necessary for attaining the 0.1 per cent target in Denmark by imports from Brazil.

Q453 ***Lord Cameron of Dillington:*** But if you are dubious about the carbon dioxide/greenhouse gas production of biofuels in Denmark, you must be

even more dubious about the production methods in Brazil, where you are knocking down sub-tropical forests in order to grow sugar cane, et cetera, and then ship it 7,000 miles?
Mr Friis: In fact there have been calculations on the CO_2 balance on various technologies for the production of ethanol, and ethanol based on sugar cane is one of those which come out best. If you look at the various technologies, ethanol based on typical European crops like sugar beet or wheat, it performs rather poorly and you can even find technologies where the CO_2 balance is negative, worse than ordinary petrol, when we are talking about first generation biofuels.

Q454 ***Chairman:*** Mr Friis, we have seen those tables. We have studied them, but I am not quite certain where it leaves Denmark in answer to Lord Cameron's question. What modifications in the directive or the targets would make this more acceptable to Denmark, because you cannot really have expected to get away with the letter which suggested a target of 0.1 per cent?
Mr Friis: I would say from the beginning it was not our cup of tea, this directive. That is no secret. We could have lived without it. We accepted the directive because we thought it gave us the total flexibility to put our target at a very low range. Obviously, the Commission is not quite in agreement with us in that respect. Basically, our view is that we prefer indicative targets for the use of bioenergy or renewable energy in general, not individual targets for specific fuels, and again this is because we need to use the instrument for reducing CO_2, which is the most cost-effective in Denmark because of the very tough target we have for the CO_2 reduction. So we can accept targets for biomass in energy use, but any target which has a certain degree of binding quality regarding biofuels we would be very much against. So any amendment of the directive which meant that the targets should be taken more seriously than we think they are to be taken today we would be against. So we would welcome modifications in the directive which made it clearer that Member States do have the freedom to set the national indicative targets, also at a very low level, if they can justify that on the grounds already mentioned in the directive. I quoted the motivation we have given to the Commission, which we think is a fair one. It is not that we are not doing anything in this field. We are among the top ranking nations in the EU promoting biomass or bioenergy, and Danish agriculture receives in fact a lot of money through excise tax reliefs on energy from biomass, so we just think that this is the most cost-effective way of exploiting biomass for energy.
Chairman: Thank you.

Q455 ***Lord Lewis of Newnham:*** If I understand you correctly, it is not that you are against biofuels in principle, your problem is primarily one of efficiency of process which is going on at the moment?
Mr Friis: Yes.

Q456 ***Lord Lewis of Newnham:*** So if you were to go to the secondary, which is something like enzymatic production of biofuel, you would be perfectly happy with that, but what sort of efficiency increase are you anticipating before you would really want to take this over? I take it from this that you would be primarily interested in bioethanol rather than biodiesel?
Mr Friis: That is correct, the last part of your question. We are more interested in bioethanol than biodiesel. Concerning the possible effectiveness on second generation biofuels, this is a very difficult question. Our experts tell us that the second generation biofuel has the potential of becoming more cost-effective. One of the main reasons for that is the fact that you use waste products which have little or almost no value for the production of the fuel. Instead of foodstuffs like wheat, sugar beet, sugar from sugar cane, et cetera, which competes with food in the food market, waste like straw or wood chips are normally available at very low cost. Secondly, researchers in Denmark have developed methods for producing second generation biofuels which also use and exploit the process heat in a manner which improves the cost-effectiveness considerably. They are producing the second generation biofuels in plants connected to existing combined heat and power plants and in that way there is very little waste of energy from the process. Thirdly, the enzymatic part of the process is something which is being developed very much in Denmark to a very high level of technology. The world leaders in enzyme production are Danish. Novozymes is a big company in enzymes and so is the Danisco daughter company Geninco. So they are making considerable progress in the key process, which is the conversion of the lignocelluloses to something which can be fermented. We have hopes that this will altogether result in a process which is much more cost-effective.

Q457 ***Lord Sewel:*** You have rather intriguingly said a couple of times at least that your opposition to the directive is based on the claim that biofuels are not the cost-effective way of achieving CO_2 reductions. Where would you spend the money?
Mr Friis: If we look at the bioenergy sector, we spent a lot of money, in the form of the reduction of excise taxes on biomass for the production of heat and electricity. That is not taxed in Denmark, so it gets a strong competitive edge compared with coal,

oil, et cetera, and that, in our view, is a more cost-effective way of reducing CO_2. There are other ways of reducing CO_2 which are even more cost-effective. It is not that we choose only one instrument.

Q458 ***Lord Sewel:*** Could you give us the examples?
Mr Friis: Wind energy is one method which is used very much in Denmark. Twenty percent, or even more, 19 per cent I think it is today, of our electricity generation is based on wind, which is a record level in Europe. These are typical ways of reducing CO_2. Another way of reducing CO_2 is to convert electricity production from condensing heat alone to a combined heat and power, which is a much more effective way of utilising the energy content of the fuel used and in that way reducing the total CO_2 emissions. We have a whole range of instruments and what we do in Denmark is that we calculate what we call the shadow price of CO_2 reduction per tonne and we then rank the individual instruments according to what it costs for that instrument to reduce one tonne of CO_2 and in the calculations we have made for biofuels first generation they ended up with a price of approximately 700 Danish krone per tonne of avoided CO_2, which is about €100 per tonne of CO_2 emissions avoided, which is a very high price as a comparison.

Q459 ***Lord Cameron of Dillington:*** Compared with what?
Mr Friis: For example, wind energy. By producing energy through wind turbines instead of coal, or what have you, you can get a CO_2 reduction which costs about 150 krone per tonne compared with 700 for biofuels. I cannot remember all the figures, but we ranked the instruments that way according to their effectiveness on reducing CO_2.

Q460 ***Lord Sewel:*** May we have those figures?
Mr Friis: Yes, I can make them available. I should think they are available in fact somewhere on our website, the Danish Energy Authority's website.
Chairman: I am conscious of the fact that time is moving on and you have in a sense rather anticipated perhaps the other questions which Lord Haskins is going to ask about Danish biofuels policy.

Q461 ***Lord Haskins:*** I think it has been dealt with, yes, but coming out of all this is that technically you have concerns about biodiesel as a country. There is somewhat an attitude which we in this country understand, a sort of ideological suspicion of EU regulation generally behind the thinking. There is not that, but do you not accept that whilst Denmark, because of wind farms, et cetera, is doing very well in this area, other countries are doing less well and therefore it is in the interests of you that other countries do better than they are doing and therefore is there not a case for the EU intervening in some way to help those countries intervene because they have not got the opportunities which you have to reduce CO_2?
Mr Friis: We think it should be made flexible so that Member States may choose the instrument best suited to their circumstances.

Q462 ***Lord Haskins:*** But somebody has to force them, at the end of the day, to reduce the level. Leaving it to themselves may not be good enough for your government?
Mr Friis: My government, as a matter of principle, is not in favour of obligatory targets in general. It is not that we are 100 per cent against, but in general we tend not to favour obligatory or mandatory targets.

Q463 ***Lord Haskins:*** What about regulation?
Mr Friis: You mean obligations?

Q464 ***Lord Haskins:*** Here in Britain they have produced this regulation on transport, an obligation to have a certain level of biofuels in the fuel. If that was introduced as a European regulation you would be against it, presumably?
Mr Friis: Yes, we would, because that would be the same as introducing a mandatory element in the way you promote biofuels and, fairly speaking, we think that voluntary targets also have a political effect. You can see that the Danish Government is put under pressure from pressure groups not to do more about first generation biofuels. It shows that it has a political effect. But it should be possible for governments to put arguments up and say, "We accept that we have some good arguments not to do this, then we will do something else which has the same effect more or less but is much more cost-effective."

Q465 ***Lord Plumb:*** The efficiency of Danish agriculture is well-known and has been for many years, which is why I sent my son to Denmark to learn his farming before he started in this country, but surely the farmers themselves are beginning to say, "Why can't we get in on this, because if we are going to grow crops for industrial purposes then there must be a demand there?" Are you not producing biodiesel at the moment? Is it right that you are exporting some biodiesel to Germany, for instance? Is that not the start of a development which will grow in the country?
Mr Friis: It is correct that we are exporting biodiesel to Germany, quite a lot even.

Q466 ***Chairman:*** You are exporting biodiesel?
Mr Friis: Exporting, yes. It is not being marketed in Denmark because there is no tax reduction. I can only repeat that my government is against agricultural aid and we are supporting the abolition of the European Common Agricultural Policy, and we would not like to see this aid policy replaced by a new CAP 2, as you might call it. So that is my government's point of view, but I might add, as I started out by saying, we are not against biofuels. To give you proof of that, I can inform you that the government has allocated some substantial funds for the research and development of second generation biofuels.
Chairman: We will move on, if you will forgive us, because we have one of the ministers coming to talk to us in a few minutes.

Q467 ***Baroness Miller of Chilthorne Domer:*** It was really the alternative biofuels I wanted to ask about. You obviously have a large amount of animal waste from the sort of agriculture you do. Do you think there is much potential for biogas, given the current oil price?
Mr Friis: It is more or less the same problems with biogas as we see with first generation biofuels. We would rather use the raw material to produce biogas for the production of electricity and heat. In Denmark we produce some biogas, but it is again used in the production of heating and electricity, and we believe this is the most cost-effective application of biogas.

Q468 ***Baroness Miller of Chilthorne Domer:*** So the same principles apply?
Mr Friis: Yes.

Q469 ***Baroness Miller of Chilthorne Domer:*** I understand what you are saying about not wanting targets which limit the way that you use things. Which targets do you sign up to in terms of CO_2 reduction?
Mr Friis: Our national target is 21 per cent as part of the EU general CO_2 reduction policy, the "bubble", as we call it.

Q470 ***Baroness Miller of Chilthorne Domer:*** So what you are saying is that providing it falls under that 21 per cent umbrella you want freedom to do anything within that?
Mr Friis: From an economic textbook point of view, what you do if you put a target on one individual instrument is that you sub-optimise that particular instrument, which we do not want to do in Denmark. We want to have the freedom to choose from an economical perspective the most effective instrument.

Q471 ***Chairman:*** I think we are going to have to draw the line there, I am sorry, but thank you very much indeed. I think you put over your case very subtly and it was very interesting to hear. If there is anything you would like to have the opportunity to say and there was not enough time, do write to us about it. We hugely appreciate your coming this afternoon and we will be interested to see what further steps Denmark takes in this area.
Mr Friis: I would only say, as I started out by saying, thank you for letting me appear before this Committee. It has been a great pleasure, my Lord Chairman, and I hope you can make use of the evidence I have given in your report.
Chairman: Yes. Thank you very much indeed. It is much appreciated.
Lord Palmer: You did say in answer to Lord Haskins about your government. If there was a change of government, presumably so much of what you have said could be completely reversed?

Q472 ***Chairman:*** You have got twenty seconds in which to answer that!
Mr Friis: If the opposition win at a new election, which is far away, then there might be a change in policy, yes. I agree that could happen.
Lord Palmer: Thank you very much.

Q473 ***Lord Livsey of Talgarth:*** May I say congratulations, my Lord Chairman? I was a farming student in Denmark for some time. It is nice to see a Dane here.
Mr Friis: Thank you.
Chairman: Thank you very much indeed. We much appreciate your coming.

Memorandum by the Department for Transport

Introduction

1. The Department for Transport welcomes the opportunity to submit evidence to the Committee. Biofuels have a key role to play in helping to meet the UK's climate change targets, with a number of other benefits too, including contributing to the diversity of the UK's transport fuel mix and offering rural employment opportunities in the UK and elsewhere.

2. The Government's main support for biofuels will in future be delivered through the Renewable Transport Fuel Obligation (RTFO), which will require all transport fuel suppliers to ensure that biofuels make up a percentage of their total aggregate fuel sales. It will create a significant market for biofuel sales in the UK, and will include robust carbon and environmental assurance schemes to ensure that the biofuels it supports deliver the maximum environmental benefit. UK agriculture will be well placed to provide the biofuels that will be needed to meet the Obligation.

3. The Committee has sought views under seven headings, and the Department's response is grouped around them.

Biofuel Targets

4. The Committee has asked *which Member States have been most successful in meeting their biofuel targets, and how they have achieved this.*

5. The Biofuels Directive requires Member States to set indicative targets for sales of biofuels, taking account of the reference values set out in the Directive. This process is a rather messy compromise, resulting from the concerns of a number of Member States (including the UK) at the Commission's original proposal for mandatory, EU-wide targets.

6. Member States have set widely varying biofuel targets for 2005, ranging from zero to 3 per cent. A comprehensive overview of the performance of different Member States against their 2005 targets will become available over the next few months as Member States submit their annual progress reports to the Commission (for which the deadline is 1 July 2006).

7. Early indications are that few Member States have met their targets in full. But because the Directive only requires Member States to set "indicative" targets, it is not clear what action, if any, the European Commission can or will take against Member States which fail to meet them.

8. Virtually all Member States have relied on fuel duty incentives (which themselves vary widely) as their main support mechanism for biofuels, with some making use of capital grants to help support new biofuel production infrastructure. Those which have offered the most generous fuel duty incentives (including in particular Germany) have generally seen the highest level of sales. As discussed below, however, fuel duty incentives are a relatively blunt support mechanism and do not allow governments a great degree of control over biofuel sales.

Economic Instruments

9. The Committee has asked *what financial instruments or incentives have proven to be most effective in meeting national targets for biofuel market share.*

10. As noted above, fuel duty incentives have to date proved to be by far the most effective policy levers. Most Member States, including the UK, have only a limited scope for offering capital support towards the construction of biofuel processing plants as a result of State Aid rules. The UK is intending, subject to State Aid approval, to introduce an Enhanced Capital Allowance scheme to support the development of the most environmentally beneficial biofuels production plants.

11. Fuel duty incentives have a number of advantages. They can generally be introduced quickly, and they are relatively straightforward and well understood.

12. But they also have a number of downsides. They are generally short-term in nature because few governments are willing or realistically able to guarantee them for the long-term. This can inhibit investment in biofuel production capacity. It is also very difficult to get the level of the duty incentive right when the commodity prices of oil and biofuels fluctuate widely and independently of each other. At certain times, a particular level of incentive can be enough to deliver significant sales, but at other times the same level of incentive can deliver next to nothing. This also means that governments have no real control over how much biofuel is sold, and that the costs to them are unpredictable (and potentially very high). Duty incentives are also a blunt instrument, and are generally unable to distinguish between, for example, different types of biofuel which may vary widely in environmental performance.

13. For these reasons, a large number of Member States have signalled a move away from duty incentives towards biofuel obligations of one sort or another.

Biofuel Obligations

14. The Committee has asked *to what extent the imposition of biofuel obligations by Member States has reduced the biofuel industry's need for fiscal support.*

15. It is perhaps a little early to give a definitive answer to this, since few Member States have an Obligation already in place. Obligations and fiscal incentives are both forms of support for the biofuel industry, although they operate in very different ways. In the UK, for example, the Renewable Transport Fuel Obligation is likely over time to replace fiscal incentives as the main form of support for biofuels in future years, but decisions on the extent to which this happens are a matter for the Chancellor of the Exchequer.

16. One of the main reasons that the UK Government has decided to introduce an Obligation is that it should be a more cost-effective and economically efficient way of getting biofuels to market. By requiring the oil industry to enter into major long-term contracts with biofuel producers, we hope that we will achieve economies of scale and drive down the costs of biofuels.

17. It is highly likely, however, that biofuels will continue to need some form of support—whether in the form of fiscal incentives or Obligations—for the foreseeable future.

Production of Biofuel

18. The Committee has asked *which countries have the lowest biofuel production costs and why, and what steps Member States have taken in research and development to reduce the production costs of biofuels.*

19. It is difficult to compare production costs in different Member States, given the different feedstocks and processes which are used. The role of the Renewable Transport Fuel Obligation will be to create a significant market for biofuels in the UK, and it will be up to the market to determine where those biofuels come from. The RTFO should also lead, over time, to greater efficiencies in production and processing methods as the focus shifts from Government subsidies for biofuels to a market-based mechanism, with Obligated companies likely to enter into long-term contracts with biofuel producers.

Trade in Biofuel

20. The Committee has-asked *which Member States import the greatest volume of biofuel and why, and what impact imports of cheap biofuel have had on domestic production in the European Union.*

21. The Department for Transport does not hold detailed information on this. Biofuels are a globally traded commodity, and under mechanisms such as the RTFO biofuels produced in the UK and the EU will have to compete with those imported from overseas. The rapid growth in demand for biofuels in the EU and elsewhere is likely to mean that there will be ample opportunities for EU producers to compete with overseas producers.

Technical Barriers

22. The Committee has asked *what technical requirements have acted as barriers to the introduction of biofuel into national fuel markets.*

23. There have been a number of barriers, some technical and others political. These have included:

- the maximum blending limits imposed by the EU's Fuel Quality Directive and various technical fuel quality standards;
- the reluctance of many motor manufacturers to warrant their vehicles to run on blends of higher than 5 per cent biofuel;
- the imposition of national and EU-wide import tariffs on certain biofuel imports;
- the fact that biofuels have tended to gravitate towards those Member States which offer the greatest degree of financial support;

— global supply constraints (which is likely to be come more of an issue as demand rises in other, non-EU markets);

— the reluctance of (and lack of real pressure on) the oil industry to invest in the necessary blending and storage infrastructure, particularly for ethanol blends. This has meant that even where very generous fuel duty incentives have been offered in some Member States, they have not always been taken up; and

— concerns about the quality of biofuels, which have contributed to the oil industry's reluctance to engage with them.

Looking Ahead

24. The Committee has asked *whether the European Union should take further action to promote biofuel production; and, if so, what action might be required.*

25. As levels of biofuel use increase, concerns about the sustainability of the sources of the biofuel, and the carbon savings that different biofuels offer, are likely to become more pronounced. It is therefore important that the EU should link its future support for biofuels more closely to the environmental benefits that they offer. As part of this, it should consider ways of directly incentivising those biofuels which offer the greatest carbon savings, including perhaps "second generation" biofuels, providing they are sustainably produced.

26. Providing these concerns can be addressed, the Department believes that there is considerable scope for increased biofuel production (both within the EU and elsewhere) and use.

27. Getting to levels of biofuel use beyond 5 per cent will also require amendments to existing European Union fuel quality standards, which currently inhibit this. It will also need the support of the motor industry, which' should best be secured at a European Union level.

June 2006

Examination of Witnesses

Witnesses: Dr Stephen Ladyman MP, a Member of the House of Commons, Minister of State, and Mr Rupert Furness, Head of Policy Team, Department for Transport, examined.

Q474 ***Chairman:*** Minister, it is very good of you to come and talk to us this afternoon. It is our last day of taking oral evidence for the report which we are planning to do on the targets set by the EU for biofuels. We are now on our website. We will send you a copy of the transcript in draft in case there are any changes which you wish to make. I much appreciate your coming. I understand that you do not want to make an introductory statement, you suggest we go straight into questions, but do you want to introduce Mr Furness?
Dr Ladyman: I think Mr Furness is self-explaining.
Mr Furness: I am the Head of the Policy Team which is responsible for the delivery of our Renewable Transport Fuels Obligation.

Q475 ***Chairman:*** As you know, we are an EU scrutiny committee and we set off on this inquiry in order to look at the targets which the EU had set and which they are now reconsidering. Obviously the first question is, why is Britain doing so badly, particularly relative to other countries? That is, I suppose, where I might start, if I may. Why do you think the UK set such a modest target for the initial biofuel target, 0.3 per cent by volume, against an EU guideline of 2 per cent by energy for the end of 2005? Of course, if you look at the record of quite a few of the Continental countries, they are doing a lot better than us.
Dr Ladyman: They are indeed. Equally, several set lower levels than we did. It is important to remember it was never a mandatory target. It was a figure which the EU set. They asked countries to use it as a reference when discussing how they should set their targets. At the time we carried out a very thorough consultation and one of the clear messages we got during that consultation was that it is better to set a realistic target that you might have some chance of attaining than just paying lip service to a target which was completely unreasonable, and 2 per cent from where we were starting would have been completely unreachable. So 0.3 per cent was a significant improvement on where we were at that time. Before you run away with the idea, though, that other countries did considerably better, I think you have to question what "better" means in this context. Did they set those targets because they had an aspiration to tackle climate change or did they set higher targets because they had aspirations around energy supply and energy security?

Q476 ***Chairman:*** Or a mixture of both?
Dr Ladyman: Or a mixture of all of them. If it was climate change that was their target, what did they do about ensuring that the 2 per cent they were aspiring to use actually came from sustainable sources? I think if you measure them against the slightly higher standard, although they may have actually got more renewable fuel into their stock, there is a question about whether they did that sustainably or not.

Q477 ***Chairman:*** That is a fair point. Before we perhaps go further into that, could I ask what targets you envisage for the end of 2010, and is there a UK target for 2015?
Dr Ladyman: We have set the Renewable Transport Fuel Obligation at 5 per cent by volume for 2010. It begins in 2008 with a staged approach. We have not at this time got a target for 2015. What we have said is that at this moment we have to put all our resources and energy into making sure that the 2010 target is achieved as sustainably as possible and once we have done all the groundwork to ensure that is underway we will then look to see how much further we can push our target beyond 2010. We chose 5 per cent for very good strategic reasons. Five per cent is what we think can be produced sustainably. It is what we think can be produced without infringing manufacturers' warranties, so that it can go direct into the existing vehicle fleet without modification. Anything we do beyond 5 per cent we have to be able to reassure ourselves that we are not going to be requiring extensive modification of the vehicle fleet or that alternatively equipped vehicles are there to use anything beyond 5 per cent, and most important of all in my mind we have to be sure that anything beyond 5 per cent can come from sustainable sources. I would add, hopefully British sources, but clearly our primary objective has to be from sustainable sources.

Q478 ***Chairman:*** That is very helpful and nice to know. As you consider the future targets, do you have discussions with EU partners, with other EU countries, or with the Commission itself as to what you think might be reasonable targets for it to set?
Dr Ladyman: Only informal conversations and nothing as concrete, certainly not at ministerial level. Officials may have engaged in more detailed discussions, but certainly from the point of view of ministerial discussions I have to say that we have not got into the detail of exactly how much stiffer a target should be, but I have had ministerial discussions with colleagues about the challenges they face in their own countries and the particular ideas they have in their own countries. Those have included discussing with the current German minister and his predecessor some of the work which the German Government has done, and with the Swedish minister I have discussed some of the work they have done in Sweden, in particular around encouraging the E85 vehicle, which is a vehicle which can take 85 per cent bioethanol, but those discussions have not at ministerial level reached the point of quantifying a new target.

Q479 ***Chairman:*** If it was suggested that the EU target should be made mandatory, what would be your reaction?
Dr Ladyman: I would almost certainly resist a mandatory target because there is a huge challenge to ensure that renewable fuels are produced sustainably, and I have to say that in some of the conversations I have had with some ministerial colleagues around other states I am not entirely convinced that they all understand the issue of sustainability. There is, perhaps, with some of them a slightly naı£ve assumption that all renewable fuels and all fuels produced for biomass must, by definition, be of benefit to the environment and must be sustainable, but then you start to address issues with them such as where would the biomass come from, and in order to do that within the economic constraints of the limitations imposed by the economic cycle in that country can you ramp up without encouraging people to pull down rainforests in order to produce your biomass, and those are very complex issues. So my first instinct would be to resist a mandatory target. I just suspect each state of the Union would be in a slightly different position and it would be difficult to impose a target.
Chairman: Thank you. That is very interesting.

Q480 ***Lord Lewis of Newnham:*** Minister, I think I know part of the answer to this question, but nevertheless I shall ask it of you: how far does the Government view the relative importance of biofuels as a CO_2 reduction factor? We have just had a discussion with the Danish Government minister and he was pointing out that in fact they are concerned essentially with the efficiency of CO_2 reduction and putting this in the context of the total CO_2 problem, not just referring it solely to the biofuel problem. There is also the point you have raised about the security of supply, which is another recognition of why you want this biofuel operation, and we have been given the reasoning, for instance, that other countries have developed it, in converse to your point about security of supply, that we have no need to do this because of our North Sea oil perspective in this. What is your attitude towards the totality of looking at the problem not from the point of view of just CO_2 and biofuels but CO_2 in total, and then perhaps you would not be quite as keen on the biofuels side of it?
Dr Ladyman: I entirely agree with you. I think we have come at this for climate change reasons because we want to save CO_2. There are undoubtedly

ancillary benefits from taking this approach around energy supply and energy security and those are issues we are discussing with the DTI in the context of the energy review, and if you want further information about the energy review, I am afraid I need to ask you to wait until a DTI minister can come and brief you on that. I think the solution to carbon saving is going to be a multiplicity of approaches and one extremely valid approach is clearly the renewable fuel approach and the renewable fuel obligation. There are many others which have to be factored into the equation. That is why we are pressing, for example, the idea of the possibility of an emissions trading scheme for land transport. Then there are other modalities which have to be considered including, as we all know, the effect of the growing aviation sector on climate change. So there are many factors to be considered. In some parts of the picture I think renewable fuel will be a useful contributor, but nobody is kidding themselves it is the total answer to climate change. I do not know whether Mr Furness wants to add anything to that?

Mr Furness: I think we would accept that you need to look at the best uses of biomass in the round. Is it most appropriate to use biomass in electricity generation, or to convert it into a transport fuel and use it in that way? I think if the Government is to have any hope of getting to the very ambitious future target which has been set we will need a bit of everything, as the Minister says. Even though transport fuel may not be the most cost-effective use of biomass, it will certainly have a role to play.

Q481 ***Lord Lewis of Newnham:*** You did state that 5 per cent was chosen as a figure because that was the amount you could put into fuel without modification. I thought you could actually get up to 10 per cent?

Dr Ladyman: Technically, you almost certainly can get much higher than 5 per cent, but manufacturers write their warranties to allow 5 per cent without infringing their warranties. I have had conversations with a number of car manufacturers, and if you will forgive me I will not say which ones because it would be embarrassing to at least one of them, as you are about to appreciate. Several of them have said to me that they would actually be reasonably open to the idea of going beyond 5 per cent, they do not see a problem with it, but one of them in particular which has made significant investments in other types of clean technology has said no, it would not go beyond 5 per cent. When pressed to say whether that is because they think there is a genuine technical constraint, they mumble a bit and shuffle their feet, which makes me think that actually it is because of a commercial interest they have in promoting other types of clean technology and they do not want this particular clean technology, as they see it, to undermine their investment. So I think in terms of technology, you are absolutely right, we almost certainly can go beyond 5 per cent and we have to work out how we can do that, and it probably will not be a technological constraint, it will be legal and requiring us somehow to compel the cooperation of the manufacturers.

Mr Furness: If I could just add, one of the European Union's technical committees has been asked to investigate raising the 5 per cent limit to 10 per cent in the case of biodiesel and they are also looking at revising the Fuel Quality Directive to allow a similar level for ethanol in petrol.

Dr Ladyman: I do not know whether you saw yesterday, actually, the very exciting announcement from BP that they are going to look to biobutanol. Of course, biobutanol does not have some of the problems which bioethanol has in terms of the tolerance of engines to it, so it may well be that if biobutanol becomes a real option then we can go significantly beyond 5 per cent, assuming we can deal with the sustainability issue. Let us never lose sight of the sustainability issue. There is no point in doing this for climate change reasons if it starts to mean that we either suck in ourselves unsustainably produced biomass or we encourage a country to sell us their sustainable biomass and sell somebody else unsustainable biomass.

Q482 ***Lord Lewis of Newnham:*** This is a percentage by volume?

Dr Ladyman: It is a percentage by volume, yes.

Q483 ***Lord Lewis of Newnham:*** In which case you can double the butanol, because it is mainly the OH group which does the damage?

Dr Ladyman: Yes.

Q484 ***Lord Cameron of Dillington:*** Just following up on that, do you think in terms of sustainability and CO_2 the Commission should issue sustainability criteria into any fuel obligation, for instance, it might try to impose?

Dr Ladyman: Certainly we have introduced sustainability criteria. We are going to have sustainability reporting in our Renewable Transport Fuel Obligation, so if it is good enough for us to do it, why would I not want to see the EU, if they were going to set such targets, do it? Certainly I think if they are intending to try and be aggressive about encouraging biofuels then there has to be some guarantee built into the process that people are getting it from appropriate sources.

Q485 ***Lord Cameron of Dillington:*** Moving on to the UK, how do you see the split between bioethanol and biodiesel in the future, and do you think that the RTFO should be a transferable option?

Dr Ladyman: It is. All the RTFO requires is that 5 per cent of biofuel is used, so we are not specifying. We do see biodiesel as being important. It will depend to some extent on the way technologies develop and the place where manufacturers choose to put their investment into producing one or the other. I would not myself rule out the possibility of us wanting to encourage at some point in the future biokerosene as aviation fuel if it could be produced from sustainable sources, because of course kerosene is kerosene whether you make it from biomass or you use it by cracking hydrocarbons. So certainly biodiesel is something we want to encourage.
Mr Furness: The obligation does not specify which fuel it has to be. My understanding from the oil industry is that in order to get to the 2010 levels we have set they will need to supply both biodiesel and bioethanol. It may be that they focus on biodiesel first, because I think it is easier for them to blend that into diesel. It does not have the same sort of difficulties which ethanol has for them, so I think they will tend to go first for biodiesel and then a year or so later go for bioethanol.

Q486 ***Lord Cameron of Dillington:*** By 2010 what proportion of the 5 per cent do you think will be home-grown?
Dr Ladyman: I do not have any figures for that. From the conversations I have had with colleagues in Defra and from reading Lord Rooker's evidence to you last week, I think he seems fairly confident that 5 per cent could be produced from home-grown sources. Whether it will be or not I suspect will depend upon whether the British farmer and the British producer get their act into gear and make sure it is.

Q487 ***Lord Cameron of Dillington:*** Or whether the RTFO is instilled for long enough and high enough to encourage the downstream?
Dr Ladyman: That is why we have gone for an RTFO. After all, it is an obligation, it is not a target, and the Government and the Chancellor have made long-term commitments to it precisely in order to give people the comfort they need to make investments. You will not have found any minister making any comment that even hints that we are going to row back from the RTFO. So if anybody out there is thinking of getting their cheque book out and making some investments, they will not have heard any discouraging noises from the Government.
Chairman: I think that is precisely the area which we would like to tackle next, so I will ask Lord Haskins to come in at this point.

Q488 ***Lord Haskins:*** The RTFO seems very interesting. It has come up time and again in our discussions with various people. On the one hand the Danish representative a few minutes ago said that they would not touch it. They have their sort of free market approach towards things. On the other hand, we hear that the Commission is looking at the RTFO as if it might be possibly practicable right across the Union. We have heard also, I have to say, from farmers' lobbies this morning that you took on some advisers, consultants, to advise you on this, who advised that the obligation should be a 15 year obligation and you have halved it, I think, and that the buy-out price should be much greater and you have halved that as well. Why did these subtle changes take place in the proposals?
Dr Ladyman: One group of people told us that we needed to have an enormously high buy-out price. Another group of people told us we needed to have no buy-out price. Another group of people told us we needed to scrap the fuel duty incentive altogether. Another group of people told us it needed to be a lot higher. When we actually picked our way through all of this and chose our strategy, at the time that we were committing to it, the buy-out price and the fuel incentive, we got equally criticised by all sides, so my view is we got it exactly right!

Q489 ***Lord Haskins:*** So it was just a judgment after listening to all the forces?
Dr Ladyman: Yes, it was.

Q490 ***Lord Haskins:*** But the 15 year argument down to a seven year argument is the one of long-term investment. Is that a long enough time for people to invest confidently?
Dr Ladyman: It is, and what we also have to do is not only encourage investment in first generation biofuels but we have to make sure that we are doing it in such a way that we do not discourage investment in second generation biofuels, because it is when we go to second generation biofuels that we get the biggest hit for the environment. So we do not want to be closing the door on that investment either. These are very difficult, narrow lanes which we have to walk down, and I hear what the farmers' representatives have suggested. I would suggest to them that if they can think of anything else where governments have made 15 year obligations, bearing in mind that chancellors never usually make more than one year obligations—the current Chancellor has made a number of three year spending commitments and a number of longer obligations than that, and I think he is pretty unique in the history of UK Chancellors in doing that—if they seriously think that a UK Chancellor was going to make a 15 year prediction, I think they are barking, to be frank. I think they have been out in their tractors for too long! I think we have judged it just about right. I think we have given the industry the encouragement they need to make their investments and the long-term confidence—

Q491 ***Lord Haskins:*** What I am reading from this is that as a result of the investment existing technology could become redundant rather quickly.
Dr Ladyman: If we get this wrong and we have misjudged when second generation biofuels are likely to be available, then clearly that would be the case. I would be interested in the Committee's advice on this. If we were to set targets in such a way that we were clearly committed to first generation biofuels for a very, very long time, what would that do to the ability of British technology and British manufacture in terms of their willingness to do the research and development to get second generation biofuels to come along? Somebody is going to do that work in the world and I would rather it was British companies that were doing it and making money out of it. So we have to get this balance right between allowing first generation biofuels to flourish and not closing the door on the long-term.

Q492 ***Lord Haskins:*** The difficulty is this is always going to be a regulated market of one sort or another. The market will not decide these issues, so you either have government intervention through tax incentives or through regulation. It is a very difficult one for governments to call.
Dr Ladyman: You say it is going to be a regulated market for ever, but let us speculate. It is probably a very dangerous thing for ministers to do and it will almost certainly get me ticked off by somebody, but let us just speculate in the very long-term. If we go for a system of emissions trading for land transport and we somehow build into an emissions trading scheme a way to encourage biofuels, maybe it will be a less regulated market. Maybe the mark II Renewable Transport Fuel Obligation will not be 5 per cent by volume, or even by energy, but maybe it will have a carbon basis to it and it will express your obligation in terms of the amount of carbon produced in the environment which you must reduce. Maybe that would be the way in which we would encourage further development in this field without us, as a government, having to intervene. We were somewhat reluctant to intervene in setting up the RTFO precisely because we could see that it was requiring us to intervene in a market place, and we are reluctant to do that, but there did not seem to be any other way, in our minds, that we could encourage this technology in the UK without doing it. So that is where we are at the moment.

Q493 ***Chairman:*** That is a very interesting point, and before I ask Lord Lewis to come back in, some of us went to visit an independent factory which was just hoping to set up in the bioethanol field. I will not mention its name, but you could probably guess what it was if you wanted to. They, of course, have got to raise their money on the stock market and they have got to convince investors not only that they have got long-term supplies but long-term sales in order to make a sensible cash-flow forecast. One of the comments made to us by this company was that really it was very difficult for the likes of them to get going unless they had both the car companies and the major fuel companies on their side. Is that one of the difficulties, that actually the big boys will want to take over and some of the independents are looking at it now and, if anything, be rather put off by this announcement by BP and Dupont?
Dr Ladyman: I think it is inevitable that any long-term market where there is considerable money to be made will attract the attention of big players. That is just the world that we live in, and none of us should be naı£ve enough to believe that that is not the case. I certainly believe there are opportunities for small players at the moment. I certainly believe that there are opportunities for people to invest in bioethanol at the moment and anything we did in the future would have to recognise the investment they are making and ensure they are going to get a return on it, but if they think they are going to get the market to themselves for ever and they are not going to find themselves one day competing against Shell and BP, and the other big players, then of course they are sadly mistaken. Those players will always want to be in a lucrative market.
Mr Furness: I think the Renewable Transport Fuel Obligation has always been about mainstreaming biofuels into the fuel mix and getting away from biofuels as a niche sector or a cottage industry, and if the obligation results in big players taking more of an interest in that sector, that is perhaps an inevitable consequence.

Q494 ***Chairman:*** Inevitability is really the word?
Mr Furness: Yes.

Q495 ***Lord Lewis of Newnham:*** You have really been talking about biofuel production processing and the potential for new processing to come along, which you hope will be far more economic than the present programme. How much money is actually being invested in this? We were told by our Danish visitor that in point of fact Denmark was investing a considerable amount of money and in fact claimed to be one of the leading experts in enzymatic-type cellulose problems, for instance the hydro-cracking of vegetable oil as opposed to esterification in the diesel area. Is the Government investing in that area at all? Is it sponsoring research in universities or other institutes?
Dr Ladyman: We are doing some sponsorship, and I will allow Mr Furness to give details of that, and if we do not have them with us, we will write to you and let you have them, but of course there are also big investments going on in the private sector, and there

we are probably not going to be able to give you any clear idea of the size of those investments because when I have spoken to the big oil companies they have made it clear to me they are making significant investments. They regard those investments as commercially sensitive. They will not even share with me, for obvious reasons, the second generation molecules which they are interested in because each of them believes they have got ideas of their own which will give them some competitive advantage. So it will be very difficult, I think, for us to give you any clear idea of how much private investment is going in, but so far as the Government is concerned—

Mr Furness: I think the Government has made it clear it is very keen to see these technologies developed. We are directly supporting some research into some second generation biofuel techniques, largely through some of the DTI's research programmes. I can either give you some examples now, or perhaps more sensibly we can send them to you?

Q496 ***Lord Lewis of Newnham:*** I would be perfectly happy for you to send them on to the Committee, but it does strike me that this is an area where this is going to become absolutely paramount, because you are going to be using basically a catalytic or pseudo-catalytic type of processor.

Dr Ladyman: That is exactly why the oil companies will not even tell us what molecules they are interested in.

Chairman: Could we move on to the impact of oil prices?

Q497 ***Lord Sewel:*** There is another question I would like to ask after that, but let us do oil prices first. What would be the effect on policy of significant movements up and down of the oil price, because clearly a lot of people who have talked to us have had the long-term oil price very much in their minds? What would be the impact on biofuels policy of, say, a drop to 30 to $40 a barrel, or an increase to 90 to $100 a barrel? Could you give us an indication of at what level of the oil price you think biofuels would be competitive without any sort of fiscal or legislative support?

Dr Ladyman: It is very difficult to answer that question. When I first was appointed to this portfolio and started to look at this issue, I think oil prices were around the $40 to $50 mark and the consultants we employed in my team were telling me that everybody seemed agreed that the figure was $60 and once it reached $60 they would be competitive on their own. We went past $60 some time ago, and yet the people who make these things still tell me they need lots of incentives to help them carry on. If you had asked me that question twelve months ago, I would have been quite happy sitting here telling you it was $60 and now we have gone past $60 and I am not happy telling you it is $60 any more. So I cannot absolutely give you an answer to that, and I think one of the reasons is because at the moment these biofuels, of course, are additives into other fuel mixes by and large, so the price tends to track what the price of the rest of the market is doing, so I am afraid there is not a simple answer there. What I can assure you is that we have designed the regulations which govern the buy-out price and the way we are incentivising biofuels such that if we suddenly found that everybody was buying out of the process, we could increase the buy-out price in order to disincentivise them from doing that. Likewise, if we found that people were building up credits because it had become so profitable to include bioethanol, we could adjust the buy-out price and the incentives to deal with that if we wanted to. So we have got the mechanisms there to deal with fluctuations in the price, but I am afraid I just do not have a clear-cut answer to your initial question.

Q498 ***Lord Sewel:*** Could I ask the question I wanted to ask? I have found this inquiry incredibly difficult, quite honestly, just to get to grips with, and I think it is in part because there are dual objectives behind the policy. It is clear that in some countries the real concern is energy security and for others, a smaller number, it is CO_2 emissions and the countries which seem to be making most progress are the ones which are looking at it in terms of energy security. Other countries, including ourselves, and perhaps the Danes, who are more concerned about CO_2 emissions, have been hesitant. The Danes, I think, have been remarkably up-front and have said, "Look, we don't think this is a cost-effective way of meeting a CO_2 target, so we don't want any regulation at all here. We don't want anything imposed upon us. We will set ourselves a high CO_2 target and we'll put our money in the most cost-effective area." Is that not the best way of doing it?

Dr Ladyman: They have chosen to put their money in what they think is the most cost-effective area. We are putting our money in what we think is the most cost-effective area. We are investing heavily in other technologies. Again, you will have to seek the advice of an energy minister if you want to go into the detail of how we are trying to encourage other forms of renewable energy and energy conservation. My responsibility is particularly for the climate impact of land transport and I have to take account not only of climate change but of the effect on our economy of anything which costs British business or the British tax-payer more than they are currently paying and more than the market place can sustain. I think, with the RTFO as we have set it at the moment, we have struck the right balance and I think it is a pretty cost-effective way of stimulating research into what could potentially be very important technologies, making some contribution to issues like energy supply and

energy security, but most importantly doing the carbon equivalent of taking a million cars off the road.

Q499 ***Lord Sewel:*** It is just that it might be lurking out there somewhere that in order to reach a British global CO_2 target transport is not the area to do it in?
Dr Ladyman: That is entirely possible, but the view of the Government is that everybody has to make their contribution. I can assure you that I have regular meetings with my colleagues across government. We do not accept any obligation on transport which we do not think can be cost-effectively produced. Of course, because climate change is the number one threat which the planet faces at the moment, the Prime Minister and the Secretary of State for the Environment are very firm that every government department must do everything it can to contribute, but they are always persuaded by the argument that what we are being asked to do would damage the economy, and I can assure you that I have not been asked to do anything which I think would damage the economy. I think this has got the balance just about right for us.
Chairman: We have only got a few more minutes of your time, Minister, and I know Baroness Miller would like to catch your eye.

Q500 ***Baroness Miller of Chilthorne Domer:*** You referred a moment ago, Minister, to the fact that the high oil prices had less of an effect on promoting biofuel where it was a mix, but obviously the market cannot have much of a pull on this for anything else, such as the 85 per cent option, for example, when the distribution network denies it to them. What do you mean to do about the distribution network to solve the fact that the market actually has no choice in this?
Dr Ladyman: The market does have a choice in it because the market sells both the E85 mix and is responsible for putting the infrastructure in place, and there are vehicle technologies out there. There are at least two available now, the Saab 95 and the Ford Focus with E85 engine options available to them. So far as we are concerned, we make available something called the infrastructure grant, so if people want to put E85 pumps into their forecourt we will supply some funding to help them do it.

Q501 ***Baroness Miller of Chilthorne Domer:*** Let me be very specific. By "the market" I mean the actual end consumer and you have addressed the middle man. If I, as a consumer, wanted to buy a Ford it would be useless because I have got no way of filling it up anywhere near where I live.
Dr Ladyman: That is true, and that is why we have been trying to stimulate interest in local programmes which can kick-start this initiative. There are two at the moment. There is one in the West Country, is it Cornwall?
Mr Furness: I think in Somerset they have a number of E85 pumps.
Dr Ladyman: And there is one in the East of England. Unfortunately, if you fill up your E85 car in the east of England, it will be empty again by the time you get to the other area! But the important thing about the E85 vehicle, of course, is that you can fill it with ordinary petrol, so if you cannot get E85 you can just use what you can get. You are not going to break down on the motorway with no fuel available to you. So if we can stimulate it in local areas and start getting a market going in those local areas, then we can start spreading it out from there. There are two at the moment and my officials and I keep exploring ways in which we might be able to one day encourage a cluster here in London. If we could get a cluster in London, we would be going a long way to kick-starting this market.
Mr Furness: It may also be that the Renewable Transport Fuel Obligation is enough of an incentive for oil companies to start supplying an amount of E85 fuel because they will get a lot of credits for doing that under the obligation and it would give them a degree of flexibility in how they comply with the –

Q502 ***Lord Haskins:*** How quickly will we know if that is working?
Dr Ladyman: The RTFO begins in 2008 and I would guess if we have not started to see people putting in or starting to talk seriously about putting in the infrastructure by the end of next year, then clearly the RTFO is not having that particular effect.

Q503 ***Lord Haskins:*** So you could then adjust bits of it, as you said earlier?
Dr Ladyman: Then we would have to look at things like the infrastructure programme and other incentives. I have to say—and you are probably surprised to hear me say this as a Labour politician—I am not happy about intervening in markets and what you are putting to me is that governments should be creating a market and governments typically have not been very good at creating markets. The markets they have created have not lasted for very long. So I would much rather see the genuine market addressing this issue, rather than me having to intervene to make it happen, but we have done what we believe is necessary to start the process.

Q504 ***Chairman:*** Thank you, Minister. I allow myself the privilege, as Chairman, of the last question to you. One of our witnesses this morning, when we were talking about how was it that some EU countries have moved forward more quickly than us—I take your point about not trying to compare like with like—said that one of the difficulties is that

in, let us say, France and Germany, if you have something you want to do in this field you know precisely which minister to go and talk to about it, and that is not true in Whitehall. We are not quite certain whether it is going to be Transport, Defra, the Treasury, what have you. Do you think—and you have been pretty straight with us this afternoon—that is still one of the troubles with us, that in this area we have been talking about there is no clear ministerial responsibility?

Dr Ladyman: I am sad that somebody felt like that, because I am clearly designated as the minister who has responsibility for developing policy in terms of transport fuel. Clearly, there are other aspects to what I do which have to be cross-departmental. Encouraging the British farmer to produce biomass is clearly a Defra responsibility. Setting climate change targets is clearly a Defra responsibility. Duty is clearly the Treasury and the Chancellor's responsibility. So I have to liaise with colleagues in all of those departments, but I would hope that I would have been seen as offering something of a one-stop-shop, so if somebody has any doubts about these issues, if they approach me or my office then I would undertake to make sure that they were, if not speaking to me then speaking to the people they ought to be speaking to.

Q505 ***Chairman:*** The Sustainable Development Commission came to talk to us this morning. They are financed by, I think, five different government departments, and the Scottish Parliament and the Welsh Assembly, but not by the Department for Transport.

Dr Ladyman: We provide funding to an awful lot of people and they are probably the only group in the entire country that we have missed out!

Q506 ***Chairman:*** Enough said! Thank you very much indeed for coming to talk to us this afternoon. We much appreciate it, and if there is anything more you want to say to us that we have not had time to ask you, send it in to us.

Dr Ladyman: I certainly will. Thank you very much.

Supplementary letter from Dr Stephen Ladyman MP, Minister of State, Department for Transport

When I gave evidence to your Committee on 21 June, Lord Lewis asked for details of Government support for research into advanced, "second generation" biofuel production processes. I undertook to write to you on this.

The information is conveniently summarised in the attached Lords Hansard extract from December 2005. The Committee might also be interested to see the results of a DTI scoping mission to the US and Canada last year (at http://www.oti.globalwatchonline.com/online_pdfs/36526MR.pdf), which aimed to provide an overview of the current status and future trends of technology development in bioenergy in the US and Canada.

As I said to the Committee, however, Goverment-funded research is only a small part of the overall picture. Our expectation (which has been borne out by recent announcements from BP and others) is that the Renewable Transport Fuels Obligation will stimulate a range of industry-led research and development projects. This is because it will give a very strong and stable incentive to obligated companies to invest in the development of advanced, cost-effective biofuel production processes which can deliver the maximum carbon savings at the lowest cost. This will be all the more true if, as we hope, we are able at some point in the future to introduce into the RTFO direct incentives for those fuels which offer the highest levels of carbon savings.

Stephen Ladyman

21 June 2006

Annex A

EXTRACT FROM LORDS HANSARD, 15 DECEMBER 2005: COLUMN WA178

ETHANOL

Lord Campbell-Savours asked Her Majesty's Government:

What support they are giving to research into, and development of, the use of ethanol as a fuel for motor cars. [HL2658]

The Parliamentary Under-Secretary of State, Department of Trade and Industry (Lord Sainsbury of Turville):

Under the Department of Trade and Industry's technology programme and its predecessors there have been some projects on the production of the fuel and the environmental impacts of production.

Current projects on production

Hyperthermophilic Proteolytic Fermentation to Generate Ethanol as a transport fuel, by British Leather Research, is investigating the production of ethanol from waste proteins and fats. Total value £186,000 grant £93,000.

Biofuel production from plant biomass, derived sugars, by TMO Ltd, is investigating the production of ethanol from complex sugars using thermophillic bacteria. Total value £585,000 grant £234,000.

Final reports from past projects on environmental impacts:

URN 03/836, Carbon and energy balances for a range of biofuels options. Sheffield Hallam University.

URN 03/982 Technology Status review and carbon abatement potential of renewable transport fuels in the UK. The two reports commissioned by Defra which cover bioethanol:

> Liquid biofuels—prospects and potential impacts on UK agriculture, the farmed environment, landscape and rural economy Central Science Laboratory, 2002.
>
> Liquid biofuels—industry support, cost of carbon savings and agricultural implications Central Science Laboratory, 2003.

As part of the sustainable arable LINK programme, Defra is co-funding with the Scottish Executive an industry-led project which has relevance for bioethanol fuel although it also covers other uses for cereals eg for animal feed, alcoholic drinks etc. The research could reduce the energy inputs required for producing feedstock, reduce the cost of the feedstock, and improve the efficiency of the fermentation process—potentially increasing the energy balance of bioethanol production and reducing the cost of bioethanol.

LK0959—Genetic reduction of energy use and emissions of nitrogen in cereal production. Total value £2.5 million. Grant for biofuel aspect of the project £273,000.

The Department for Transport has also supported research into the long-term prospects for significant use of biofuels in the transport sector (available at www.dti.gov.uk/energy/sepn/futuretransport.shtml), and research into the emissions consequences of ethanol blends (available at www.dft.gov.uk/stellent/groups/dft–roads/documents/Page/dft–roads–32579.hcsp).

EPSRC has one grant that specifically mentions ethanol in this regard:

> GR/T28560/01—Radical Kinetics for Combustion Applications, Dr P Seakins, University of Leeds, £867,663.80, started 20 June 2005.

26 June 2006

21 June 2006

Letter to the Sub-Committee from M P Carl, Director-General, Directorate-General Environment, European Commission

Thank you for your call for evidence in relation to EU biofuel strategy. I am grateful for the opportunity to comment.

Within the Commission, DG TREN has the primary responsibility for biofuel policy. In view of this DG Environment does not have observations to make on the majority of the questions posed in your document.

I am pleased to attach a detailed response to question 6 on technical barriers.

7 July 2006

Memorandum by European Commission: DG Environment to Question 6

Question 6 refers to Technical Barriers. Some of the requirements of the Fuel Quality Directive have the potential to constrain how, and in what quantity, biofuels may be employed. It should first be recalled that the limits set in Directive 98/70 serve a number of purposes. The Directive was adopted under Article 100 of the Treaty to facilitate the single market in the fields of vehicles and fuel. It has as its objective to put in place the minimum standards for petrol and diesel fuel to ensure adequate protection of health and the environment.

The Commission adopted in 2005 a Thematic Strategy on Air Pollution that established emission reduction targets for the Community for a number of pollutants. The impact of biofuels on pollutant emissions needs to be considered within this framework. NOx and Volatile Organic Compounds (VOCs) are precursors of ground level ozone which has negative health and environmental impacts. The Thematic Strategy aims to reduce NOx emissions by 60 per cent and VOC emissions by 51 per cent by 2020.

By virtue of the definitions of petrol and diesel set out in Article 2 of the Directive, it only applies to fuel that is more than 70 per cent derived from mineral oil. Therefore the use of pure biofuels, or any blend exceeding 30 per cent biofuel in petrol or diesel falls outside the scope of the Directive.

It is generally agreed that the easiest means of introducing biofuels to the market is by blending them into petrol and diesel. At low concentrations, these fuels do not appear to have adverse effects on vehicle performance.

A number of the elements of the Directive constrain what quantity and how biofuel may be employed as blends in petrol and diesel. The main explicit limits are in relation to the limits on oxygenates (specifically ethanol, ethers and overall oxygen limit) and the maximum permitted vapour pressure.

In addition, because of the higher density of FAME (Fatty Acid Methyl Ester) compared to mineral diesel, the maximum permitted density of diesel means that if large proportions of biodiesel are blended into diesel, the pre-blended feedstock has to have a lower density to remain within the maximum permitted level for the final fuel.

The limits on oxygenates were put in place as a result of concerns about higher levels of oxygenates leading to increased levels of NOx in vehicle exhaust emissions. Emissions of non-regulated pollutants such as acetaldehyde and formaldehyde are also reported to increase with oxygenate use. The vapour pressure limits are established to limit emissions of VOCs from vehicles. When ethanol is blended in petrol it also leads to a significant increase in the permeation of VOCs (Volatile Organic Compounds) through fuel system components.

Ethanol can cause damage to fuel system components and this is another factor that needs to be taken into account when considering the maximum permissible volume of ethanol in petrol.

The Fuel Quality Directive is curently under review. The Commission has extensively consulted stakeholders, including through two stakeholder meetings held in 2005 in Brussels. Some scientific work has also been carried out in relation to the impact of vapour pressure on evaporative emissions from vehicles. The Commission is currently preparing the Impact Assessment of the different aspects of the review of the Directive. It is hoped that the Impact Assessment will be completed during the Summer. Subsequently the Commission will, if necessary, prepare a proposal for amending the Directive in those areas that are considered appropriate.

Examination of Witness

Witness: MR PAUL HODSON, European Commission, Energy and Transport Directorate, examined.

Q507 ***Chairman:*** Mr Hodson, thank you so much for finding time to come and talk to us this afternoon. We much appreciate it. This is the last day and I think you actually are our last witness. This is our last day in taking oral evidence for the short inquiry we have been doing on the EU targets which were set two or three years ago and the possibility of them being now revised for biofuels. We are obviously very interested in why Britain is so far behind some of the Continental countries, what is likely to be in any new targets, et cetera. So we greatly appreciate your coming this afternoon. This is on our parliamentary website. We will send you a draft transcript in due course and if there is anything you want to correct you will have the opportunity to do so. Is there any introductory statement you would like to make to us before we start asking you questions?
Mr Hodson: Not really a statement, my Lord Chairman, but I should say that I am an official with the European Commission and I am very happy to contribute to your inquiry as far as I can with factual points, but there will be perhaps political issues which you will raise which it is not appropriate for me to trespass on.

Q508 ***Chairman:*** Those are the ones upon which we will press you the hardest! We hear what you say. Thank you very much indeed. Could I start with a fairly basic question, which is how, against Directive 2003/30/EU, do you rate EU progress in general terms on liquid biofuel use?
Mr Hodson: To quote some numbers, the share of biofuels in 2000 was about 0.2 per cent. When the directive was adopted in 2003 it was about 0.5 per cent. We do not yet know what was achieved in 2005. It will certainly be somewhere between one and 1.4 per cent. You can look at those numbers in two ways. You can say there is certainly a very rapid rate of growth there, but you could also say the reference value in the directive for 2005 was 2 per cent and we are clearly quite a long way short of that. So I think it is a mixed picture and it depends how you look at the figures.

Q509 ***Chairman:*** You have been involved in this sphere of activities in the Commission for quite some time. Would you say that as a whole this has gone the way you would have anticipated three or four years ago, about the same amount of success and non-success?
Mr Hodson: The directive says what it says. The politicians, through the Council and through the Parliament, took a decision in 2003 on what their level of ambition was, and that level of ambition was 2 per cent, and that was clearly established. However, they also decided that Member States would have a wide range of discretion around what targets they would set, so it cannot have been a surprise to them that more of those targets were below the reference value than were above. So I think the Commission would have been happy to see the 2 per cent achieved, but we cannot expect, with the structure of the directive that we have, that that will necessarily be the case.

Q510 ***Chairman:*** Looking forward then to 2010 and the new directive on the subject, do you think that the EU system of targets, such as they now are, needs to be adapted, to be changed, and if so, how?
Mr Hodson: This is a question in the review which the Commission is currently conducting. We will be very glad to hear the opinion of the Committee and of other bodies on that subject.

Q511 ***Chairman:*** I expect you wrote that opinion, did you not?
Mr Hodson: I wrote the questions, but it would be inappropriate for me to express an answer in advance of receiving the responses to the questions from the whole range of those who will be answering, including, I hope, yourselves.

Q512 ***Chairman:*** But you expect change?
Mr Hodson: We are asking three questions. The first one is, are biofuels still a good thing? The second one is, if they are still a good thing from an economic and environmental point of view, are we on track to achieve the 5.75 per cent objective? It is only if we conclude that they are still a good thing and that we are not on track to achieve the 5.75 that the directive encourages us to come forward with proposals for amendment and we will go through those three steps. We have not yet gone through steps one and two, therefore it is premature for us to say whether step three is needed. The consultation document, which I think you have seen, sets out quite a few options, if we do go to step three, which could be adopted but we have taken no views as to whether any of those (or if so, which) will be proposed by the Commission.

Q513 ***Chairman:*** Have you lost any of your confidence in biofuels in this past year or two?
Mr Hodson: This is question one, is it not, are they still a good thing? The answer is, no we have not changed our level of confidence.
Chairman: Thank you.

Q514 ***Lord Palmer:*** That has rather sort of made me sit up and think, because of my involvement over the last 10 years. Our Chairman alluded to the fact that

this country is lagging behind most of our European counterparts, with the possible exception of Denmark. In your view, which Member States really have achieved most success with biofuels for their transport and why do you think this is?
Mr Hodson: Sweden and Germany are clearly the Member States which have achieved the most success. Germany was at 1.7 per cent in 2004, Sweden was at 2.3 per cent. Preliminary figures for 2005 for both those countries showed them closer to three than to 2 per cent, so they are achieving the biggest market share, Germany with biodiesel and Sweden with bioethanol. They have both had a consistent policy over quite a number of years in favour of biofuels. They have both used a range of measures rather than a single measure to achieve that. They have both promoted high blends as a starting point, so 100 per cent biodiesel use in the case of Germany and 85 per cent or 95 per cent ethanol use in the case of Sweden, but then they both accompanied that with measures to support low blends. They both had adequate financing in place and they both sourced their biofuel partly from domestic production but also partly from imports, so I think there are some things in common between those two success stories.

Q515 ***Lord Palmer:*** Which would really explain why the UK does not rank very highly against our European competitors, because of the lack of direction?
Mr Hodson: If you look at the data for market share in 2003, the UK had a very low market share for biofuels, but that is true not only of the UK but of the majority of Member States. In 2003 a minority of Member States had already started to achieve significant shares of biofuels, so I do not think it is appropriate to single out the UK as one of the very worst performers in this respect. Having said that, given that I have said that Sweden and Germany both have a long history of support and that the UK was only beginning in 2003, clearly at least in that respect that was a factor which has been lacking in the UK and was present in those other countries.
Lord Palmer: Thank you very much.

Q516 ***Lord Haskins:*** Explain why the EU should play a role in this, in the sense that you were saying Member States vary enormously according to what they are doing. Where does the EU make an added contribution to this whole argument?
Mr Hodson: There are two ways in which the EU makes an added contribution. One is that the support which Member States give for biofuels is state aid, or is at any rate subject to EU law on competition and on state aid, and it was necessary to adjust those rules and to make it clear that Member States are encouraged and are enabled to take action in favour of biofuels, and that meant that the biofuels directive we are talking about was accompanied by the Energy Taxation Directive, which facilitated the giving of tax exemptions for biofuels. The second link is that Member States are choosing to go forward together in at least this choice they made about energy policy. I said that in 2003, based on national choices, five or six countries had established a significant share for biofuels. The big change which has happened since then is that most Member States have begun moving, and that is a clear product of a collective choice through the EU's decision-making machinery.

Q517 ***Lord Haskins:*** And Denmark is the only country out of step?
Mr Hodson: At one point Denmark adopted a target of zero and when Denmark's target was zero then it clearly was in a different place from all the other Member States which had adopted a positive target. Denmark has since amended its target, so it is now 0.1 per cent and it is now at the bottom of a continuum rather than on the other side of a gap.

Q518 ***Lord Haskins:*** You are aware of this awful acronym, the RTFO, the Renewable Transport Fuel Obligation, which is about to be introduced here?
Mr Hodson: Yes.

Q519 ***Lord Haskins:*** There has been a suggestion that the EU is interested in this, as to how it might develop, and that it might even be a basis for a directive at some time in the future?
Mr Hodson: We are interested in it, that is correct. There is a number of Member States which are thinking of, or have already adopted measures which fall into this general category, that is to say an obligation on fuel suppliers to achieve given shares of the market. There are four aspects where the UK measure is distinctive. The first one is the use of tradable permits. The second one is a clearly developed penalty system. The third one is the way in which tax relief is being reduced but not completely removed at the same time the scheme is being introduced. The fourth one is the link to reporting on sustainability. All of those dimensions are something which the UK is bringing to the European policy discussion, which is a very active one. I know that in Germany and in the Netherlands, two other countries which are looking at obligations, the UK scheme is being studied and, as you said, it is one of the options which could be adopted at European level in an amendment of the directive to do the same thing at a European level.

Q520 ***Chairman:*** Is this the sort of area where you have had some talk with the British Government before this RTFO, for example, was introduced? Are you exchanging ideas at all with Whitehall in this area?

Mr Hodson: Very much so. I personally must have had four or five meetings with the UK authorities in the two and a quarter years I have been doing this job to discuss both policy developments in the UK and also policy developments at European level.

Q521 ***Chairman:*** Who are the UK authorities in this respect?
Mr Hodson: The Department for Transport. They are my interlocutors on this. That was European jargon, but I hope you understand it.

Q522 ***Chairman:*** We were told a bit about the Climate Change Commission's report which they have submitted to the Department for Transport, in which they recommended that actually the RTFO should be made firm for 15 years rather than three, and of course the Transport Minister has not accepted this at this stage. Is there any comparable like that developing in other EU countries? I think the report they received said that in order that there should be certainty in the minds of people as to what was happening next, instead of just introducing the RTFO for three years it would be much better if it was for a much longer period?
Mr Hodson: I am not aware of that report.

Q523 ***Chairman:*** I think it was a question of the buy-out being known for a much more substantial period of years.
Mr Hodson: This may well be connected to the state aid clearance which is being sought for the buy-out part of the scheme.

Q524 ***Chairman:*** It has been given. There is no EU problem about the buy-out.
Mr Hodson: I am not aware of any EU problems. I am sorry, it is not helpful for me to comment on that. If I could comment on the other half of your question, if I may, which is about the long-term, one of the issues we raised in the consultation is whether it is necessary to extend EU reference values beyond 2010 to 2015 and 2020, and the benefit of doing that would clearly be to give more certainty and a more clear framework to investors, and that would be helpful for biofuels in general. It would also be particularly helpful for the most capital-intensive forms of biofuels, which are the second generation biofuels, which have extra advantages to offer.

Q525 ***Chairman:*** Are you making a recommendation in that direction?
Mr Hodson: We are waiting to see the result of the consultation exercise.

Q526 ***Lord Haskins:*** But the Minister did say to us just now that their concern about the long-term was that events could overtake it, in other words that they need to be flexible to be able to keep up to date with the technological development.
Mr Hodson: We need technological development in this area. We need to bring the second generation biofuels to the market and we need to set up an incentive system which encourages the firms which are developing those fuels to keep investing and to go to the necessary scale, which will bring the costs down. So there would not be any disagreement at all on that point. It seems to us that the argument can be made that one element of establishing that incentive framework is to know that the targets do not stop in 2010 but run forward to 2015 and 2020.
Lord Haskins: Yes.

Q527 ***Lord Lewis of Newnham:*** You make the remark, "We need". Is that a remark involving an assessment of the present economic situation of the production of biofuels, or is this just "We need" because it is going to be a good thing to have a more effective way of dealing with this problem?
Mr Hodson: If they are a good thing, then it is best to have biofuels which are capable of being made from a wider range of feedstocks, which is the biggest advantage of second generation.

Q528 ***Lord Lewis of Newnham:*** It is the phrase, "We need" and "need" seems to imply to me an obligation of some form or another, or a necessity of some form or another?
Mr Hodson: Perhaps it was loose language then. I mean in a context where we are working to promote biofuels it makes sense to promote, to bring better biofuels into the market.
Lord Lewis of Newnham: I would agree.

Q529 ***Lord Plumb:*** How do you see the future developing, and the market in particular, on an EU basis between biodiesel, bioethanol and biogas?
Mr Hodson: Biogas has the disadvantage that it needs to be used in very different cars or vehicles and while that does not rule it out as an option, it seems to mean that it is unlikely to achieve the market shares which biodiesel and bioethanol will achieve. Between biodiesel and bioethanol the split is approximately 80 per cent biodiesel at the moment and, if anything, the share of biodiesel is growing slightly. The biggest influence over the medium term will be which kind of second generation biofuels become commercially viable and technically viable. If BTL (which is biomass to liquid, which is a replacement for biodiesel) is made technically viable, it produces a fantastic quality fuel which is better than biodiesel, better than diesel in its characteristics from the point of view of the car makers, and that will win a big market share. If cellulosic ethanol (which is the second generation ethanol) comes to the market and BTL does not, one would expect that alone would mean that the ethanol

to diesel balance would improve. Setting aside this question of second generation, attempting to answer your question, Lord Plumb, from the point of view of first generation, a lot will depend on the attitude of the fuel companies, which in turn is heavily influenced by the fact that at the moment they have got too much petrol and not enough diesel. Having said that, there are also technical developments which could make it easier for them to incorporate ethanol into petrol and we would have hopes that that would encourage the use of ethanol over the medium term.

Q530 ***Lord Plumb:*** Do you have any estimates of the cost of producing fuel within the EU and how that compares with, say, Brazil, the United States and Canada?
Mr Hodson: I have estimates, but every source you read gives a different figure and that is partly to do with real differences and partly to do with differences in methodology. We have worked with figures of about €900 per tonne of oil equivalent for ethanol, which is equivalent to about €45 per hecto litre, and we have worked with figures of about €750 per tonne of oil equivalent for biodiesel, produced in the EU in both cases. As I say, those are at the centre or perhaps towards the lower end of quite wide ranges of real costs. Nowhere in the world has a stronger record on biodiesel production than we do, so we have costs which are competitive there. On bioethanol, both the United States and Brazil are cheaper. I am afraid I do not have Canadian figures. On the Brazilian side, again it depends a lot on the price of the imports, which vary according to the state of the harvest and the demand for sugar, but probably less than half most of the time of the European production costs for bioethanol, and American costs for corn-based ethanol are certainly a good deal lower than ours, typically about halfway between the Brazilian and the European prices. Having said that, the price at which we, purchasers within Europe, can buy Brazilian ethanol is not the same price as it is produced by the producers in Brazil and it tends to be on sale here at only a slight discount to European production.

Q531 ***Lord Plumb:*** Is the American price or the cost of production related to the level of subsidy which is paid in America on the product?
Mr Hodson: These figures are intended to be net of subsidy, although that is always a difficult thing to achieve. The figures I gave were intended to be the true cost of the production of that fuel. Having said that, there are two reasons why the American production is cheaper than the European production. One is scale, and we can match that scale if we ramp up European ethanol production. The other is that the feedstock is cheaper and that is a consequence of much broader agricultural and agronomic factors.
Lord Plumb: Thank you very much.

Q532 ***Lord Livsey of Talgarth:*** What I would like to ask is, given the primary producers are producing a lot of the primary products to convert into biofuels, what discussions have you had with the EU Agricultural Commission and have you had any discussions with the Commissioner about downstream involvement of, shall we say, marketing biofuels by primary producers' cooperatives?
Mr Hodson: I am too lowly to have discussions with the Commissioner, but we, DG Transport and Energy, and DG Agriculture, were co-authors of the Biomass Action Plan in December 2005, co-authors of the Biofuel Strategy in February 2006. We very much see that we have a role on the demand side and the Biofuels Directive creates a demand or encourages Member States to create a demand which was not there before, and the agricultural services have a role on the supply side to ensure that at least part of that demand could be met from European production. On the point about cooperatives, it is not an issue that we have specifically discussed with our opposite members. I know that in France, for example, quite a high priority is given to ensuring that some of the added value goes to people within the agricultural sector, but it is not an issue we have looked into.

Q533 ***Lord Sewel:*** What role do you see for imports of biofuels and biofuel feedstocks from non-Member States and to what extent have imports of low-cost biofuels inhibited the domestic biofuels production in the EU? Also, if you could answer a question which is lurking behind a number of the issues we have discussed, which is, is it actually possible to demonstrate that biofuels are a cost-effective way of reducing CO_2 emissions?
Mr Hodson: On imports, on the one hand it is neither possible nor desirable to follow an antarkic route in which Europe would meet all its needs or all its objectives for biofuels with domestic production. We do not want that, and we could not do it even if we did want it. On the other hand, we do not want the outcome to be one in which all of the needs or all significant parts will be met with imports, even if those imports are cheaper. The reason for that is that Europe or the EU has adopted these policies for three reasons. One is greenhouse gas reduction, the second is security of supply, and the third is to develop economic opportunities in rural areas. If you adopt an all imports route, it is not clear that you achieve as much across those three objectives as you do in a mix where there is also domestic production.

Q534 ***Lord Sewel:*** So you have got the problem of confusing and possibly conflicting objectives?
Mr Hodson: We have three objectives.

Q535 ***Lord Sewel:*** Confusing and possibly conflicting?

Mr Hodson: We have three objectives. The second question, I do not have any data which would enable me to answer that question, that is your point about has the low cost imports led to a lack of domestic production. You have what various interest groups will say about that, but I am not aware of anything which can enable me to give a confident view on that. On the third question, if your objective is purely to reduce greenhouse gas emissions and you do not have any concerns about which sector that is achieved in and you want to do that in the short-term and you want to do that with the least expenditure of public money, then biofuels are not the right way to do that because there are other means of reducing greenhouse gas emissions which are at a lower cost in public money. That is the case, for example, with energy efficiency. It is also the case with applications of other forms of renewable energy, such as wind power. The greenhouse gas part of the case is that transport is not as easy a sector to achieve greenhouse gas reductions in as other sectors and while agriculture, services, households, electricity generation, have all achieved a steady state or reducing greenhouse gas emissions in the EU25 over the last 10 to 15 years and are forecast to continue doing so, emissions from transport have risen and are forecast to continue rising. So the greenhouse gas argument for taking action on biofuels is that it is one of the few methods available to us to achieve significant reductions in greenhouse gas emissions from the transport sector, a sector where all measures are difficult, either politically or financially. Coming to your question about cost-effectiveness, from an EU point of view it would be appropriate to assess cost-effectiveness against the contribution which biofuels make to all three objectives which we have and not only to the greenhouse gas objective. It is on that basis that political decisions have been taken at EU level.

Lord Lewis of Newnham: Thank you.

Chairman: If we could move on to the impact of oil prices.

Q536 ***Lord Lewis of Newnham:*** Obviously one thinks about the price of biofuels in terms of the impact on present oil prices, which have got a little bit crazy in the immediate past. How has the rise in the price of crude oil affected the Commission's thinking on fuel security, which seems to be a motivation for why some people have got involved in biofuels, and do you foresee a price for crude oil at which biofuels would be directly competitive? I realise this is not an easy question because, of course, it depends upon the length of time at which this figure will stay, but those are really the two basic questions I have.

Mr Hodson: On the first question, the Commission's concern about security of energy supply pre-dated the increase in the oil price and it is a concern about excessive dependence upon a number of sources of fuel and a concern about the need to diversify the sources of energy which we have in order to reduce risks. One of those risks is price-related, but that is only one of the risks which would concern us. The increase in the oil price reduces the cost of delivering certain alternatives, including biofuels. It reduces the cost compared with the cost of continuing to use conventional fuels and it is probably in that respect that it has had the most impact on our thinking, but the broader energy security agenda continues to be one which is a concern. On the question of the price of crude oil, there is a technical answer, which is that if the figures I gave earlier are approximately correct, then oil would need to rise to €75 per barrel—

Q537 ***Chairman:*** Dollars?

Mr Hodson: Euros, because we are comparing this with Euro-denominated production, in order for biodiesel to be competitive with diesel, and to €95 per barrel in order for bioethanol at the prices I have quoted to be competitive with petrol. As perhaps the answer I gave to Lord Plumb in relation to the American market suggests, we believe there is scope to reduce European production costs and thus bring those numbers down, but they are still significantly higher than the price of oil today.

Chairman: Thank you. We have kept you a long time, but we have one or two more questions only.

Q538 ***Lord Cameron of Dillington:*** Reducing greenhouse gas emissions is your first objective, perhaps I could say your primary objective, in promoting biofuels. I am just wondering whether you felt the EU should involve itself in the life cycle of the production of biofuel, and if you were to interest yourself in that whole production process what levers do you think would be best to achieve low greenhouse gas emissions in the life cycle of the production of biofuels?

Mr Hodson: It is one of the questions we are looking at quite closely. We have not taken a view yet whether to make a proposal, but it is certainly something we are looking at seriously. There are three questions which arise in working out how you could do it. The first one is, how can you measure and establish criteria for what you want to encourage, and can you actually measure what the greenhouse gas emissions are in a way which you are comfortable with? In addition, given the fact that greenhouse gas is only one of the European Union's objectives, it might be necessary or appropriate for any such scheme also to include the measurement of other objectives which are even more difficult to measure than greenhouse gas. Security of supply has no consensually agreed method of measuring, so that is one problem which would need to be solved and which we are looking at. The second problem is, what mechanism would you use to actually ensure that, having established those

criteria, you were getting an outcome which was consistent with those criteria, for example a big part of the greenhouse gas emissions from biofuel production is related to land use and there is the possibility of displacement where you displace an activity which would otherwise have taken place on a piece of land, you measure the emissions from that piece of land—

Q539 ***Lord Cameron of Dillington:*** And import food from far away?
Mr Hodson: Yes, the activity goes and causes excessive emissions somewhere else. So finding a way technically to do this is not easy. The third problem is finding a way to do it which is not going to get us into problems with the World Trade Organisation, and certainly any view that this was purely about imports and about controlling the greenhouse gas impact of imports would not be acceptable in WTO terms. It needs to be very clear that any measures which are put in place need to apply both to domestically produced and to imported biofuels, but in our understanding that alone will not be sufficient to ensure that you have a watertight scheme. So there are many problems, but I do not want you to get the impression that we are running away from those problems. We are looking hard at them and looking for solutions.

Q540 ***Lord Cameron of Dillington:*** Finally, bearing in mind what you have just said about balance and displacement and also the fact that we have got to produce as much of our own food as possible in Europe, what percentage of our fuel consumption do you think it might ultimately be possible for us to produce through biofuels?
Mr Hodson: I would like to answer, if I may, by talking about biomass energy in general and then I will say something about biofuels at the end. The European Environmental Agency has just published a report which looks at the environmentally sustainable production of biomass energy. So they set a set of constraints which mean a reduction in the environmental impact of agriculture, which protect roots and so on, nutrients being left in the forest. They also say that the amount of European consumed food which is European-produced should remain at the same level as it is today. So they set those constraints and then they say how much biomass energy resource is available. If you run that forward to 2030, the figures they come up with are a bit more than 15 per cent of total European energy consumption for all purposes could be met from European-produced biomass. The question of whether or not you would want to use that for transport, for liquid biofuels, or whether you would want to use it in heating or in electricity generation is quite a complicated one. There is first the technical question, can we develop the second generation biofuels which will permit us to use wood and waste, which are part of that figure, as well as agricultural crops in the production of liquid biofuels? But secondly, where does the market take us, where do the politics take us, where do the needs take us in terms of the mix between those uses? That is why I am reluctant to give a figure for biofuels alone.
Lord Cameron of Dillington: I understand. Thank you very much.

Q541 ***Chairman:*** Thank you very much indeed. You have been very helpful. I wonder if I could just end up by asking you, we know that the EU's biofuels policies are currently under review, a public consultation process which is based on a comprehensive review paper due to end in July 2006, and you are asking for responses by 10 July. We would very much like to submit our views on this in writing, but we have now got to the last of all our witnesses and we have to take some time to digest our views and come to some conclusions, perhaps. Would it be all right if we sent in our views a few days after the deadline?
Mr Hodson: Yes, and we would be very grateful to receive them. Even if they come after the deadline, you can be quite certain that they will be read with great interest.

Q542 ***Chairman:*** Thank you. That would be very helpful to us in our timing. We should send these, perhaps directly to you?
Mr Hodson: There is a website address given. The consultation document is on the Europa website and there is a link there where the responses need to be sent.

Chairman: Thank you very much indeed. Thank you for answering our questions so fully. We really appreciate it.

WEDNESDAY 19 JULY 2006

Present
Haskins, L
Lewis of Newnham, L
Livsey of Talgarth, L
Miller of Chilthorne Domer, B
Palmer, L
Renton of Mount Harry, L (Chairman)
Sewel, L

Examination of Witnesses

Witnesses: MR PHILIP NEW, Senior Vice-President, BP Fuels Management Group, MR CHRIS CARTER, Director of Corporate Affairs, British Sugar plc, MR KARL CARTER, Agricultural Director, British Sugar plc, and DR MICHAEL DOLAN, Industry Leader, DuPont, examined.

Q543 ***Chairman:*** Good morning. It is extremely kind of the four of you to come at this short notice to talk to our Committee. As you know, we are doing a report on the EU targets for biofuels and we really have come to the end of taking oral evidence, and then we read about the new plant of BP, DuPont and British Sugar, and it seemed such a potentially important development that we very much hoped that we would be able to see you before the summer holidays. We are very grateful to you all for managing to fit it in; we really appreciate it. This is all going out on our website so it is in the public domain. We will send you a copy of the draft transcript so that if you feel that there is something incorrect you have said and you want to correct it, you have an opportunity. That said, welcome. Do introduce yourselves. Is there anything that anyone would like to say before we start firing questions at you?
Mr New: I do not think there is any particular opening remark that we feel inclined to make at the moment. Just to introduce ourselves. I am Philip New and within BP I look after our biofuels business globally, so obviously I have a keen interest in everything that we are doing there.
Dr Dolan: My name is Michael Dolan and I am the Industry Leader for the DuPont, company, in biofuels in Europe and we as DuPont and me, personally, are delighted to be here this morning to answer any questions that you might have.

Q544 ***Chairman:*** Thank you. Mr Carter, we have met before.
Mr Karl Carter: Karl Carter from British Sugar. We have already met and already given evidence. I am responsible for biofuels as well as agriculture at British Sugar.
Mr Chris Carter: Chris Carter, likewise, Corporate Affairs Director at British Sugar.

Q545 ***Chairman:*** Thank you very much. Whichever of you wants to answer do so and then if others want to come in, this is on the record but very informal. We want to make certain that we cover everything. The first thing that I would like to ask is that we are an EU scrutiny committee and we very much like to get a real EU flavour into our reports. What role do you think the EU itself—the Commission and Council—should play in the development of biofuels within the Community? Would renewable transport fuel obligations be a better tool, a more effective tool for developing biofuels than fiscal incentives which we see at the moment and which are particularly prevalent in Germany?
Mr New: If we work on the presumption that a goal could be the creation of an economically and environmentally sustainable biofuels industry, then it seems to us that the EU has a pretty critical role to play in ensuring that this can happen across Europe, so, first of all, making sure that the policy objectives and goals associated with biofuels are clearly defined. What we are struggling with at the moment is, to an extent, some inconsistency in approach across Member States which creates a real risk of Balkanisation and perhaps distorted trade flows between countries and can, we think, get in the way of biofuels growing as fast and effectively—

Q546 ***Chairman:*** If I can just pick you up on the word "Balkanisation". You mean because of protected duty tariffs, not a free market, or what?
Mr New: But also different regulatory mechanisms working in different countries. An example would be the consequences of Germany's relative generosity recently in the matter of waiving a mineral tax on biocomponents as a whole, which has led to an influx of biocomponents into Germany, therefore making it more difficult for Member States bordering Germany to be able to advance their own policy goals. That is a small example but nonetheless one that we fear could have consequences in the future, creating a Balkanisation of both biofuels markets and potentially fuels markets as a whole. To that end, ensuring that policy is consistent with the principles of a Single European Market appears to us to be quite important. It is a particular concern when we think about the potential introduction of ethanol as a direct blended component in gasoline which requires modifications to the base gasoline specification. This could constrain the free flow of gasoline between Member States and have a distorting impact on the

market price of gasoline country-to-country, a phenomenon we call boutique fuels, which is widespread in America and has contributed in part to some of the supply disruptions that the US has seen, particularly on the East Coast, so far this year. I think it also plays as an extension of that point into ensuring that product specifications remain consistent across Europe and that product fungibility is something that can be offered consistently as well. It again supports the idea of a relatively efficient market. So, broadly, the importance of the EU in ensuring there is consistency of legislation and that that legislation is consistently applied seems to us to be very important.

Q547 ***Chairman:*** Could I just take you up on that, and other members of the Committee want to, too. Up until now in our preliminary conclusions, which we are sending to the EU Commission today and they will be on the website if you want to see them, we have taken the view that really the EU as an overseer is helpful and important but that basically we believe in national governments in this issue taking the final decisions. Are you suggesting that for this to work you think the EU must have more real mandatory powers by way of either Directive or Regulation?
Mr New: I would hesitate to go so far as to say that a Europe-wide mandate or some similar mechanism would be either necessary or appropriate. But ensuring, for example, that specifications are held Europe-wide is going to be very important in the future. If we have different fuel specifications it will create Balkanisation, it may create issues for the car companies in terms of what models can be sold in which markets, and so forth. That would be an example of where consistency would be critical. Where consistency would be desirable in the service of inter-state trade flows would perhaps be around regulatory mechanisms.

Q548 ***Lord Lewis of Newnham:*** Could I put the question, if I may, in a slightly different way. We have been given really two reasons why people are interested in biofuels, amongst many but two principal reasons. One is essentially the climate change problem, the CO_2 problem, but the other one is security of supply. For instance, if we look at Sweden and Germany, I believe perhaps the motivation there is more security of supply whereas perhaps the motivation in this country has been more on the CO_2 problem, so that one has quite a difference of view of the aims of actually going in for the biofuel operation as a whole. Taxation on fuel has always been a variable that extends considerably from state to state, as we know for our sins in this country.
Mr New: The European fuel market is essentially a single market and is highly fungible and inter-Member State trade flows are significant. I suppose my concern would rest in the supposition that biocomponents are likely to remain in short supply for the foreseeable future. Under those circumstances, they will tend to be attracted towards Member States that offer more generous, or more punitive, conditions. I think what we would say is that people need to be mindful of significant inconsistency if the case is that we have a shortage of biocomponents. In terms of RTFO, or similar, this interesting question of fiscal incentive versus obligation, incentives have worked to an extent, but even in the very generous case of Germany, ethanol has not really succeeded in entering into the market on any type of scale. It has had a greater impact on the introduction of biodiesel, which is for a set of technical reasons that we could come to later. Our view is that both have a role to play but we believe that it is becoming increasingly clear that an obligation will have to feature in the future, simply because of the practical concern that the fiscal consequences of sustained and significant subsidies/incentives by themselves may eventually restrict the ability of biofuels to penetrate at the type of scale that would be appropriate to the policy goals that you mentioned earlier, be it energy security or greenhouse gas savings. I think we would say that in our view the UK RTFO framework feels as though it has the potential to be a very sensible piece of policy.

Q549 ***Chairman:*** We are going to come back to RTFO in perhaps slightly more detail in a later question. If I could lead on from what you are saying, before other colleagues come in, really to take a look at the future. At the present time what percentage level of biofuel incorporation might you see in the EU, given current incentives, technologies, oil prices five years out, 10 years out, 20 years out? What would be expected in the UK? What might be your business forecast?
Mr New: I think the technical constraints as much as policy constraints play on our minds in thinking about this question. There are limitations simply on the ability to use the current generation of biofuels like ethanol or diesel from oil-bearing crops. So right now we are aiming for a 5.75 per cent by energy content penetration by 2010. We believe that is going to be difficult if not impossible.

Q550 ***Chairman:*** Five per cent by 2010?
Mr New: We think that is going to be a very difficult, if not impossible, Europe-wide.

Q551 ***Chairman:*** That is very much the view we took.
Mr New: Inconsistent regulation plays a part but at the moment we can only put 5 per cent of ethanol into gasoline. We can only put 5 per cent of biodiesel into the diesel pool on a volume basis.

Q552 ***Chairman:*** Is that partly because there is a feeling that that is the maximum amount to still make the petrol work well, in simple layman's language? How is that 5 per cent seen as right?
Mr New: Really it is to do with compatibility with vehicles.

Q553 ***Chairman:*** It is.
Mr New: Yes, so the issue with ethanol, for example, is that it has a very high oxygen content and so theoretically one could go up to 3.5 per cent oxygen content in fuel which would allow you to use 10 per cent ethanol, which then raises another set of questions. We are not sure there is enough of a food crop surplus in Europe to meet a 10 per cent requirement in the short term. Going beyond 10 per cent we would need to recalibrate car engines, re-map car engines, which we cannot do, and we also have the problem that the ethanol would start to rot engine components, which is slightly troubling. With biodiesel, again we have some issues with the cold-flow properties, and in high concentrations again there are issues with vehicle compatibility, which is one of the reasons why we are quite interested in exploring the potential for advanced molecules that can overcome many of these practical problems.
Chairman: The short answer to that is the engines, which mean you have to keep it at 5 per cent.

Q554 ***Lord Lewis of Newnham:*** Yet they are running engines at 85 per cent.
Mr New: Yes, but these are engines that have been specially adapted and you cannot retro adapt an engine. Speaking with Ford and others, it is impossible.

Q555 ***Chairman:*** You have got to build it with that in mind?
Mr New: Yes, it has got to come out of a factory and so the sheer inertia of the car fleet turnover means that even if every car was to come out as a flex-fuel vehicle today, it would still be several years before it was a significant part of the market.

Q556 ***Lord Palmer:*** Whilst I am aware that you are not car manufacturers, for example in Brazil most cars do run on ethanol. Is it completely different motor manufacturing out there?
Mr New: Volkswagen, for example, are a very big player in the Brazilian car market, and in the United States now Ford and General Motors, in particular, are being quite public in promoting flex-fuel vehicles but it is still a very small proportion of the US car fleet. About 3 per cent of US cars are flex-fuel capable. What we have to remember is that the Brazilian ethanol industry that we see today is a function of a pretty consistent application of government policy over 25 years, supporting both the manufacture of ethanol and providing strong incentives to car manufacturers to make flex-fuel vehicles and strong tax incentives to consumers to opt to buy them. So it is a very mature industry compared with Europe.
Chairman: Very interesting. Lord Livsey?

Q557 ***Lord Livsey of Talgarth:*** As a comment before asking a question, presumably this must be the reason why Ford is putting the £1 billion into research and development in the UK that has just been announced this week, but that is by the bye. You partly answered this question, in your assessment, what are the principal limitations of existing biofuels? You made a statement just now about biodiesel, I think, but particularly in relation to the environmental performance of second generation biofuels, what are the principal limitations in comparison?
Mr New: Our Chief Executive, Lord Browne, always speaks in groups of four so we have four limitations for current biofuels.

Q558 ***Chairman:*** Does he? I have heard him speak often enough. I will follow carefully next time!
Mr New: Availability, while they are based on food crops, is an issue. In the United States there is only enough corn to meet 7 per cent of US gasoline demand, we think, and in Europe we are similarly constrained. Cost: ideally to be sustainable we would want biofuels to be able to be at least on parity with conventional gasoline or diesel at about $40 a barrel of oil. I think that is a target to go for. We have spoken quite a lot about the compatibility problems with car engines. The other issue is greenhouse gas emissions. We believe that while from food crops we can get between 10 and perhaps 30 or 40 per cent improvements in greenhouse gas emissions, it is very much crop dependent in Europe. With some of the more advanced feedstock and conversion sources, that can go up to 80 to 90 per cent.

Q559 ***Lord Livsey of Talgarth:*** In doing so, Chairman, I think that partly answers my second question, which is what carbon savings in percentage terms does BP see arising from second generation biofuels, such as biobutanol, compared with savings from current biodiesel and bioethanol production?
Dr Dolan: I will give Mr New a break. In terms of carbon savings of biobutanol, the detailed what we call "well-to-wheel" work is still being done. However, we would anticipate that the types of carbon savings that you would see with bioethanol would be broadly equivalent to those with ethanol. However, I think the real benefit of course has been alluded to, the limitations of ethanol in fuels. If you look at biobutanol, biobutanol has a capability to be used in existing fuels under existing regulations at a

rate of 10 per cent, as opposed to 5 per cent for ethanol, and of course that translates directly into a potential doubling of the carbon savings just based on this existing technology.

Q560 ***Lord Livsey of Talgarth:*** So existing engine technology in cars can quite easily cope with that?
Dr Dolan: Absolutely. That is one of the reasons why we have been working towards biobutanol for several years now.

Q561 ***Lord Lewis of Newnham:*** We would like, if we may, to have a description of your biobutanol process. If I understand it correctly, looking back at the literature, as I have, this is really the use of microbiological processes in order to do the transformation and fermentation-type system. I think the Germans were getting C4 but they were mainly as C4 acids in the early days, so presumably you have modified the microbiological side of it to allow you to get the butanol. Which of the butanols are you getting? Are you getting the straight chain or is it the branch chains?
Dr Dolan: 1-butanol.

Q562 ***Lord Lewis of Newnham:*** Are there any aldehydes present or is it just as a straight alcohol?
Dr Dolan: I think I would have to refer that back to my technical colleagues, but the butanol component of the fermentation is 1-butanol.

Q563 ***Lord Lewis of Newnham:*** What about separation? Is this more difficult to do than the ethanol process?
Dr Dolan: Yes, we are using a technology that has in fact been around for quite some time. It allows us the ability to get butanol into the market-place now so that all of the individuals in the chain can begin to learn about butanol and see the advantages of butanol. The real gain for us is in our research programme which is targeted at butanol molecules but in a much more cost-effective fashion. So it is something that will allow the technology to be much more broadly applicable to the market, which is of course essential for any biocomponent that is targeted on a global basis.

Q564 ***Lord Lewis of Newnham:*** As far as your colleagues are concerned, they are taking sugar beet or something of this particular nature and at the moment you can transpose it quite readily into ethanol. You can do that quite as easily in the butanols?
Mr Karl Carter: Yes, we believe so. That is the plant that we are presently starting to lay down. Clearly we were starting to lay down an ethanol plant. It would appear that sugars, in particular the sugars that we produce which are quite high-quality sugars, are going to be easier to break down using the bacteria that DuPont have been working on, so yes, from a process that has been around for a while we think we can push forward on that.
Dr Dolan: But I think it is fair to say that it is a very equivalent process to the ethanol process in that it takes sugar and starch components, places those in a fermentation vat, and a biofuel (although in this situation a more advanced biofuel) comes out at the other end. Obviously there are differences, as you know, in the processing but fundamentally at high level it is exactly equivalent.

Q565 ***Lord Palmer:*** If you are going to be sending us a paper on this, could I make a plea it be written in the simplest possible language because science is not my top subject, so if it could be really easy to understand, that would be brilliant.
Dr Dolan: Of course.
Chairman: I think we all share that thought. Lady Miller?

Q566 ***Baroness Miller of Chilthorne Domer:*** I just wondered if you could say what the by-products are? For example, is heat a significant by-product as well?
Dr Dolan: There are some by-products that could be used to generate heat that would feed back into the process to make the process more effective. The heat that would be generated directly as a result of that would not significantly change the configuration of a biofuels facility.

Q567 ***Baroness Miller of Chilthorne Domer:*** So would it affect the siting of the facility?
Dr Dolan: No.

Q568 ***Baroness Miller of Chilthorne Domer:*** In other words, they are not going to be envisaged as any sort of CHP process?
Dr Dolan: No.

Q569 ***Baroness Miller of Chilthorne Domer:*** What about other bio waste products?
Dr Dolan: Some of these by-products are quite valuable so we very often would not describe them as waste products. It is envisaged that in this particular situation, for example, some animal feed products are generated and they would be equivalent to the type of animal feed products that are generated from the existing ethanol process. It differs, there are some other components of this early technology that we are using that would feed into other mechanical processes that we, DuPont, the company, use but I would not describe any of them as waste products in that sense.

Q570 ***Lord Livsey of Talgarth:*** Are these products high in protein, or starch, I presume? Are they highly digestible for ruminants?
Dr Dolan: Ruminants are the key target market for what are called distillery-dried grains so, yes, they would be a very valuable animal feed product.

Q571 ***Chairman:*** Can we get back to something you may have answered to Lord Lewis, and if so I missed it. With biobutanol is it easier to put a higher percentage into a current ordinary engine?
Dr Dolan: Yes.

Q572 ***Chairman:*** So the 5 per cent limit that you talked about earlier would not be a 5 per cent limit necessarily for the sort of car that I am driving at the moment?
Dr Dolan: That is absolutely correct.

Q573 ***Chairman:*** It is a 10 per cent limit that it goes up to?
Dr Dolan: Yes.
Mr New: If the EU were to change the oxygenate limits in its gasoline specification, which I understand is something it is considering at the moment, to 3.5 per cent, that would constrain ethanol to being a 10 per cent component, but under those circumstances butanol could be present at up to 16 per cent. Given the higher energy content of butanol, effectively this would double the energy from renewable sources per litre of gasoline, so we see it as a quite important potential tool for enabling the acceleration of the use of bioproducts.

Q574 ***Chairman:*** This oxygen content is news to me. Is this something that you could send us a paper about or should we know about this?
Mr New: Yes, of course we can.

Q575 ***Lord Lewis of Newnham:*** Oxygen is desirable in many ways because of course this does effect the emissions. You actually add the ethyl tertiary butyl ether in certain parts in order to ensure that the emissions are coming out more effectively, so in a sense oxygen is desirable but there is a maximum value that they want for it.
Mr New: Exactly.

Q576 ***Lord Lewis of Newnham:*** If you take this particular processing, and quite clearly DuPont have been doing a lot on the microbiological side of it, I think it was implied by your statement, Mr New, that of course there are going to be other secondary biofuels. One immediately thinks of enzymatic possibilities from cellulose and things of this particular nature. I may be wrong but I do believe BP are considering setting up a research establishment with quite significant amounts of money associated with it to look at the whole concept of biofuels. I am not sure where you are going to put it at the moment, which country it is going to be in, but nevertheless I think this must be one of the aims. How far are we along this particular road because it strikes me this could be a major step forward in this particular operation?
Dr Dolan: I think the current thinking is that enzymes will be the foundation of the cellulosic biofuel industry and I think we, DuPont, are obviously involved in that. The thinking, from our side at any, rate is that those types of process and materials would start coming from those types of processes within the 2011 to 2013 time-frame. We do also look at other technologies, technologies where you would combine the ability to break down cellulose with the ability to ferment a biofuel in the same organism, what we would call consolidated bioprocessing. That is something that we are very actively watching as a possibility going forward, but I think it is fair to say that our belief is that that technology is probably 10 years out. It offers potential for advantages but I think the industry will start initially to use enzymes before we would look at more sophisticated technologies that would overlay on the enzyme technology.

Q577 ***Lord Lewis of Newnham:*** Are you implying that the enzyme is possible within the 2010 timeframe or is this further out?
Dr Dolan: I think my technical colleagues might baulk at committing to 2010, but certainly within the five to seven-year period we would expect to see that technology becoming commercial. Of course, there will be a lag while the types of investments are put in place. That will probably be a two-year lag before we see that at a scale that is beginning to impact on agricultural materials.

Q578 ***Chairman:*** Mr Carter, I interrupted you earlier.
Mr Karl Carter: It was about co-products and I think we have moved on so I am quite happy.

Q579 ***Chairman:*** I just wanted to come back on to what extent the proposed Renewable Transport Fuels Obligation is a factor in terms of your establishment of a biobutanol plant in the UK?
Mr Karl Carter: I think it is fair to say that the RTFO was a significant announcement for us within British Sugar, which gave us some confidence for investing at Wissington in what clearly was an ethanol plant, and clearly that was our intent. We do support fully the RTFO, as BP have already said. On that though, as we stated before, we need to understand the detail of the RTFO. It is a 5 per cent inclusion which only makes it round about 3.3 per cent energy, so it is not the 5.75 that has been talked about within the EU. It

is coming up slightly short on the EU target. We think that is an important factor because we do feel that the RTFO should be setting targets for the future so the industry can have confidence in the future. In terms of why convert to bioethanol, which is hopefully the question we need to answer, basically what you have heard on ethanol, we knew. The constraints of ethanol, whether it be the lower calorific value, whether it be the water and the other issues, we knew that. We were building a plant that was going to be supplying ethanol into the blender market, which is an independent market. It was highly unlikely that a company like BP would have taken any ethanol from us and would certainly try to push back on ethanol as long as possible. We knew that. When BP and DuPont came to talk to British Sugar with a molecule that overcame those problems, we could see that that was going to give us what we thought was the real market pull that we have wanted for this industry. Basically a molecule which is as near to petrol as they can get today has such a big pull that we believe that was the way forward. So working together we have decided to convert the plant at Wissington and make it a biofuels plant so that we can develop that molecule on because we do believe that is the starting point for a real pull for a molecule that will go into petrol because the ethanol molecule is not the best molecule for going into petrol.

Q580 ***Chairman:*** Do you expect to pay local farmers a higher price for their sugar beet?
Mr Karl Carter: The price that we pay for sugar beet, which is a three-year deal, is based on having to be competitive with Brazil, so it is for their excess sugar. The long term we believe in Europe, and particularly here in the UK, is wheat based and therefore we are working together with both DuPont and BP at what would be large scale, and large scale in the UK would be wheat based. Clearly we would like to see wheat based producing biobutanol and that is when we think we have got a molecule which can certainly go into the market-place.
Chairman: Lord Haskins, who has joined us after having spent three hours on a train, poor man, and then Lord Sewel.

Q581 ***Lord Haskins:*** Thank you, my Lord Chairman. This is the nub of the issue in the legislation. There are three things. First of all, do you think that a regulation of this sort would be useful to your company across the EU? Is that a logical extension, assuming it works out properly, and therefore that brings the EU much more into play as a regulator than at the present time? Secondly, it is possible to develop all these fuels without any state intervention? I was on a long train journey and so I was able to read all about Ford yesterday, who were spending vast amounts of money but who at the end of it were making a very strong plea for state aid to encourage investment. Are you in a similar situation?
Mr New: We think the RTFO is potentially a very supportive and sensible piece of legislation. It has a good combination of carrot and stick. It creates a clear target people have to aim for so it will generate market demand. We think it has significant advantages over some of the either current or proposed legislation that is being considered by other Member States. It does seem to be looking at things on a technology-neutral basis. It seems to set out a basis for a level playing field which we would applaud. It does not specify that one has to use certain biofuels and certain transport fuels which again, as we talked about, gives maximum flexibility for the market to find its own way and force innovation. I think the targets have been set at a stretching but nonetheless sensible level which should provide just the right incentive for investment. As to the question of whether or not this would happen without state intervention, I have to say I doubt it very much. I have spent lots of my life in BP trying to create and then market green products and I have found, to my cost on some occasions, that UK consumers or international consumers are happy to take them when they get them for free, but fundamentally one has to offer all the normal range of enhanced benefits or competitive prices in order to get people to buy things. They will not buy for green alone. So consumer pull is still not really strong enough to create a signal from our customers that we would be able to respond to economically. The fundamental economics versus fossil fuels remain disadvantaged so there is not a supply driver.
Chairman: We will come back to that point shortly.

Q582 ***Lord Haskins:*** The logic therefore of expanding the RTFO to a European Directive, you would not be against that?
Mr New: I think we would be quite supportive. I think there would be one or two nuances that we would like to see, for example an encouragement of certification so that there would be clearer guarantees that the product was really as environmentally sustainable as it is possible to be, but, broadly, yes.

Q583 ***Lord Sewel:*** We have got this reference from you that you speculate that there is a possibility that biofuels could contribute up to 20–30 per cent of the transport fuel mix in the future. What policy measures are necessary to put in place to achieve that? Over what sort of timescale do you need to achieve that level of contribution?
Mr New: Before biofuels could get to that level of penetration, they need to be cost competitive so that we are not going to be reliant on state intervention over the long-term. I think a lot of industries would be reluctant to commit over much on something that

is a market that is fundamentally and permanently dependent on state support. Having confidence that we can get to a point where the technology is such that it can stand alone is one key driver. The other two key drivers are, first of all, we have got to get products that can work in the car fleet at higher concentrations than today, back to butanol to an extent. Thirdly, there is the question of simple availability. While we are restricted to using crops that have an alternative use in food, we worry that there simply is not enough good quality arable land and in any case it would have an impact on the pricing which is one of reasons why I think we all agree that ligno-cellulosic technology, better molecules, together in a package that can work at a much lower cost than today, are the three fundamental pre-conditions. The policy drivers that are going to be appropriate to support that are ones that provide strong incentives for innovation, particularly down those three avenues, recognising that there is going to be a need for support for the industry during its formative years while we are still trying to get the technology to a point where it had not been in cost terms.

Q584 ***Lord Sewel:*** That is the important thing. You need that aid in the initial period but you cannot have an industry which is forever dependent upon that level of state support.
Dr Dolan: Indeed. It would be very difficult for a company such as ours to invest in an industry where we felt that support was required forever. We absolutely have to drive towards cost-effectiveness and turn to other available biofuels ultimately as compared with conventional fuels.

Q585 ***Lord Sewel:*** The second question is what do you see as the likely demand for second generation biofuels?
Dr Dolan: I would say we have touched on a number of things that would be related to that question. There are three major points I would raise. Obviously the regulatory environment will have an impact on that demand for a period of time. How long that will be remains to be seen but that is certainly going to be important for the foreseeable future. Increasing cost-effectiveness delivered by the types of technologies that you talked about, be it ligno-cellulosic technologies or existing transformations making them more effective. I would say then the other factor that needs to be taken into account is consumer pull. This does not really exist right now despite the strong aspirations of consumers to consume green. That will certainly need to be a much more important factor in the mind of a consumer when he or she pulls up to a filling station in future.

Q586 ***Chairman:*** On that very point, do you, as an international company, find a difference between the different EU countries on that point of the consumer pull. For example, are the Germans much more ready to buy new elaborate fuels than the British or the Finns?
Dr Dolan: I would say, yes, there are huge differences between the individual countries but I think the point on which everybody agrees is that while consumer aspirations are different, Consumer behaviour tends to be quite similar, as Mr New mentioned earlier. It is very tough for a consumer at the pump to justify paying anything extra just to have a green tag on that.

Q587 ***Chairman:*** Do you find that is changing? What about the States, is it changing in the States?
Dr Dolan: I would say probably not. I would say consumers are very similar in terms of that behaviour right across the board.

Q588 ***Lord Sewel:*** This discussion is very much in terms of the environmental benefits which we are having so far. If you look at where progress is being made on the biofuels front, it is those Member States who are chasing biofuels not for the environmental gains but for their energy security.
Mr Karl Carter: Exactly, yes. As Lord Lewis mentioned earlier, there are those two things which are important and then it depends on which country you are in to decide which way round that is.

Q589 ***Lord Sewel:*** The consistent picture is that it is energy security that is driving it.
Mr Karl Carter: That has come up the agenda as the price of oil has come up. Everything is pushed up.
Chairman: That falls very much on what Lord Palmer would like to ask.

Q590 ***Lord Palmer:*** I have got three questions, perhaps I could start on them with the price of oil. One of the reasons I got involved in this was the security of supply. In that Lord Browne talked about crude oil falling back to $40 a barrel, how do you think the decision about biofuels would be affected if that really did become the reality, difficult though it is to imagine today? Also, if it rose to, I think it was about 78.6 this morning, $100 a barrel what impact do you think that would have conversely on biofuels?
Mr New: We made the choice to commit quite significantly to biofuels, notwithstanding the fact that we believe that there is scope for some variation in the oil prices in the future. We plan clearly against a range of oil price potential levels. It is a factor that is perhaps more tactical than strategic in the matter of the evolution of the industry. Energy security is an issue today but the potential for bio to continue to play a strong role in supporting rural communities and agricultural communities across the world and

the potential for it to be seen as a contributor to climate change will mean that there is going to be an underlying support or interest in bio, regardless of the oil price set in the future. While we talk about oil potentially reaching $40, I am not sure that anyone is making any claims as to what oil might be in 2020, and it has the potential to go back up again. We have to almost make some of these strategic decisions blind to the oil price.

Q591 ***Lord Palmer:*** Irrespective of the oil price.
Mr New: Yes.

Q592 ***Lord Lewis of Newnham:*** One of the things that worries me slightly is that the best concentration you are looking at is about 20 per cent, you have still got to find the other 80 per cent, so the security business is really on a very delicate balance, is it not? You are still going to have to go for that 80 per cent and you are not producing it in any other way.
Mr New: My Lord, I do not think anyone would claim that biofuels of themselves are a silver bullet solution either to climate change or to energy security. Road transport, or transport generally, is in the low 20s as a proportion of overall human generated CO_2 emissions and so it is as important, or more important, that we also focus on what happens with power generation, what happens with domestic heating and other forms of greenhouse gas emissions. By the same token while transport fuel represents a large proportion of what happens with crude oil, again, it is a relatively small proportion of overall energy balances. In the round it has a role to play but it is not the only thing. Then, in the matter of road transport itself it has a role to play but the only thing we would say is that it is absolutely as important that companies like Ford do invest to produce ever more fuel efficient vehicles, that we see hybrid technology start to develop, for example. When we have looked at very long range views of what might be happening our conclusion is we are likely to see a combination of increasingly fuel efficient vehicles using decreasingly non-renewable carbon content fuels. It is that combination that I think can begin to answer some of these fundamental questions. They have a roughly equal role to play and there will be times when one might take the lead over the other but they are both absolutely—

Q593 ***Lord Palmer:*** If, for example, you were giving evidence to the Commission and they ask you for a shopping list, what do you think are the most favourable market conditions for BP to expand its global biofuels capacity? If you could just say a bit about the EU, in that we are an EU sub-committee, that would be very helpful.
Mr New: I am trying to think how to answer this without too much regurgitation. I think we would start by saying a suite of regulation that is technology neutral, that does not have state entities, pick winners, but creates the condition for winners to emerge from a combination of technology and market would be fundamental, something that enables us to maximise the flexibility so that we have facilitating sensible market mechanisms to work through as well. We would want to see incentivisation increasingly around either energy content or its impact to really force us to start to look towards next generation products, be they next generation molecules or next generation conversion technologies.

Q594 ***Chairman:*** Would this come from the Government or from the consumer?
Mr New: It is going to be very difficult, as a fuels marketer, to be able to explain some of the differences to consumers in a way that they can make informed choices between, for example, a fuel that has come from a particular feedstock route which has a particular greenhouse gas profile versus another. At the moment they are struggling with the difference between bio and normal. I think there is an extent to which some of these fundamental drivers need to be on the supply side, they need to come from the state, because only the state is going to have the sophistication to be able to make those distinctions real.

Q595 ***Lord Haskins:*** I come back to my original point relevant to this. Actually regulation makes the price variation in oil irrelevant whereas the other financial incentives other countries have mean they have to constantly adjust those according to the price of oil. Everything points towards a regulatory approach towards this issue. If that is the case then everything points towards the environmental issue being the highest, most important element followed by the security element and that message has to come from Europe.
Mr New: Absolutely. This is why I completely concur and, therefore, pushing the industry by favouring more environmentally sound products and products that have better energy characteristics would seem to be the fundamental way in which those goals will be addressed.
Lord Lewis of Newnham: Mine is a minor point. I completely agree, I think it has been shown from more than one study that if a green product is cheaper or the same then it is bought, but if it is more expensive it just does not get bought. There is nothing new in that but one then does think of the lead situation where lead-free petrol was sold at a cheaper rate and that was the incentive that got people into the market. Is this really a fiscal argument which is

going to be the driver, which is essentially what has been said by Lord Haskins?

Q596 ***Chairman:*** You remember the saying "in the kingdom of the blind, the one-eyed man is king".
Mr New: For bio-containing fuels to be sold at a discount to regular fuels they will require a significant regulatory intervention. They cost typically more than normal fuels today. What is happening, for example in Germany, is there are people who are effectively selling 100 per cent biodiesel to trucks. It only works on big, old trucks and even then I do not think we would sell it under a BP brand because it is not particularly good fuel. They are selling it because they are effectively passing most of the duty waiver on, a big proportion of it, to their customers. That is an example of where people are taking advantage of a market mechanism. That can work in a world where there is just an incentive and there is no obligation. However, if we go back to a situation where there is an obligation which has set a volume target and a likelihood that the market will be short, supply constrained against that volume target, then I think it begs the question why you would need to put in that extra incentive.

Q597 ***Lord Livsey of Talgarth:*** Is there not a logical answer to some of this perhaps in that if fuel at the pump was re-categorised into the level of emissions which come from certain fuels, maybe manipulation of the market, as happened with lead, this could be an answer to, shall we say, converting public opinion driven by manipulation of the market?
Mr New: I think there is potential in that route. One thing we have to bear in mind, which is very frustrating, is that we have highly integrated secondary distribution infrastructures which make it quite difficult to have a whole suite of products available, or if that were to happen it would be at an extortionate cost. We also have limited tankage, the plumbing on most petrol stations is quite restricted, so we can typically only offer three or four products. What has tended to happen is when an obligation has forced bio into the market then an entire supply envelope would tend to move across to bio. The only situation where I think we might be able to do something different is where we have absolutely segregated distribution, as we did for our premium fuels, and we could do something special around that.

Q598 ***Lord Sewel:*** I take the risk of spoiling the party in a way and put to you the argument that we heard from the representative of the Danish Government. The Danes have not done anything with biofuels really. They said, "We are very environmentally sensitive. We have set ourselves as a country very high targets in terms of reducing emissions and, quite frankly, we get a better return by investing our money in other things rather than biofuels".
Mr New: At one level that is an entirely rational response. I mentioned before that power generation creates almost double the emissions that transport fuels do. Certainly it is a lot cheaper to tackle emissions by tackling power generation per tonne of carbon saved than it would be through transport fuels. Transport fuels are probably more relevant in tackling some of the energy security concerns because of the preponderance of oil and the particular issues around security of supply with oil compared with gas and other forms of energy. I think we would also say that just because power generation is big it should not let transport off the hook. We know from our research with consumers that a glimmer of hope on this consumer argument is this is the one area around energy consumption where individuals feel that they are making a choice and, in a sense, are participating. When you turn on a light switch you have little or no way of knowing whether or not the electron is green but there is the potential to enable people to participate in the sense of choice around something they do interact with when they are buying their energy for their car. To go back to the beginning, at one level this is quite rational.
Mr Karl Carter: Can I just add to that as well. I think agriculturally Denmark would be slightly behind in terms of yields that they could get for sugar beet certainly, because we know their yields of sugar beet, and probably behind on cereals. Land availability and availability of cereals in Denmark may look quite different from how it looks here in the UK and, therefore, they may consider not wanting to use cereals and it being more expensive to produce biofuels in Denmark in comparison with what it is going to be here in the UK.
Mr Chris Carter: I think the fundamental question will remain long-term is it really sustainable to leave a sector which is as large as the transport sector, 25–30 per cent of a normal country's energy usage, completely untouched. Is that a sustainable position long-term?

Q599 ***Lord Sewel:*** If, say, the alternative was zero emissions on power generation the answer is yes.
Mr Karl Carter: If it was a cost-effective solution, yes.

Q600 ***Baroness Miller of Chilthorne Domer:*** You talked a bit earlier about the issue of certification, I wonder if you could expand a bit on how you see that operating and why you think it is important.
Mr New: There are two examples at the moment of bodies that are trying to work out how you could make certification practical. In the UK we think the work of the Low Carbon Vehicle Partnership is groundbreaking in this regard. We think globally there is no body that is as advanced in its thinking as

the UK Low Carbon Vehicle Partnership in trying to develop frameworks for certification. Another example would be the Round Table for Sustainable Palm Oil Production. Palm is a quite cost-competitive source of vegetable oil, potentially for use in loads of things but potentially for biodiesel. We are very concerned about the sustainability of palm production and the impact it would have on rain forest habitats. Getting involved with more formal schemes to try and develop ways of certifying that the product has come from renewable sustainable sources seems to us to be an important precursor to being able to feel comfortable about the adoption of these feedstocks.

Q601 ***Baroness Miller of Chilthorne Domer:*** So you would see a model along the lines of, for example in other sectors, the organic food sector or the Forestry Stewardship Council that is industry supported and led or EU driven?
Mr New: As I understand it, under WTO rules at the moment it would be quite difficult to have something that was mandated around sustainability so it would need to be a high profile and voluntary set of certification standards, but analogous to those bodies.

Q602 ***Baroness Miller of Chilthorne Domer:*** Is it industry-led so that where you are producing organic food you pay a membership to the certification body and they do the work for you, is that what you are suggesting?
Mr New: I am not sure that our thinking, certainly my knowledge, in this area is as advanced as it needs to be to answer that specific area. My gut feel says that would be a viable way through, I am not sure it is the only way through, but something of that nature seems sensible.

Q603 ***Baroness Miller of Chilthorne Domer:*** Would you be able to give us any more written information on how you would see a certification system working?
Mr New: I think the best thing we would be able to do is provide you with the Low Carbon Vehicle Partnership work on this because that is something we support.

Q604 ***Chairman:*** Thank you. Chairman's privilege, I would like to ask you two last questions if I may. First to you, Dr Dolan: DuPont is an international company, in doing this project with BP and British Sugar, is this more than you are doing in any other EU country at the moment or are you entering into similar joint ventures of this sort in other EU countries?
Dr Dolan: We are looking for similar possibilities.

Q605 ***Chairman:*** So this is something that you would like to do Europe-wide because you see that there is a very considerable future in it.
Dr Dolan: We see a role for advanced biofuels in every region of Europe. Saying that, it is a particular pleasure to be able to do it in the UK first with British Sugar and British Petroleum.

Q606 ***Chairman:*** Yes, good. I would expect you to say that. Mr New, a little while back you commented that biofuel components are in short supply. Is that short in relation to real market demand or short because of the artificial fiscal incentives?
Mr New: You could argue that there is no real market demand absent the fiscal incentives. At the moment they are in short supply against the obligation levels that we see today and that we predict into the future. We touched on the issues that there are and the constraints there will be around hitting, for example, the 5.75 per cent by energy content EU target. Today there is a significant shortage of biogasolene component capacity in Europe. There is still a shortage of biodiesel capacity in Europe. One of the most interesting things about this whole new industry is we are seeing the fuels industry and agri-business start to come together, neither of which are particularly familiar with the other. There are bottlenecks and potential constraints through the value chain starting with availability of feedstock, then we could get into crush capacity, then we could get into conversion, processing plants and ability to put it into the distribution system, all of which leave us thinking it is likely that available supply will lack demand for the foreseeable future.

Q607 ***Chairman:*** That is very helpful indeed. Is there anything you would have liked to have said to us that you have not said?
Mr New: The only point we would like to highlight is often this industry has been characterised as by definition being about two quite polar and opposing forces, we have the oil guys on one side and agri-business on the other side, and people popularly presume that we are in profound competition with each other and what is good for one is bad for the other. One of the things we are quite proud of is the way in which through our co-operation at Wissington, which we hope, as Michael was saying, to extend further, we are seeing a great example of the energy industry, agri-business and technology firms working in unison to try to respond to the bigger challenges of energy security and global warming.
Chairman: That is a very good thought on which to end this conversation. Thank you very much indeed and thank you for the time you found at very short notice to come and talk to us today, we really do appreciate it. Thank you very much.

Written Evidence

Memorandum by Archer Daniel Midland

Biofuel Targets

All answers are given from a biodiesel producers point of view.

1. *Which Member States have been most successful in meeting their biofuel targets; and how have they achieved this?*

Most successful country in the EU25 is Germany. Since the early nineties biodiesel is fully exempted from excise duty. Diesel market share of biodiesel in volume is approximately 6.5 per cent. France is the second biggest market. France has supported the development of a biodiesel market by offering changing excise duty incentives within a quota system.

Economic Instruments

2. *What financial instruments or incentives have proven to be most effective in meeting national targets for biofuel market share?*

- excise duty incentives offering consumers the opportunity to consume biodiesel with a price advantage.
- Consumption mandates.

Biofuel Obligations

3. *To what extent has the imposition of biofuel obligations by Member States reduced the biofuel industry's need for fiscal support?*

Especially pure blend mandates limit the number of biodiesel customers and increase the dependency for a biodiesel producer. Thus each obligation should include as well the opportunity to develop a B100 (pure biodiesel) market.

Production of Biofuel

4. *Which countries have the lowest biofuel production costs and why? What steps have Member States taken in research and development to reduce the production costs of biofuels?*

Most influential on pure production costs is the size of the production plant and process. But more important on total biodiesel costs is the selection of the raw material used.

Trade in Biofuel

5. *Which Member States import the greatest volume of biofuel and why? What impact have imports of cheap biofuel had on domestic production in the European Union?*

Biggest importer seems to be Germany because of competitiveness and the fact that Germany is an open market. EU25 countries will be competitive with imports if imported volumes will not be subsidised twice (double dipping).

Technical Barriers

6. *What are the technical requirements that have acted as barriers to the introduction of biofuel into national fuel markets?*

There were no real technical barriers in the blend market in the past, other than car manufacturers warranty.

For B100 consumption cars and trucks need warranty given from manufacturer.

Looking Ahead

7. *Should the European Union take further action to promote biofuel production; and, if so, what action is required?*

Europe is expecting a diesel deficit in 2015. To secure supply and reduce dependency on imports European Union should take further action. Useful would be the increase of target volumes for the period 2010–15 as France already did. In addition EU diesel specification should allow a blend portion of 10 per cent biodiesel in future.

19 June 2006

Memorandum by the Committee of Professional Agricultural Organisations in the EU and the General Confederation of Agricutural Co-operatives in the EU (COPA) and (COGECA)

1. COPA and COGECA are pleased that the European Commission has realised the strategic interest of agricultural and forest biomass in the EU-25 by submitting a Biomass Action Plan (COM(2005)628) and an EU Strategy for Biofuels (COM(2006)34). They stress that the increased use of biomass and biofuels must feature among the measures in the new roadmap for renewable energy sources suggested in the Green Paper entitled "European strategy for sustainable, competitive and secure energy" (COM(2006)105) since agricultural and forest biomass constitute the most reliable source of renewable energy in reducing the EU's energy dependence. COPA and COGECA present below their proposals on measures they consider essential.

Biofuels in Transport

2. COPA and COGECA stress that the use of biofuels in transport is an essential means of reducing CO_2 emissions from automobiles and ensuring that the CO_2 emission limits of 140g/km and 120 g/km are respected by 2008 and 2012 respectively.[1]

Mandatory incorporation and tax measures

3. COPA and COGECA reiterate their position that provision must be made for a specific exemption scheme for biofuels in the framework of Directive 2003/96/EC on the taxation of energy products and electricity. They ask for a reduction in excise duties for pure biofuels and those blended directly or indirectly. The European Commission and the Member States must commit themselves to maintaining this reduction (or exemption where it exists) in the short term, giving the sector clear perspectives from which to work and allowing for plans to be made. In any case, it is unacceptable, when energy is equal, for biofuels to be taxed at higher levels than the equivalent fossil fuels.

4. The European Commission must submit an evaluation report to the Council and European Parliament by 31 December 2006 at the latest on what progress has been accomplished in the use of biofuels in the Member States, and if necessary, put forward proposals on the adaptation of the system of indicative targets laid down in article 3 § 1 of Directive 2003/30/EC. COPA and COGECA believe that the approach of mandatory incorporation is a promising one only if imports take place under specific provisions (see point 10) and if the detaxation of pure or directly or indirectly blended biofuels is not called into question (see point 3). The duty-free importing of raw materials used for producing biofuels and of biofuels goes against the objective of establishing a European Union biofuels production on the basis of local raw materials.

5. Any negotiable certificate system is to be rejected because it is about introducing biofuels on the market and not providing the petrochemicals industry with an opportunity to evade their obligations to incorporate biofuels by purchasing certificates.

[1] Commission recommendation (N)1999/125/EC of 5 February 1999 OJ L40.

Regulatory restrictions

6. The European Commission must submit proposals to amend directive 93/12/EEC on the quality of petrol by 31 December 2006. This directive allows bioethanol to be incorporated into petrol in the form of ETBE, composed of 47 per cent bioethanol and 53 per cent petroleum products. The possibilities for directly incorporating bioethanol into petrol, which nevertheless offer the most energy and environmental advantages, are restricted by the limits of 5 per cent bioethanol and 2.7 per cent oxygen as well as by constraints regarding vapour pressure.

7. COPA and COGECA ask for the constraints on the use of biofuels to be lifted.

(a) For bioethanol, it is necessary to:

- adopt suitable measures to ensure that the petrol companies dominating markets in Member States make fuels suitable for the incorporation of biofuels available to independent distribution firms;
- double bioethanol and oxygen content limits from 5 per cent to 10 per cent (in energy equivalent) and from 2.7 per cent to 5.4 per cent respectively;
- increase the vapour pressure limit in a suitable manner, at least during the introductory phase of bioethanol-petrol blending, or obtain a pressure vapour limit specific to petrol containing bioethanol;
- revise standard EN228 as a result;
- oblige European refineries to supply distributors, upon request, with "ethanolable" petrol with a volatility adapted to the European biofuels promotion objectives to encourage bioethanol-petrol blends; and
- make it clear in the list of biofuels in Directive 2003/30 that the energy value to be taken into account for the incorporation percentage is solely that of the fraction of renewable ETBE, that is to say the bioethanol it contains.

(b) For biodiesel, COPA and COGECA:

- request that the incorporation of biodiesel into diesel be increased from 5 per cent to 10 per cent by 2010 by revising standard EN 590 on diesel;
- support the European Commission's proposal to substitute ethanol for methanol in biodiesel EN14214; and
- as a general rule, only biofuels which comply with biofuels standards and additional national requirements can be used as pure fuels or as a component of a blend, and as such be encouraged through fiscal measures.

(c) Finally, for all biofuels, COPA and COGECA ask for minimum biofuels levels in petrol and diesel to be authorised.

International trade

8. The European Commission proposes a balanced approach for the trade in biofuels with third countries. COPA and COGECA ask that this approach be truly balanced between energy dependence in fossil fuels and the production of European fuels/biofuels, and that it makes provision for a sufficient adaptation period to allow the burgeoning European industry to reach the level of competition needed to face up to competition from long-developed industrial sectors in third countries.

9. By proposing to maintain conditions for the market access of bioethanol which are no less favourable than those laid down in the current trade agreements and revise standard EN 14214 to facilitate the use of a wider range of vegetable oils in the production of biodiesel, COPA and COGECA do not believe that the European Commission will reduce its energy dependence or stimulate the creation of jobs expected from the use of biomass in the EU's rural areas.

10. To reduce the EU's energy dependence and generate new jobs in rural areas, COPA and COGECA propose:

(a) the establishment of new tariff headings specific to biofuels, which must make compliance with standard EN 14214 a pre-requisite for biodiesel to be used as a fuel;

(b) the establishment of import quotas for biofuels corresponding to 7 per cent of Community production from the previous year;

(c) appropriate Community management of biofuels imports, notably in the framework of the import licence scheme;

(d) the maintenance of specificities which meet the technical requirements of the automobile industry in the biodiesel standard EN 14214;

(e) the specific use of non-denatured ethanol for carburisation purposes;

(f) the implementation of an equivalence system with third countries in connection with ecological and socio-economic standards (see point 17).

Ecological assessment

11. Given the differing results in the impact studies and the ecological assessments on biofuels as a result of different methodology, COPA and COGECA request that the European Commission take appropriate measures to reach consensus on the value of biofuels and fossil fuels based on the EU's strategic objectives to reduce dependence on fossil energy and greenhouse gas emissions.

Biomass for Heating/Cooling

Legislation on renewable energy in heating and cooling

12. COPA and COGECA support the European Commission's proposal to encourage the use of biomass for heating/cooling and electricity. They emphasise that the heating market in particular provides an opportunity to develop regional economic circuits.

13. In this context, the Commission should promote:

(a) measures to stimulate demand for biomass fuels, given that resources, in particular forest resources, are unexploited;

(b) reduced VAT rates for all types of fuel produced from biomass;

(c) the technological development of combustion plants, which will mean developing the appropriate technologies to fulfil requirements on emissions;

(d) the development of district heating which must cover all types of heating consumption (private houses, small local heating networks, district heating, CHP plants, industry, etc) and different kinds of biofuels (unrefined wood fuels, agricultural fuels, waste-derived fuels, by-products, refined fuels, etc);

(e) the installation of multiple-use boilers for the thermal use of different types of biomass, be it for heating or waste.

Biomass for Electricity

14. The Commission must ensure that existing discrimination between biomass and biogas on the one hand and other renewable energy sources used for network supply on the other is removed and that network supply systems, such as the scaling down of compensation for network supply and/or the drawing up of long-term supply contracts are harmonised more at EU level.

15. Member States must facilitate access to the electricity network of "small suppliers" such as biogas plants and biomass co-generation plants, and ensure a high price for electricity from biomass because it contributes to the decentralised energy supply security at local level. Biogas should also have access to the natural gas supply network under non-discriminatory conditions.

Community biomass supply

16. COPA and COGECA support the European Commission's proposals aimed at developing EU biofuels production and distribution. Nevertheless, they make the following requests:

(a) the use of intervention stocks of cereals for non-food purposes must not interfere with the contracts signed between producers and processors for the use of agricultural raw materials for non-food purposes;

(b) appropriate incentives to produce energy crops must be put in place in all EU Member States, and especially in the new Member States;

(c) the support scheme for energy crops must be simplified;

(d) there must be increased aid for energy crops to stimulate the development of these crops in the EU, given that they contribute to reducing the EU's energy dependence and CO_2 emissions in the transport sector, and to net job creation in rural areas;

(e) the Maximum Guaranteed Area in the aid system for energy crops, ie 1.5 million ha, must substantially be increased given the need to develop these crops and the sugar beet area to be taken into account within the scope of the CMO sugar reform;

(f) no crop ought to be excluded from the aid scheme for energy crops. An example of this is hemp in rotation with miscanthus for energy purposes. There must be appropriate incentives for multi-annual crops used for energy purposes. For example, the plantation of short rotation coppices should be co-financed by the EU and Member States so as to make this renewable raw material competitive for energy uses;

(g) in the framework of the Doha negotiations, the European Commission must seek to definitively free itself from constraints on the production of oilseeds for non-food purposes (Blair-House agreement);

(h) collectors must be able to draw up the contracts.

Certification

17. The European Commission is proposing to introduce a certification scheme for crops used for biofuels. COPA and COGECA feel that the positive impact of energy crops on crop rotation and biodiversity should be taken into consideration. COPA and COGECA stress that current legislation and the implementation of cross-compliance (Regulation (EC) no 1782/2003) guarantee the respect, in Community production, of biodiversity, crop rotation and the environment. Specific certification of energy crops is likely to increase the administrative burden for the sector. However, COPA and COGECA demand equivalent requirements for products from third countries. Equivalent requirements in third countries must be approved by Community authorities like in other sectors. The European logo for organically farmed products is a case in point.

Use of biomass and biofuels on holdings

18. Agriculture must also be able to make use of biofuels as a consumer, since the strong increase in the price of petrol over recent years has significantly increased the cost of crop production. These costs could not be passed on to the final product due to the nature of the agricultural markets. Member States must make provision for aid under rural development plans so that farm machinery and equipment can run on biofuels and small combustion plants can produce heat from biomass.

19. In all events, the opportunities provided by the energy tax directive 2003/96/EC must be tapped into, and biofuels consumed in the agricultural sector must be fully exempt from excise duties.

20. The use of biomass in agricultural and/or local holdings must be favoured. COPA and COGECA ask for the obligation to denature cereals produced on set-aside land to be removed and for a quota to be attributed corresponding to the power of the heating equipment on the farm.

Technological Research and Development

21. COPA and COGECA are pleased that the European Commission wishes to support the implementation of strategic agendas prepared by the technology platforms and give priority to actions aimed at strengthening the competitiveness of the biofuels industry and using every part of the plant (bio-refinery concept).

22. Nevertheless, COPA and COGECA ask that applied research be encouraged for crops devoted specifically to biomass and average-wattage or large-sized poly-combustible equipment so as to meet industrial or collective heating needs while at the same time preserving the balance in the supply of straw and other by-products which must be able to be replaced by annual or multi-annual wood and energy crops.

23. In light of the funds provided for research and development and the priorities established, the 7th framework programme for research and development must take account of the extreme importance of biomass as a strategic element in guaranteeing energy supply in the European Union. The production of energy from biomass begins by growing crops and optimising rotation with new energy crops that are adapted to the different terrain. This increases biological and landscape diversity, and encourages the diversification of activities in rural areas and income sources for farmers.

21 April 2006

Memorandum by The Energy Research Centre of the Netherlands

OVERVIEW AND ANALYSIS OF NATIONAL REPORTS ON THE EU BIOFUEL DIRECTIVE

Preface

This study has been performed by the Unit Biomass of the Energy research Centre of the Netherlands (ECN) in the scope of Work Package 3 "Liquid biofuels for transport" of the Network of Excellence project "Overcoming barriers to bioenergy" (6th Research Framework Programme of the European Union, contract no SES6-CT-2003-502788). The ECN project number is 7.5243.

Abstract

In 2003 the European Parliament and the Council have adopted a Directive to promote the use of biofuels for transport. This Directive requires Member States in 2005 to replace 2 per cent of their diesel and petrol with biofuels, although deviations are possible when justified. In 2004, the member states had to report their measures to promote biofuels, their national target for biofuel use in 2005 and their reasons for any deviation of the 2 per cent target. This report gives a summary of those country reports that were published before April 2005 and makes an analysis of their contents in order to provide an insight on how member states currently deal with the Directive.Especially the reasons to deviate from the indicative 2 per cent target are analysed, since they can be considered as barriers for implementation of liquid biofuels for transport.

Keywords

Barriers, biodiesel, bioethanol, biofuel directive, biofuels, biomass, EU, policy, transport.

Summary

In May 2003, the European Parliament and the Council have adopted the "Directive on the promotion of the use of biofuels or other renewable fuels for transport". This Directive requires member states in 2005 to replace 2 per cent of their diesel and petrol with biofuels, although deviations are possible when justified. In 2004 the member states had to report their measures to promote biofuels for transport, their national target for biofuel use in 2005 and their reasons for any deviation of the 2 per cent target. These reports express an official view on the Directive by the EU member states and are, therefore, very interesting to analyse.

This report summarises these country reports and analyses their contents with specific attention to the national targets, the motivations for deviation of the 2 per cent target, the views on biofuels for transport and the barriers reported. This was expected to give an insight in how member states currently deal with the Directive and what this could mean for the production and use of biofuels for transport in Europe in the future. It might also reveal the success factors for large-scale implementation of biofuels for transport.

It was found that in March 2005 five reports were still not available, either not submitted or not published yet. Also many of the available reports did not contain all the information that was requested by the Directive. However, from the information available it can be concluded that the EU will not reach 2 per cent of biofuels for transport in 2005. The EU biofuel production will probably still be quite considerable in 2005, approximately 1.5 per cent, mainly because large transport fuel consumers like Germany, France and Spain do intend to reach the 2 per cent target.

The countries that have set a lower national target than 2 per cent give various reasons for this deviation. The main ones are:

— Biofuels for transport are considered not cost-effective for reducing greenhouse gas emissions.

— Fuel end use is problematic.

— Limited amount of feedstock available in certain countries.

Furthermore, it is mentioned that the current biofuels for transport have some negative environmental aspects, that there are legislative barriers, and that there is currently limited production capacity.

Some of these barriers can be fairly easily removed, whereas others are more complicated. A more complicated barrier is the limited potential of biomass in some countries. This could be overcome by importing of biomass or biofuels, which is, however, generally seen as undesirable, because this is not considered to contribute to the security of energy supply. However, the interpretation of "security of supply", which was an important argument for the creation of the Directive, seems to vary between countries from a narrow perspective, such as national energy self-sufficiency, to a broad perspective, such as diversity of energy suppliers.

Another complicated barrier is the argument that biofuels for transport are not cost-effective in reducing greenhouse gas emissions. Although this is true for the current biofuels for transport (such as biodiesel, bioethanol, bio-ETBE), it ignores the motivation for the Directive to reduce the dependence on oil, which also has a cost. Many countries mention the need for so-called second-generation biofuels for transport (such as Fischer-tropsch diesel, bioethanol from lignocellulosic materials) that will be more cost-effective and also remove some other barriers, such as some negative environmental performances and technical barriers for end-use of the current biofuels for transport.

Many countries seem to agree on the usefulness and, therefore, the need for second-generation biofuels for transport, but these countries are very different in their current implementation of biofuels for transport. All the European countries have different domestic conditions for energy supply and transportation, but also different political views on the use of biofuels for transport. This makes an analysis of the success factors and barriers for large-scale biofuel implementation based only on the country reports difficult. A wider scope is necessary to determine especially the success factors for large-scale implementation of biofuels for transport and to provide a "road map" for biofuels for transport.

1. Introduction

On the 8 of May 2003, the European Parliament and the Council have adopted the "Directive on the promotion of the use of biofuels or other renewable fuels for transport" (Directive 2003/30/EC, see appendix A (*not printed*)). This Directive aims at promoting the use of biofuels or other renewable fuels to replace diesel or petrol for transport purposes, with a view to contribute to objectives such as improving the security of energy supply, reducing greenhouse gas emissions and creating new opportunities for sustainable rural development.

The Directive requires Member States to ensure that a minimum proportion of biofuels[1] and other renewable fuels for transport is placed on the market and, to that effect, set indicative targets. Reference values for these targets are: 2 per cent for the end of 2005 and 5.75 per cent for the end of 2010, on the basis of energy content of all petrol and diesel for transport purposes.

Member States may deviate from the reference values but if they do, they should report their motivations for the deviation to the Commission. These motivations may be based on: limited national potential for production of biofuels, amounts of resources allocated to the application of biomass for energy uses other than transport, specific technical or climatic characteristics of the transport fuel market or policies allocating resources to the production of other transport fuels based on renewable energy sources. Thus, the Directive offers a few "escape routes" to justify lower targets. It is yet unclear if there will be penalties and of what kind if the Commission finds the deviation unjustified. Setting mandatory targets for the use of biofuels for transport is a serious option. The Commission will draw up a first evaluation report by the end of 2006.

Member States also have to report before 1 July every year on the measures taken to promote biofuels or other renewable fuels, the national resources allocated to the production of biomass for energy uses other than transport, the total sale of transport fuel, and the share of biofuels placed on the market in the preceding year. For the first reports in 2004, which should include the national indicative targets set for 2005, the Commission had extended the deadline to 1 October.

The reports by the EU Member States are very interesting, because they express the first official view on the Directive by the EU Member States. The reports published by the EU countries contain the different views on biofuels, the policy measures used and intended to promote biofuels, the barriers encountered in implementing the Directive and motivations for deviation (if any) from the reference values.

This report summarises the country reports available and analyses the indicative targets, the motivations for deviations of the 2005 target, the views on biofuels and the barriers reported. This will give an insight on how Member States currently deal with the Directive and what this could mean for the production and use of biofuels in Europe in the future. This might also reveal the success factors for large-scale implementation of biofuel for transport.

In chapter 2 of this document the available reports by the EU members to the European Commision are summarised. The following topics are considered:

— Current production and use of biofuels.

— National indicative targets.

[1] In fact the word biofuels is also used for other forms of bioenergy; in this report biofuels are considered biofuels for transport, both liquid and gaseous (see also Table 1.1).

— Policy measures for biofuels.
— Motivations for the targets set.

In chapter 3 an overview is given of the targets set by individual countries. From the overview of targets it will be clear that not all Member States intend to follow the indicative targets suggested by the European Commission. In chapter 4 the reasons to deviate from the indicative targets are analysed. The report ends with some general conclusions in chapter 5.

Table 1.1

OVERVIEW OF DIFFERENT LIQUID AND GASEOUS BIOFUELS FOR TRANSPORT

Biofuel name in the Directive	*More specific name (if any) & alternative names*	*Biomass feedstock*	*Production process*
	Current biofuels		
Bioethanol		Sugar beets, grains	(Hydrolysis) & fermentation
Pure vegetable oil	*Pure plant oil (PPO)*	Oil crops (eg rape seed)	Cold pressing/extraction
Biodiesel	Biodiesel from energy crops *RME, FAME*	Oil crops (eg rape seed)	Cold pressing/extraction & transesterification
Biodiesel	Biodiesel from waste *FAME*	Waste/cooking/frying oil	Transesterification
Biogas	*Upgraded biogas*	Wet biomass	Digestion
Bio-ETBE*		Bioethanol	Chemical synthesis
	Second-generation biofuels		
Bioethanol	Cellulosic bioethanol	Lignocellulosic material	Advanced hydrolysis & fermentation
Synthetic biofuels	Fischer-Tropsch (FT) diesel *Synthetic (bio)diesel Biomass-to-liquids*	Lignocellulosic material	Gasification & synthesis
Synthetic biofuels	Heavier (mixed) alcohols *Biomass-to-liquids*	Lignocellulosic material	Gasification & synthesis
Biogas	Bio-SNG (Synthetic Natural Gas)	Lignocellulosic material	Gasification & synthesis
Biomethanol	*Biomass-to-liquids*	Lignocellulosic material	Gasification & synthesis
Biodimethylether	Bio-DME	Lignocellulosic material	Gasification & synthesis
Biohydrogen		Lignocellulosic material	Gasification & synthesis *or* Biological process

* Bio-ETBE is produced from bioethanol and isobutylene (a by-product from oil-refineries) and is therefore only partly biofuel.

2. Country Reports Summaries

By the end of March 2005 20 country reports were published on the website of the European Commission.[2] Summaries of these reports are given in this chapter. Some of the reports that were published already early in 2004 make reference to intended actions or communications later that year or in early 2005. In most cases it is unknown if these were executed. However, Greece, Sweden and the UK have submitted additional letters to the Commission, which are also published on the website, and their contents have been included in the summaries.

The official reports are published in the language of the Member States. For most of the reports, English translations are also provided on the website and these have been used for this report. For the French report a third party translation was consulted. This report contains for a large part citations from the English translations of the country reports. Comments by the author are given in italics. The summary is not entirely complete, because five country reports (from Belgium, Italy, Luxembourg, Poland and Slovenia) were not available yet.

[2] http://europa.eu.int/comm/energy/res/legislation/biofuels_members_states_en.htm

2.1 *Austria*

2.1.1 Current production and use of biofuels

Currently, Austria has nine large-scale and three pilot biodiesel plants that have a combined biodiesel production capacity of more than 100,000 tonnes per year. In 2003, 55,000 tonnes of biodiesel were produced in Austria and approximately 90 per cent of this quantity was exported to other countries, as the price that could be obtained for biodiesel in Italy and Germany was higher than in Austria. Austria does not have a bioethanol production plant.

Besides biofuels, in 2003 more than 200 million cubic meters of biogas was produced in Austria, of which almost 100 per cent was converted directly into electricity by the producers. However, some producers are very interested in using biogas as a fuel for transport. Further in Austria in 2001, 67 PJ of solid biomass was used, in particular for residential heating and electricity. This represents a proportion of 5.2 per cent of the gross domestic consumption.

2.1.2 National indicative target

A proposal by the government, out for consultation until August 2004, for the indicative targets of shares of biofuels in the transport sector contains a target of 2.5 per cent from 1 April 2005, a target of 4.3 per cent from 1 April 2007 and a target of 5.75 per cent from 1 April 2008. This results in the prognosis as given in Table 2.1.

Table 2.1

PROGNOSIS FOR BIOFUEL USE IN AUSTRIA

Year	*Biofuel target (per cent)*	*Biodiesel (tonnes)*	*Bioethanol* (tonnes)*
2005	2.5	220,900	—
2007	4.3	317,500	120,200
2008	5.75	481,900	150,000

* Also as raw material for Bio-ETBE.

The report notes that there is a maximum substitution potential for biofuels by blending of fossil fuels based on the European fuel standards: 5 per cent biodiesel in diesel and the use of 5 per cent bioethanol or 15 per cent bio-ETBE in petrol. The combination of these blending variants results in a proportion of biofuels of 4.66 per cent. In order to achieve the required 5.75 per cent, it is necessary to replace 1.09 per cent of the total energy requirements of the transport sector with pure biofuels.

2.1.3 Policy measures for biofuels

Pure biofuels are exempted from mineral oil tax. The blending of up to 2 per cent biodiesel in diesel is also exempted from mineral oil tax. There is also a tax reduction for the blending of up to 5 per cent biofuels in petrol. A substitution requirement (quota) is proposed.

2.1.4 Motivation for the target

Austria gives no motivation for its commitment to biofuels, but the report mentions that the full implementation of the EU Biofuels Directive (5.75 per cent) could reduce greenhouse gas emissions by up to 1.0 million tonnes CO_2 equivalent per year, which corresponds to approximately 5 per cent of the current greenhouse gas emissions from the Austrian transport sector.

Austria has mainly experience with producing biodiesel for export and has set high targets for its national biofuel use.

2.2 *Belgium*

The Belgian report was not available yet. Belgium currently uses no or little amounts of biofuels. Federal and Flemish ministers have expressed several times in the media their intention to promote biofuels.

2.3 *Cyprus*

2.3.1 Current production and use of biofuels

Production and sales of biofuels in Cyprus are considered to be negligible. Interest for investment in this field has been very limited. Since February 2004, when a new grant scheme was put into operation, some interest has been expressed particularly for the production of biodiesel from used edible oils. It is expected that within the next two years there will be further progress, with more applications.

2.3.2 National indicative target

The setting of a national target for biofuels is presently under study by the Ministry of Commerce, Industry and Tourism in co-operation with other interested parties. The final decisions should have been made before the end of 2004.

2.3.3 Policy measures for biofuels

In the last few years Cyprus has taken measures in order to promote the production and use of biofuels for transport, in the context of policy initiatives for the promotion of the Renewable Energy Sources and Energy Saving. The introduction of additional measures for biofuels is presently also under study.

2.3.4 Motivation for the target

The potential for energy crops in Cyprus is considered to be limited, although no studies on this topic have been carried out yet. A three-year study on this topic started in October 2004.

Cyprus has not set the target for biofuels yet and seems to be more interested in other types of renewable energy than biofuels. The main reason is that the potential of domestic feedstock for biofuels is expected to be limited.

2.4 *Czech Republic*

2.4.1 Current production and use of biofuels

In the years 1991–95 grants were allocated from the State budget to establish manufacturing capacity for rapeseed methyl ester (RME). Additional public resources have been made available and are being dedicated exclusively to promoting RME and biodiesel production. A biodiesel blend, ie a blend of diesel and RME containing 31 per cent RME by volume, is produced for the domestic market from 1997 onwards. At present there are 14 RME producers in the Czech Republic, which have a total production capacity of approximately 150,000 tonnes of RME annually. In 2001 39,600 tonnes were used in the Czech Republic and in 2002 68,800 tonnes. The use of bioethanol in the form of bio-ETBE has been stimulated and production capacity is available, but limited.

2.4.2 National indicative target

The Czech Republic has set indicative targets, which result in the outlook as given in Table 2.2. The targets will become definitive in the course of 2005, since they depend on the possibilities of the State budget and on agricultural production.

Table 2.2

OUTLOOK FOR PRODUCTION OF BIOFUELS IN THE CZECH REPUBLIC

Amount of biofuel	*2003*	*2004*	*2006*	*2010*
RME production (tonnes)	70,000	80,000	100,000	120,000
RME share in diesel (energy per cent)	2.1	2.2	2.75	3.1
Bioethanol production (tonnes)			174,000	220,000
Bioethanol share in petrol (energy per cent)			5.2	6.6
Biofuel share (energy per cent)	1.2	1.3	3.7	4.5

2.4.3 Policy measures for biofuels

The higher costs and lower energy efficiency of the biofuel components were offset by the payment from 1999 to 2001 of direct subsidies to manufacturers of RME and fuel blends. From 2001 to April 2004, compensation took the form of price rebates for the raw material (oilseed rape) grown on set-aside land. In addition, RME producers received direct support for processing rapeseed oil for non-food uses. This support is continued for a maximum of 100,000 tonnes per year. Also, there is a lower excise duty on blended fuel/biodiesel, which means that RME incorporated in a fuel blend carries zero excise duty.

Policy measures are in preparation in order to replace fossil-derived methanol by bioethanol in the production process of RME and MTBE, thus producing respectively rapeseed ethyl ester (also biodiesel) and bio-ETBE. Also, minimum quota for the production of bioethanol intended exclusively for transport purposes are proposed.

2.4.4 Motivation for the target

The admixture of biofuels on a large scale is expected to be implemented in the Czech Republic in 2006–07, once the technical and legislative prerequisites are in place. The target for 2006 clearly exceeds the percentage specified by the European Commission. The reasons for this lie in EU accession, and the need to create new opportunities in the countryside and systematically pursue a rural development strategy. The report also mentions the number of jobs that will be created by the local biofuel production. Furthermore, increasing energy self-sufficiency and efforts to improve the environment are fundamental issues for the Czech Republic.

Legislative and technical issues might keep the Czech Republic from reaching the reference value of 2 per cent in 2005. However, the Czech Republic is very ambitious in the field of biofuels and commits itself to a very high target of 3.7 per cent for 2006. The main motivation is the rural development caused by the local production of biofuels.

2.5 *Denmark*

2.5.1 Current production and use of biofuels

Denmark produces 40,000–45,000 tonnes of biodiesel, which is exported. Danish biofuel production is mainly dependent on the size of the European market and the competitive position of the Danish producers. The Danish consumption of biofuels for transport is very low and limited to experiments at local levels.

2.5.2 National indicative target

Denmark's indicative target for the use of biofuels in 2005 is zero. This decision is in line with the Government's position during the negotiations on the Directive. Here, Denmark was instrumental in replacing the obligatory targets for the use of biofuels contained in the original proposal for a directive with optional targets in view of the fact that the cost effectiveness of such measures varies from country to country, and that obligatory targets are not cost-effective. In the longer term, developments in biofuel technology or changes in the energy markets may change the outlook for and the costs of using biofuels. Developments will therefore be closely monitored in coming years with a view to fixing the indicative target for 2010 in 2006.

2.5.3 Policy measures for biofuels

The Government plans to abolish the current CO_2 tax on biodiesel (ca 12 €/tonne CO_2) and introduce similar tax rebates for other biofuels for transport. However, the energy tax, which is the major part of the taxation of transport fuels, remains.

Efforts to promote the use of biofuels for transport in Denmark have taken the form of research. The aim is to bring the costs closer to the prices of fossil fuels. This work may lead to biofuels becoming a cost-effective climate policy measure in the future.

2.5.4 Motivation for the target

According to the Danish Government, biofuels are of no great benefit to the environment. Although biofuels are almost CO_2 neutral, this gain is out of all proportion to the additional costs. Biofuels are far more expensive to produce than ordinary petrol and diesel. In addition to this, considerable additional investment is required in existing systems in order to handle the fuels during storage and distribution. The calculated cost of achieving the CO_2 reductions with biofuels is typically far higher than the indicative sum of DKK 120/tonne CO_2 (ca. 16 €/tonne CO_2) in the Government's climate strategy. It would be far cheaper to reduce CO_2 emissions in other ways.

The Directive points out that an indicative target lower than the reference value may be justified by the amount of national resources used to produce biomass for energy use other than transport. A considerable amount of biomass is used to produce electricity and heat, regarded until now as the most cost-effective use of biomass for energy production in Denmark. Denmark lies well above the EU average in terms of the proportion of its total energy production produced using biomass. In 2002 the total use of biomass was approximately 85 PJ. By way of comparison, it is estimated that the Directive's reference value of 2 per cent biofuel use in 2005 corresponds for Denmark to 3.4 PJ in 2005 and the reference value of 5.75 per cent in 2010 is estimated to correspond to 10.4 PJ.

The issue of reducing the dependence on imported energy is not urgent for Denmark. Because of its North Sea reserves, Denmark can be more than self-sufficient in oil at least until 2010. Denmark is also expected to be self-sufficient in energy as a whole, also because sustainable energy production is expected to continue to account for around 14 per cent of total energy consumption.

Denmark also expects some environmental damages from biofuel production. Energy crops for biofuels are sometimes grown on set-aside land, which puts a strain on the aquatic environment through increased leaching of nitrogen, phosphor and pesticides. There may also be increased emissions of ammonia and nitrous oxide (a greenhouse gas) into the air. This is in addition to the effect on biodiversity and natural amenities.

Furthermore, it is doubtful whether there would be any increase in total employment, particularly in the long term, by stimulating demand for biofuels in Denmark. Also, the report mentions some minor problems with technical aspects of biofuels.

Denmark is quite clear in its report: it does not consider biofuels for transport as an effective means to reduce greenhouse gas emissions. It considers electricity and heat from biomass much more cost-effective greenhouse gas reduction options and does promote this at large scale. When it comes to security of supply, Denmark has a convenient position by having its own oil reserves.

2.6 *Estonia*

2.6.1 Current production and use of biofuels

No pure or blended biofuel has been sold or consumed for transport purposes in Estonia. Estonia has produced 69,200 tonnes of rapeseed in 2003, but this has been used for the production of cooking oil. Starting production of biodiesel in Estonia requires an extension of the area for rapeseed cultivation or imports of rapeseed. The production of biodiesel from rapeseed has been tried, but the fuel obtained did not meet European standards. Industrialists have expressed interest in the possibility of producing biodiesel, but there are no concrete plans for starting production.

2.6.2 National indicative target

Estonia has not defined a target, but concludes that based on the current situation and the policy measures already taken it is unlikely that biofuel produced in Estonia will come onto the market in 2005. The import of biofuels into Estonia is also seen as unlikely. In the course of 2005 Estonia will assess the impact of the measures taken and plan supplementary measures. The planning of measures will be based on the objectives set in Directive.

2.6.3 Policy measures for biofuels

An act exempting biofuels from excise duty is expected to enter into force on 1 January 2005. Furthermore, the report mentions that growers of energy crops have the possibility of applying for direct EU aid. Similarly, growers and processors of energy crops can apply for investment aid from the EU structural funds.

2.6.4 Motivation for the target

The report mentions that no national resources have been directly allocated to the production of biomass, so Estonia cannot appeal to the fact that biomass is used in other energy sectors than transport. However, policy measures for the promotion of the use of renewable energy sources are being taken.

The report also mentions that car importers do not rate the technical readiness of vehicles in Estonia for the use of biofuels very highly.

It seems that the current policy measures taken by Estonia are not enough to make biofuels competetive and that Estonia is reluctant to introduce more policy measures.

2.7 *Finland*

2.7.1 Current production and use of biofuels

The use of biofuels in Finland is not widespread and it has mainly been based on pilot projects for a fixed period. The volume of bioethanol, produced from imported raw material, placed on the market in connection with these pilot projects was 1.6 million litres in 2002 and 7.9 million litres in 2003. This bioethanol has been used in blends of 5 per cent by volume with petrol. There have also been small-scale trials on the production of biodiesel and biogas for use as transport fuel. In 2003 biofuels accounted for approximately 0.1 per cent of the total sales of transport fuels.Furthermore, Finland produces 9 million litres per month of bio-ETBE from bioethanol for blending with petrol. It is based on imported raw material and is subsequently exported.

The total bioenergy consumption, mainly used in combined heat and power production, in Finland in 2003 was approximately 287 PJ, which was approximately 20 per cent of total primary energy consumption.

2.7.2 National indicative target

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

The report mentions further that setting a national target for the proportion of biofuels for transport purposes for 2010 would not serve any purpose at this moment.

2.7.3 Policy measures for biofuels

Since 2004 biogas used as transport fuel is exempted from tax, because this is covered by an act intended for the promotion of natural gas and LPG as transport fuel. Other biofuels can be partly exempted from tax on a project basis, intended for research and testing.

There is a large amount of funding of research into the possibilities of crop production, the production and use of biofuels and for projects that aim to develop more economic non-crop based biofuel solutions. Investment aids are granted for demonstration projects on the production of liquid biofuels.

2.7.4 Motivation for the target

Biodiesel production is not considered a viable option for Finland for two reasons. First, because the potential is limited: the production volumes of rape are limited by cultivation techniques such as crop rotation and large quantities of rape for food production are already imported. Second, because the costs are high: the production costs of arable crops in Finland are among the highest in Europe and the estimated cost of reducing carbon dioxide emissions by combined heat and power is much lower (€10-20/t CO_2) than for biofuels derived from arable crops (over €200/t CO_2).

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

The report does acknowledge that the importance of biofuels for transport may increase in the long term, because of technological advances in the production of (second-generation) biofuels, and thereby to lower production costs, and because of trends in prices of crude oil.

Finland is committed to the use of bioenergy, but it sees combined heat and power as a far better option than the current biofuels for transport produced from crops. However, it does actively promote research for second-generation biofuels.

2.8 *France*

2.8.1 Current production and use of biofuels

France has encouraged the use of biofuels already for more than 10 years. In 2003 the French consumption of bio-ETBE was 164,000 tonnes from 77,190 tonnes of bioethanol. The consumption of biodiesel, used as blend of 5 per cent in diesel, was 321,000 tonnes in 2003. Combined, this is approximately 0.7 per cent of total diesel and petrol use, based on energy content.

2.8.2 National indicative target

The French indicative target for 2005 is set at 2 per cent. Furthermore, France has announced to increase the production of biofuels to an amount of 1,200,000 tonnes[3] per year in 2007, which is three times the current production, but this is not much more than the indicative target of 2 per cent in 2005.

2.8.3 Policy measures for biofuels

Biodiesel and bio-ETBE have been partly exempted from taxation since 1992. The amount of the exemption is adjusted each year and is enough to compensate for the cost difference with traditional fuels. Since 2004, bioethanol directly blended in petrol is also partly exempted from taxation. These tax exemptions apply to certain maximum volumes of biofuels and are also adjusted each year. For 2004 the maximum volumes are 387,500 tonnes of biodiesel, 199,000 tonnes of bio-ETBE and 12,000 tonnes of bioethanol.

2.8.4 Motivation for the target

The report does not give any motivation for the French commitment to biofuels production.

The French report is very brief and unclear, but it does contain the target of 2 per cent for 2005, equal to the Directive's reference target. According to the Directive the report is incomplete, because it does not contain the requested information on the national resources allocated to the production of biomass for energy uses other than transport and also the total amount of transport fuels sold in France is missing.

[3] The original French report mentions abusively a figure of 800,000 tonnes.

2.9 *Germany*

2.9.1 Current production and use of biofuels

Biodiesel production started in 1993 and biodiesel is in 2003 still the only biofuel of any substantial importance on the German market. In addition, very small volumes of pure vegetable oil were used in approximately 4,000 cars. In 2003, 800,000 tonnes of biodiesel was used and 5,000 tonnes of pure vegetable oil. The share of biofuels in total transport fuel consumption in Germany was 1.4 per cent.

2.9.2 National indicative target

The report mentions that Germany is aiming at a target of at least 2 per cent of biofuels and that the prospects to achieve this are good.

2.9.3 Policy measures for biofuels

Before 2004, biofuels were exempted from tax, but only when used as a pure biofuel. From 2004 until 2009 all biofuels will be exempted from tax, also when used in blends with other fuels. This change is expected to result in use of bioethanol and bio-ETBE, which were not yet used as biofuel in Germany.

2.9.4 Motivation for the target

Germany does not mention a particular reason for its commitment to biofuels. In 2004 it intended to develop a long-term strategy for the promotion of alternative fuels and transportation technologies in the framework of its national sustainability strategy, and biofuels are an essential component of this.

The report does stress the German activities in the field of research for synthetic biofuels from biomass, because these fuels require no new engines or new filling station infrastructure, make use of the entire biomass raw material and have good emission values on combustion in engines. Also, Germany stresses its activities on Public Relations for biofuels in the past (biodiesel) and in the present (bioethanol, synthetic biofuels). Furthermore, it mentions its other bioenergy activities: Of the total bioenergy produced in 2003, 82 per cent was used for heating, 7.8 per cent for electricity production and 10.2 per cent for biofuels.

Germany is very active in the field of biofuels, both in current production and in research. The report does not give any motivation for this commitment.

2.10 *Greece*

2.10.1 Current production and use of biofuels

So far, there has been no production or consumption of biofuels in Greece, except for small field tests of biodiesel. Currently, two biodiesel plants with a capacity of 40,000 tons each are under construction and these will initially use mainly imported oils. Also, there has been interest to build a few smaller biodiesel plants and a bioethanol plant.

2.10.2 National indicative target

Based on the current prospects, Greece expects a total local production of 55,000–60,000 tons of biodiesel for the year 2005, which is approximately 1 per cent of total fuel use. Some additional small quantities of imported biodiesel are also anticipated. The Greek indicative target for biofuel use in 2005 has been set at 0.7 per cent and was communicated to the European Commision in an additional letter.

2.10.3 Policy measures for biofuels

Greek law has to be changed to allow the use of biofuels. Policy measures for the promotion of biofuels were expected to be finalized in autumn 2004. Various detaxation scenarios, ranging from full to zero detaxation of biofuels, are examined, aiming to secure the biofuels penetration.

2.10.4 Motivation for the target

Greece does not have a target yet, but does mention a few obstacles concerning the introduction of biofuels. For the use of biodiesel, there is some concern that, because the diesel-fuelled vehicles in Greece are old, problems may arise "in the elastomers or other parts of the engines". Also, because of some potential technical obstacles in the introduction of bioethanol as a mixture with gasoline, it has been decided that bioethanol should be converted into bio-ETBE.

Greece is still working on incorporating the fuel standards for biodiesel and bioethanol into the national legislation. For biodiesel this was expected to be completed by the end of 2004, thus allowing the use of biodiesel in the Greek fuel market. For bioethanol this is expected by late 2005 and therefore, introduction of bioethanol in the Greek gasoline market is expected to take place in 2006 or later.

However, in the report it is concluded that both the qualitative (fuel properties) and quantitative (land use, yielding capacities, prices, etc) data presented indicate that future biofuels (biodiesel and bioethanol) production in Greece can be supported to a major extent from indigenous resources.

In an additional letter to the European Commission Greece has set a lower target than the Directive's value, but also lower than what might be expected on the basis of the national report. This is probably because it is late with introducing proper legislation and has some problems with the standardization for biofuels.

2.11 *Hungary*

2.11.1 Current production and use of biofuels

In 1999 two experimental biodiesel plants were built to facilitate biodiesel use among agricultural producers. However, due to the special, low-rate excise duty on diesel granted for agricultural producers, the use of biodiesel was not an economic viable option for them and the programme failed. There was no biofuel use in Hungary in 2003. There is production capacity available to produce an amount of bioethanol enough for 40,000 tons of bio-ETBE.

2.11.2 National indicative target

The national indicative target for biofuels in Hungary in 2005 is 0.4–0.6 per cent.

2.11.3 Policy measures for biofuels

The Hungarian Government has proposed to the Parliament an excise duty refund from January 2005 to December 2010 for bio-ETBE produced on the basis of bioethanol blended in engine fuel as well as standard quality biodiesel blended in diesel oil.

2.11.4 Motivation for the target

Hungary claims that it meets the Directive condition of limited biofuel production potential. The prime factor hindering progress is that production capacities may only be enhanced on the long run. Also, in the case of biodiesel, there is a poor crop yield in Hungary due to climatic factors. However, the crop is still relatively cheap. Collection and utilization of used frying oil could play an important role in Hungary, but it is very time-consuming to design and create a system for this.

It seems that Hungary has started late with the promotion of biofuels and foresees now that not enough production capacity can be installed to meet the 2005 reference value of the Directive. However, it does not give an outlook for the period after 2005.

2.12 *Ireland*

2.12.1 Current production and use of biofuels

The only biofuel that has been sold in Ireland to date is 18,000 litres of rapeseed oil on a project basis from May 2003 to May 2004.

2.12.2 National indicative target

Ireland proposes an initial indicative target of 0.06 per cent by the end of 2005, rising to 0.13 per cent in 2006. This figure compares with current market penetration of less than 0.0003 per cent. The initial target is based on the projections from a scheme for excise relief on pilot biofuels projects. It reflects a first-stage initiative as part of an emerging national biofuels policy, which is being formulated and was scheduled for publication in late 2004. Any revised targets arising from this report, will be notified to the Commission as early as possible.

2.12.3 Policy measures for biofuels

Ireland has proposed a scheme for excise relief for pure plant oil, biodiesel blends, and bioethanol blends, but only on a project basis. The maximum amount of biofuels produced under this scheme is six million litres of pure plant oil, one million litres of biodiesel and one million litres of bioethanol per year, which adds up to approximately 0.3 per cent of total transport fuels. Ireland also offers capital grant aid for biofuels projects. Also, an aid of €45 per hectare is granted for production of energy crops, which are used for the production biofuels or electric and thermal energy.

2.12.4 Motivation for the target

A number of factors have impeded the development of an indigenous biofuels industry in Ireland, or the widespread placing of biofuels on the transport fuels market. The first factor is the relatively high cost of biofuels for transport as a carbon abatement measure, which are in the order of several 100 euros per tonne CO_2 avoided. Long term costs for second-generation biofuels could be much lower, which points to the desirability of accelerating research into the possibilities for developing FT-diesel or cellulosic bioethanol. Second is the potential conflict with the EU Directive on NOx emissions, because biodiesel, compared to diesel, increases NOx vehicle emissions by 5 per cent and on a life-cycle basis up to 30 per cent. Third is a potential increase in particulate emissions from production and use of biodiesel, which according to the report could be in the order of 15 per cent. Fourth, there are technical difficulties for biodiesel, pure vegetable oil and bioethanol with blending and its impact on conventional engines.

Finally, there are agricultural limitations on the amount of feedstock for biofuels in Ireland. The amount of biofuels that can be produced from Irish residues is about 1 per cent of total transport fuel use. Currently unproductive set-aside land could account for approximately 1.4 per cent if used for biofuel production. However, under the Blair House Agreement, there are at present some restrictions on the growing of oilseeds in Ireland on set-aside land. Use of currently productive land would induce additional feed imports. Also, cultivation rotation schemes limit the amounts of sugar beet and rapeseed that can be produced.

However, within the frame of their national climate change strategy, Ireland has set a target of reducing greenhouse gas emissions in the transport sector by 2.67 million tonnes in 2010 compared to the year 2000.

Ireland seems very thorough in exploring the possibilities and consequences of the production and use of biofuels for transport. As a consequence, market penetration of biofuels is very limited and the targets set are very low. However, Ireland has set an ambitious target for 2010 to reduce greenhouse gas emission in the transport sector.

2.13 *Italy*

The Italian report was not yet available. Italy has a current biofuel use of approximately 1 per cent of total road transport fuels.

2.14 *Latvia*

2.14.1 Current production and use of biofuels

Both in 2002 and in 2003, Latvia has used 2,500 t biodiesel, which is 0.3 per cent of the total amount of transport fuels.

2.14.2 National indicative target

Latvia has determined approximate targets of 1.25 per cent of biofuels in 2004, 2 per cent in 2005, 2.75 per cent in 2006, 3.5 per cent in 2007, 4.25 per cent in 2008, 5 per cent in 2009 and 5.75 per cent in 2010.

2.14.3 Policy measures for biofuels

Latvia has adopted a policy program for production and use of biofuel 2003–10. A new agri-production sector will be created and there will be established preconditions for the use of its products, biofuel and by-products. A full legislative framework for biofuels is being prepared. State funding allocated for bioenergy will be 10 times higher in 2005 compared to 2002.

2.14.4 Motivation for the target

Latvia expects that the targets will be reached, because there is significant interest from entrepeneurs in production of biofuels. Also, the report mentions that there are no specific technical or climatic effects in the Latvian fuel market, which could substantially impact (negatively) the use of biofuels.

The Latvian report gives very little background information, but it seems that Latvia's motivation for promoting biofuels is mainly based on strengthening the agricultural sector.

2.15 *Lithuania*

2.15.1 Current production and use of biofuels

Not mentioned in the report.

2.15.2 National indicative target

The Lithuanian Government has adopted a programme for the promotion of the production and use of biofuels in the period 2004–10, which creates the conditions necessary to reach at least 2 per cent of biofuels in the transport market by 31 December 2005, and at least 5.75 per cent by 31 December 2010.

2.15.3 Policy measures for biofuels

In February 2004 Lithuania has adopted an act, which governs the legal framework for the production, use and promotion of biofuels. Since May 2004 energy products produced from substances of biological origin receive an excise duty relief.

2.15.4 Motivation for the target

The report mentions in particular as a purpose of the act on biofuels, to reduce the Lithuanian energy sector's dependence on petroleum-based fuels and to increase the use of local energy resources.

The report of Lithuania is extremely brief and mentions only adopted policies.

2.16 *Luxembourg*

The report of Luxembourg was not yet available. Luxembourg uses no or little amounts of biofuels.

2.17 *Malta*

2.17.1 Current production and use of biofuels

The only form of biofuels used in Malta in 2003 was biodiesel produced for a Governmental demonstration project by a local company from waste industrial oil. The amount of biodiesel was 30,000 litres or 1 TJ, which is 0.02 per cent of Malta's total transport fuels.

2.17.2 National indicative target

Noting that biofuels can be used more cost-effectively elsewhere, other than transport, and that difficulties are being experienced with regard to the vehicles driven by biodiesel, Malta is exerting caution in setting realistic interim targets.

2.17.3 Policy measures for biofuels

Except for the demonstration project, in which difficulties in operation have been met, no further measures have been taken yet to promote the use of biofuels.

2.17.4 Motivation for the target

Malta is keen to exploit its potential biomass availability. This is particularly in view of the total dependence on imported fuels and the environmental benefits of renewable energy sources, including biofuel. However, in Malta there is negligible potential in biofuels from agriculture due to the limited freshwater resources, high population density and poor soil fertility. Industrial and domestic waste is the only source of biomass. A Commission document indicates a potential of 1,000 ktoe per year of biofuels for road transport in Malta, which is equivalent to 0.7 per cent of total transport fuel consumption. However, material recovery and composting is given a higher priority than energy recovery.

Malta presents a clear report on its specific situation and its reason for not setting a target.

2.18 *The Netherlands*

2.18.1 Current production and use of biofuels

Apart from a number of small-scale demonstration projects, involving some 4 million litres of biodiesel and pure vegetable oil, no biofuels are being placed on the market in the Netherlands.

2.18.2 National indicative target

The Netherlands is adopting an indicative biofuel target percentage of 2 per cent for 2006. This includes niche markets, such as the use of pure vegetable oil, pure biodiesel and mixtures of 85 per cent bioethanol with 15 per cent petrol.

2.18.3 Policy measures for biofuels

The report states that the Dutch Government is doing all it can to introduce incentive arrangements for biofuels with effect from 2006. The incentive measures will be structured in such a way as to ensure that no more than 2 per cent of road transport fuels is replaced by biofuels. The exact method of implementation will be announced in 2005.

2.18.4 Motivation for the target

The Netherlands gives two reasons for not complying with the indicative target for 2005. The first is that at present, the Dutch potential for producing biofuels from biomass is virtually nil. The Netherlands does not have the production facilities needed for the manufacture of biofuels. However, various Dutch market participants have indicated that, once the Dutch Government has made clear how it intends to implement the Directive, they will immediately take steps to build up production potential. It is assumed that this will take about a year and a half.

Secondly, the Netherlands wants to look more closely at the possibility of imposing minimum sustainability requirements (including CO_2 reduction) for biofuels. It would like to give a strong incentive for the development of the so-called second-generation biofuels, because these biofuels, such as biomass-to-liquid diesel and bioethanol from lignocellulosic materials, have the following advantages compared with the old biofuels: greater CO_2 reduction, less competition with food production, higher yield per hectare and lower costs. In the event of biofuel sustainability requirements being imposed with effect from 2006, these requirements should be set at such a level as to enable the present generation of biofuels, such as bioethanol and biodiesel, to comply with that level. Little by little, the requirements will need to be tightened. Biofuels offering improved sustainability performance may be eligible for higher compensation. Arranging such a system will require time and consequently, the possibility of biofuel incentives being introduced before 2006 is ruled out.

The Netherlands has developed a clear vision on biofuels and does intend to promote them, in particularly second-generation biofuels, which are more effective in reducing CO_2-emmisions. However, policy measures are still not taken and while the market is still awaiting them, the biofuel production is minimal. Also, it seems from the fact that no more than 2 per cent biofuels will be supported in 2006 that financial matters play an important role.

2.19 *Poland*

The Polish report was not yet available. Poland has a substantial use of biofuels, but is currently faced with political and legislative difficulties concerning biofuels.[4]

2.20 *Portugal*

2.20.1 *Current production and use of biofuels*

There have not been any sales of biofuels in Portugal.

2.20.2 National indicative target

The targets for biofuel use in 2005 in Portugal are laid down in a draft bill and are 50,000 tonnes of biodiesel and 15,000 tonnes of bioethanol, which totals approximately 1 per cent of the road transport fuels in Portugal. An additional 18,000 tonnes of biodiesel is covered by voluntary agreements with public or private undertakings operating public passenger transport fleets. This raises the figure for biofuel incorporation to approximately 1.15 per cent of total fuel sales.

2.20.3 Policy measures for biofuels

Portugal is finalizing its law for biofuel use, which will give biofuels exemption from excise duties up to certain quota set every year, which for 2005 should correspond to 1 per cent of the total transport fuels. In addition, biofuels produced in pilot projects may be covered even beyond this quota. Also, if the quota is not reached in a certain year, there is a possibility to introduce mandatory quota for biofuel use the next year. Finally, there is a possibility of establishing voluntary agreements on the use of biofuels in blends higher than 15 per cent with public or private undertakings operating public passenger transport fleets.

Furthermore, there have been events to promote biofuels, including debates on their introduction in Portugal, and demonstrations of the production of biofuels from waste cooking oil and their use.

[4] A Kulczycki, M Rogulska, Alternative fuels in the transport sector in Poland, JRC Enlargement workshop on alternative fuels in transport, Petten, The Netherlands, November 2004.

2.20.4 Motivation for the target

The target set for 2005 is below the reference value laid down in the Directive. This is due to two factors. First is Portugal's low level of agricultural biomass production for energy purposes. There is almost no additional irrigated land available in Portugal and irrigated areas used for growing food crops are not switching to energy crops. Also, Portugal considers importing raw material or processed products to be no improvement of the security of energy supply. Secondly, there is the delay in starting up potential biofuel production units, essentially because the industry is awaiting a decision on how biofuels are to be promoted.

Portugal is late with its promotion of biofuels and uses this as an excuse for not reaching the target. Still, the target set by Portugal is progressive considering it does not have any production of biofuels at the moment.

2.21 *Slovakia*

2.21.1 Current production and use of biofuels

From 2001 to 2003 Slovakia had a biodiesel production capacity of 62,000 t. In 2001, 30,290 t biodiesel was actually produced and used in Slovakia, which was approximately 1.6 per cent of the total transport fuel use.[5] In 2002, 6,267 t biodiesel was produced, of which approximately a quarter was exported and the remainder used domestically. In 2003 even less biodiesel was produced. Data for the production of bioethanol are not known. Many companies that originally produced biofuels have, in consequence to the abolition of state subsidies, rapidly restrained their production and either stopped the construction of new capacities or converted their business activities.

2.21.2 National indicative target

Slovakia seems to have accepted the reference values of 2 per cent for 2005 and 5.75 per cent for 2010 and has targets for the years in-between, but it also mentions that the quantification of national targets in 2005 and 2010 will be conditioned by availability of biofuels and investment preparedness of interested companies. It intends to start with blending 5 per cent of biodiesel into diesel with reduced excise tax ("red diesel"), which is used in agricultural and forestry production, in railway transport and in public transport.

2.21.3 Policy measures for biofuels

The report mentions that several Government bodies will take certain policy measures to promote biofuels, but they are not very concrete. One of them is to set up a proposal for determining the means for stimulation of biofuel price support.

2.21.4 Motivation for the target

Slovakia seems to commit to the Directive targets, but mentions no motivation for it. Further, it mentions that it wants to introduce biofuels "step-by-step" and especially stresses good management over fuel quality, taxes and state budget.

Slovakia has experience in biofuels and it has biodiesel production capacity. Because of its history, Slovakia should know very well what is necessary to promote biofuels, ie money. Their hesitation in introducing policy measures is probably because the costs are high or at least because they want to do it more cost-effectively than in the past. However, it could also be because it wants the legislation to be thorough and thus prevent abuse.

2.22 *Slovenia*

The Slovenian report was not yet available. There was no use of biofuels in Slovenia in 2004, it intended to implement the 2 per cent of the Directive in 2005, but this might be unrealistic.[6]

2.23 *Spain*

2.23.1 Current production and use of biofuels

In 2003 approximately 152,000 t bioethanol was produced and used as bio-ETBE. The amount of biodiesel used in 2003 was 65,810 t. The total share of biofuels in the transport sector in 2003 was 1.09 per cent.

[5] The report mentions abusively 2.9 per cent.

[6] F. Al-Mansour, A. Hanžič, Traffic energy consumption in Slovenia, JRC Enlargement workshop on alternative fuels in transport, Petten, The Netherlands, November 2004.

2.23.2 National indicative target

Spain has set its national indicative target for biofuel use in 2005 at 2 per cent.

2.23.3 Policy measures for biofuels

Since 2002 Spain has a complete exemption of excise duty for biofuels, which is valid until 2012. However, if the comparative trend in the production costs of petroleum products and biofuels so warrants, this may be replaced with a positive rate of tax.

2.23.4 Motivation for the target

The Spanish report is brief, mentions exactly and no more than what is required by the Directive and gives no motivations.

2.24 *Sweden*

2.24.1 Current production and use of biofuels

In 2003 the amounts of biofuels used in Sweden were 0.2 PJ biodiesel, 3.1 PJ bioethanol and 0.4 PJ biogas. Other biofuels, such as synthetic diesel and heavier alcohols, are used in very small quantities. The biofuel share therefore stood at 1.3 per cent in 2003. In 2003, imports of bioethanol increased sharply and now accounts for most of the bioethanol used in fuel in Sweden. It is imported from Norway, Spain, Italy, France and Brazil. The most expensive imported bioethanol is wine bioethanol from France, and the cheapest is sugar-cane bioethanol from Brazil. About 85 per cent of all fuel bioethanol is used in low-level blends, ie petrol with a 5 per cent bioethanol content. At the end of 2003, about half of all 95-octane petrol contained 5 per cent bioethanol. About 15 per cent of fuel bioethanol is used in a pure or an almost pure form (E85). In 2003 and 2004 about 7,000 Flexible Fuel Vehicles have been sold.

2.24.2 National indicative target

Sweden has established a target of 3 per cent biofuels for 2005.

2.24.3 Policy measures for biofuels

From 2004 to 2009 CO_2-neutral fuels are exempted from both CO_2 tax and energy tax. However, changes to avoid over-compensation can be made at any time, as is required by the Commission. From 2002 to 2008 it is possible to obtain a tax reduction for the purchase of environmental friendly company cars, such as cars that run on bioethanol or biogas.

Furthermore, Sweden supports research, development and demonstration measures for developing more energy-efficient and more cost-effective processes for the production of biofuels.

2.24.4 Motivation for the target

Sweden has started a strategy for switching to green taxes in 2001. Under this strategy, increased taxes on energy and environmentally harmful emissions are offset by reduced taxes on labour. This green tax reform is expected in particular to encourage the use of biofuels. The use of biofuels in Sweden is rising, mainly due to increased imports of bioethanol, and takes the view that the 2 per cent reference value recommended by the European Union for the national target could be reached as early as 2004. Based on these expectations and in order to boost the introduction process for biofuels, Sweden has established a target for 2005 that is higher than the indicative target of the Directive.

However, there is uncertainty as to what will happen to imports of bioethanol and RME if demand from other countries increases in the future. Increased demand could drive up prices and hence make imports and distribution less economic and possibly cause them to fall. In the longer term, there is a clear risk of this happening.

Sweden expects that biofuels offer a significant potential as regards to its energy supply. Research and development efforts are being made to develop more energy-efficient and more cost-effective processes for the production of biofuels. As a part of this an estimated 15,000 ha of land is used for short-rotation forestry.

Further, the report mentions particularly that there is some disagreement about the energy value to be assigned to bioethanol in 5 per cent low-level blends and it recommends that further studies need to be executed to clarify the issue.

Sweden uses biofuels for transport mainly because of environmental considerations. It is the only country that is importing biofuels on a large scale. On the longer term, Sweden hopes to produce more biofuels domestically by using lignocellulosic biomass from short rotation forestry.

2.25 *United Kingdom*

2.25.1 Current production and use of biofuels

The total sales of biofuels in the UK in 2003 were some 19,446,000 litres, which corresponds to approximately 0.04 per cent of total road transport fuels. Biodiesel sales have increased from 150,000 litres a month in August 2002 to around 2 million litres a month. To a large extent, production is from waste vegetable oil, since this is currently the cheapest feedstock. Biodiesel is currently available at over 100 filling stations in the UK; the majority is at or below 5 per cent level blend in diesel. Negligible quantities of bioethanol were used in road transport in 2003.

2.25.2 National indicative target

With current policy measures and the additional incentives announced in 2004, it is estimated that UK biofuel sales could be as much as 12 million litres a month in 2005. This would represent a six-fold increase over current levels of biofuel. As a percentage of total road fuel sales, this would equate to something like 0.3 per cent biofuels, which will be the national target for 2005.

2.25.3 Policy measures for biofuels

A 20 pence (ca €0.29) per litre duty incentive on biodiesel has been in place since July 2002, and a similar duty incentive for bioethanol will be introduced from January 2005. The current duty incentives will remain in place for at least the next three years. The UK is also seriously considering the possibility of introducing a renewable fuel obligation for the road fuel sector. Yet, at the moment still many questions remain to how such an obligation might work and whether it is the most effective mechanism.

Also, European and regional funds have been used to construct biofuel plant in less developed regions. Furthermore, the UK Government is discussing the application of certain favourable write-off mechanism for capital assets for biofuel production, thus supporting investment in the most environmentally beneficial biofuel processing.

The UK Government has been leading in promoting and using biofuels by driving part of the diesel fleets of the ministerial and delivery vehicle services and also of local Governments on biodiesel blends. When it comes to information provision, the Government has sponsored several promotional leaflets.

Also, when it comes to research and development, the UK has already supported important work in expanding knowledge on energy crops and advanced conversion technologies like gasification and pyrolysis.

2.25.4 Motivation for the target

The national target is below the Directive's reference value, because of the UKs low starting point, the considerable growth this target would imply and the limited time between now and the target period.

The industry has called for a higher level of incentive, but biofuels are currently already an expensive method of carbon abatement. Also, economic analysis suggests that greater incentive levels at this time would largely result in imports, including from outside the EU. This would limit the potential benefits to the UK and broader EU agricultural and rural sectors of a new market. In addition, there is strong concern that greater demand from the EU for biofuel feedstock could lead to further deforestation in South East Asia and South America; thereby undermining the environmental benefit sought through the measure.

The report also stresses that it takes time to consider carefully the most appropriate mechanisms to ensure the greatest carbon savings possible from biofuels and other renewable fuels, and at the lowest cost. This includes developing the right framework to support renewable fuels into the long term needs, considering major changes to the fiscal regime to enable the direct processing of biofuels into the conventional refineries and possibly some form of renewable fuel obligation.

The UK has recently started promoting biofuels and started with the current cheapest biofuel, biodiesel from waste vegetable oils. The UK is reluctant to spend more money on biofuels, also because it fears that this will result in import from biofuels from outside the EU, which is seen as undesirable.

3. Overview of Indicative Targets

From all the indicative targets mentioned in the available country reports an overview has been made, giving an expected result for the entire European Union. This overview is given in Table 3.1 and a geographical overview based on this table is given in Figure 3.1.

Table 3.1

NATIONAL INDICATIVE TARGETS AND CORRESPONDING FUEL USE

Country	*2003 biofuel use (per cent)*	*2005 biofuel target (per cent)*	*2006 biofuel target (per cent)*	*2003 petrol and diesel use (PJ)*	*2003 biofuel use (PJ)*	*2005 biofuel target* (PJ)*	*2006 biofuel target* (PJ)*
Austria	0.06	2.5		342	0.2	8.5	8.5
Belgium							
Cyprus	0	—		25	0		
Czech Republic	1.2	—	3.7	233	2.8	2.8	8.6
Denmark	0	0		162	0	0	0
Estonia	0	0**		39	0	0	0
Finland	0.1	0.1		162	0.2	0.2	0.2
France	0.7	2.0		1,931	14.3	38.6	38.6
Germany	1.4	2.0		2,385	33.4	47.7	47.7
Greece	0	0.7		233	0	1.6	1.6
Hungary	0	0.4-0.6		146	0	0.7	0.7
Ireland	0	0.06	0.13	113	0	0.1	0.1
Italy							
Latvia	0.3	2.0	2.75	42	0.1	0.8	1.1
Lithuania	?	2.0		?	?	?	?
Luxembourg							
Malta	0.02	—		6	0.0		
Poland							
Portugal	0	1.15		306	0	3.5	3.5
Slovakia	0.14	2.0	2.5	75	0.1	1.5	1.9
Slovenia							
Spain	1.09	2.0		1,237	13.5	24.7	24.7
Sweden	1.3	3.0		273	3.5	8.2	8.2
The Netherlands	0.04	—	2.0	429	0.2	0.2	8.6
United Kingdom	0.04	0.3		1,641	0.7	4.9	4.9
EU total***	0.7	1.5	1.6	9,779	69	144	159

* Based on the target percentage and the total petrol and diesel use in 2003.

** Not a target, but an expected value mentioned in the report.

*** Excluding Belgium, Italy, Luxembourg, Lithuania, Poland and Slovenia.

From the table it is clear that there are several countries that adopt the reference value of 2 per cent for 2005 and a few an even higher value, but also that there are many countries that adopt a lower target. It can be expected that the 2 per cent value for the entire EU will not be met in 2005. However, if the indicative targets are met by 2005, the EU biofuel production is still quite considerable, mainly because large transport fuel consumers like Germany, France and Spain have committed themselves to the reference value.

There are very few countries that give an outlook for the period after 2005–06. Austria is very progressive and has set a 5.75 per cent indicative target already for 2008. Czech Republic, that has a high target for 2006, expects 4.5 per cent in 2010, which is lower than the reference value of 5.75 per cent. Latvia, Lithuania and Slovakia are aiming for this reference value in 2010.

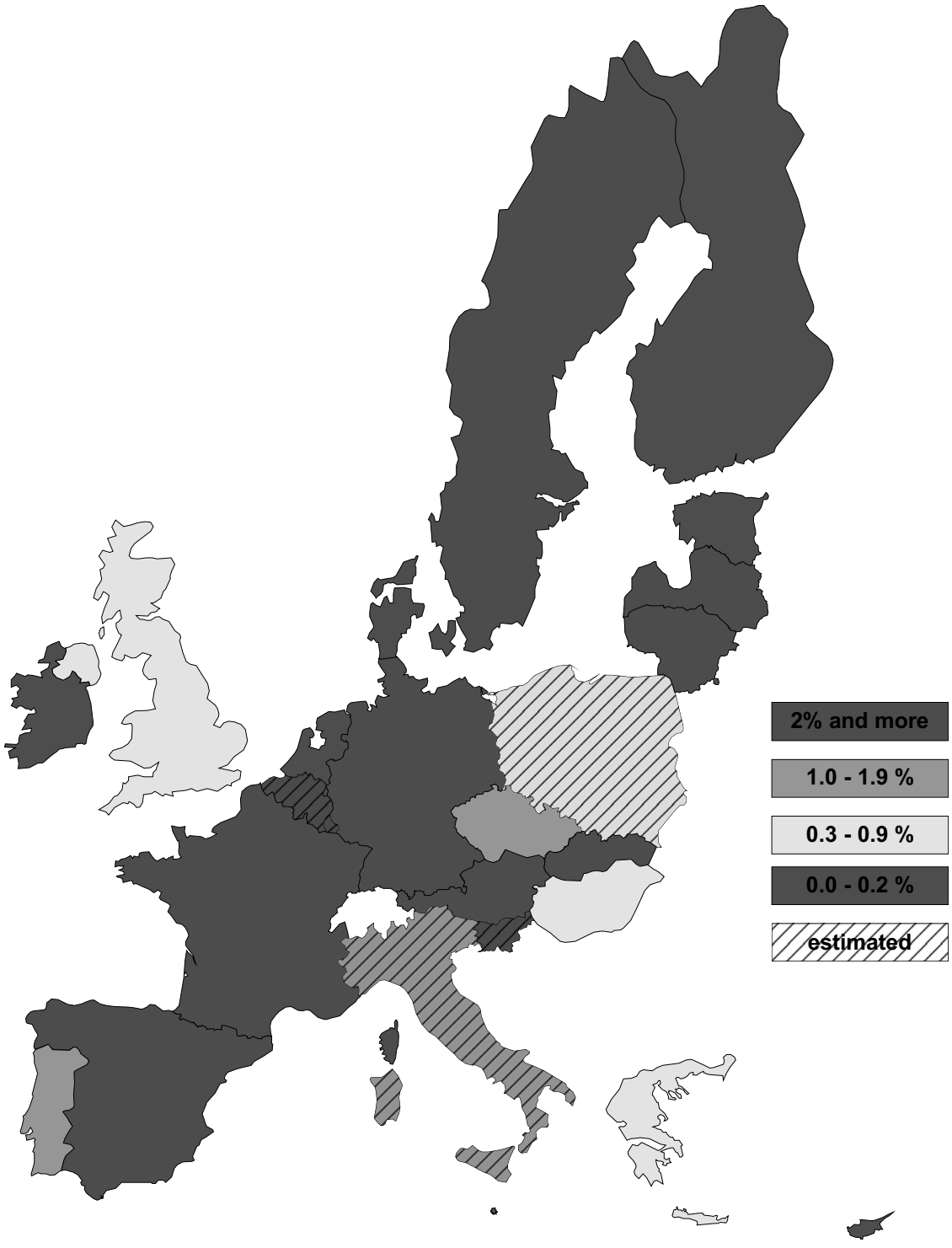


Figure3.1 Geographical overview of the biofuel use in the EU in 2005

4. Barriers for Implementation of the Directive

4.1 *Reasons for deviation of the 2005 reference value*

In this chapter the reasons mentioned for deviation of the Directive's reference value of 2 per cent for 2005 are summarised and categorised in seven different types of barriers: economic, legislative, technology, biomass supply, sustainability, social acceptance and security of supply. The first six are based on an earlier barrier analysis[7] and the seventh, security of supply, was added, because issues related to this aspect of the Directive cannot be categorised in one of the other six.

4.1.1 Economics

Biofuels for transport are currently more expensive than petrol and diesel and many countries have, therefore, introduced measures to compensate the difference. In some countries, such as Cyprus and Estonia, the measures taken did not result in the expected biofuel production. Although they are considering additional measures, it will not be possible to reach a 2 per cent target in 2005. Many countries mention that they currently do not consider the use of biofuels to be a cost-effective measure to reduce greenhouse gas emissions. Some of these countries, such as Finland and Denmark, use considerable amounts of biomass for the production of heat and power, which is currently more cost-effective. Also, it is mentioned that further research is necessary in order to make the use of (second-generation) biofuels a cost-effective measure to reduce greenhouse gas emissions.

4.1.2 Legislation

Some countries do not yet have the proper legislation ready for the (large-scale) introduction of biofuels in 2005. This applies to legislation making biofuels economically competitive, which is the case in The Netherlands, but also to other areas of legislation, such as legislation regulating the fuel quality. A few countries also mention that there is currently not enough production capacity and that the time is too short to build extra capacity in order to meet the Directive's reference value for 2005. Although this is a barrier, it seems that this is caused by a delay in promoting biofuels in these countries. One other specific legislative barrier is mentioned by Ireland: the Blairhouse Agreement, which is a trade agreement between the USA and the EU. This agreement essentially limits the amount of oil seeds that can be produced in the EU and thus limits the amount of biodiesel that can be produced from these seeds.

4.1.3 Technology

When it comes to technology an important barrier is the end use of several types of biofuels, because of their different physical properties compared to petrol and diesel. Many reports mention that blending of biodiesel in diesel and bioethanol in petrol can be a problem and that the distribution of the fuel is not straightforward. However, in most cases this is not seen as an actual barrier for implementation of the Directive. A real barrier for some countries is the difficulty to obtain a good fuel quality. Especially Malta and Estonia mention this for respectively biodiesel produced from waste oil and biodiesel produced from rapeseed. Another barrier is the incompatibility of the current cars and engines with some types of biofuels, which is mentioned in the reports of Greece and Estonia. However, technology is also seen by many countries as a solution for existing barriers, especially the technology that is being developed for the production of second-generation biofuels.

4.1.4 Biomass supply

In some countries, such as Malta and Cyprus, there is a limited amount of any kind biomass feedstock, which means that a 2 per cent target cannot be achieved by using only domestically produced biomass. In other countries, such as Finland, Hungary and Portugal there is a limited amount of certain types of biomass, such energy crops in general or a specific crop as rapeseed. Also, countries that have a limited amount of arable land, such as Finland, prefer to use this for food production. Most of the countries that mention a limited amount of biomass available do not mention or consider imports of biomass feedstock.

[7] In an internal Network of Excellence "Overcoming barriers to bioenergy" WP3 document "Barrier analysis and RTD goals", by H den Uil and E.P. Deurwaarder.

4.1.5 Sustainability

Some countries argue that current implementation of biofuels has several negative environmental effects. Denmark mentions that the cultivation of energy crops used as feedstock for liquid biofuels causes increased emissions to water, air and soil and has negative effects on biodiversity due to a high use of fertilisers and pesticides. The UK fears deforestation, especially in South-America, because of the increased demand for agricultural land. Ireland mentions a very different aspect: the increased hazardous exhaust emissions such as NOx and particulate emissions especially from vehicles driven on biodiesel. The Netherlands mention that the currently used biofuels, bioethanol and biodiesel, do not reduce CO_2 emissions enough when a life cycle basis is considered. They want to impose minimum sustainability requirements, such as a certain amount of CO_2 reduction. This would stimulate the research for and use of second-generation liquid biofuels, which have better environmental performance.

4.1.6 Social acceptance

There are no countries that consider issues related to social acceptance to be a barrier for implementation of the Directive. However, some countries, like Germany, do stress that public relations for biofuels are important.

4.1.7 Security of supply

Security of energy supply was one of the main arguments for the realisation of the Directive. However, Denmark does not consider this an argument for the use of biofuels, because it has its own oil reserves. This can, if fact, be considered a barrier for the implementation of biofuels in Denmark. The UK fears that full implementation of the Directive will lead to large-scale imports of biofuels from outside the EU and considers this undesirable, (amongst others) because the UK does not regard this as more security of energy supply.

Interestingly, the interpretation of security of energy supply seems to vary. Most countries seem to interpret this as larger energy self-sufficiency within their own country, some as larger energy self-sufficiency within the European Union. Some countries that argue that they have a limited amount of biomass do not consider or mention the possibility of imports from other EU countries. Sweden, which is importing biofuels on a large scale, also from outside the EU, is very much an exception in this respect. On this issue, the Directive itself mentions only that "the use of biofuels (. . .) can reduce the dependence on imported energy (. . .) and hence the security of supply." However, in the Commission's Green Paper "Towards a European strategy for the security of energy supply"[8] it is stated that "Security of supply does not seek to maximise energy self-sufficiency or to minimise dependence, but aims to reduce the risks linked to such dependence. Among the objectives to be pursued are those balancing between and diversifying the various sources of supply (by product and by geographical region)." Finally, in the proposal for the Directive[9] there was even a reference to the fact that biofuel development could open a new market for agricultural products, which could benefit developing countries.

4.1.8 Overall view on the barriers for 2005

The barriers that are mentioned in the country reports were categorised and counted. Some interpretations had to made, because not all the reports mention explicitly the barriers to the implemention of the Directive. The countries that expect to meet the 2 per cent of biofuels target in 2005 were not included in this analysis. Most of the countries mentioned more than one important barrier and these were all included and counted. The results of the barriers found in the country reports are summarised in Figure 4.1 and Figure 4.2.

[8] Green Paper "Towards a European strategy for the security of energy supply", COM(2000) 769 final, 29 November 2000.

[9] Proposal for a Directive of the European Parliament and of the Council on the promotion of the use of biofuels for transport, COM(2001) 547 provisional version, 7 November 2001.

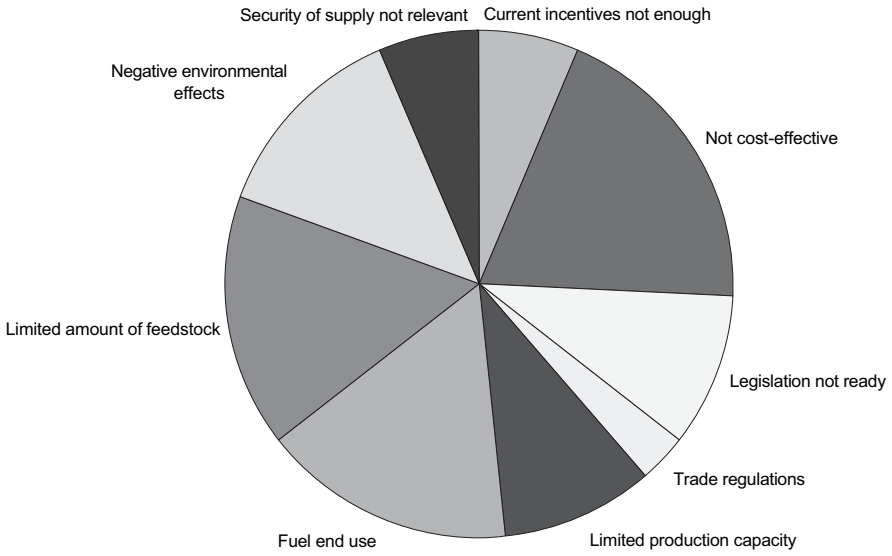


Figure4.1 Barriers for implementation of the Directive in 2005 (detailed)

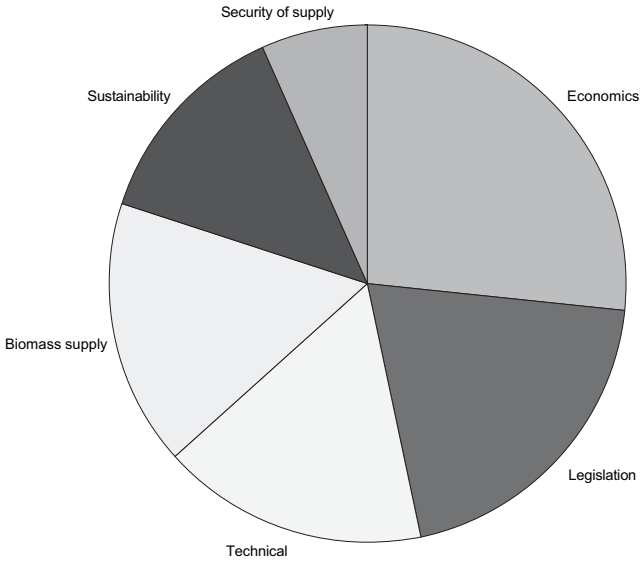


Figure 4.2 Barriers for implementation of the Directive in 2005 (generalised)

It is clear that there are several different barriers for the implementation of the Directive in 2005 and the main ones are that biofuels are considered not cost-effective for reducing greenhouse gas emissions, that the fuel end use is problematic and that there is limited amount of feedstock in certain countries. Besides, the current biofuels have some negative environmental aspects.

Furthermore, there are legislative problems and there is limited production capacity, but it seems that these two barriers can be removed fairly easily in time and could have been removed already if these countries had acted earlier.

4.2 *Barriers for biofuel use beyond 2005*

Most of the countries do not look in detail beyond 2005. Austria mentions that the 2010 target will exceed the maximum substitution potential for biofuels by blending with diesel and petrol, due to fuel specifications. Finland foresees a competition for biomass feedstock between CHP and biofuel producers. Sweden fears a

competition for its biofuel imports when demand for biofuels in other countries rises. On the basis of these country reports, it is difficult to determine which barriers for biofuel use there will be after 2005, but it seems that the availability of biomass feedstock is an important one.

4.3 *Policy measures to overcome barriers*

Most policy actions already taken are to overcome the economic barriers. The most common one is a (partial) tax exemption for biofuels. It depends of course on how much tax exemption is given and for how long this is guaranteed, but this measure seems the most effective one for current implementation of biofuels. Some countries also give investment subsidies or make use of EU funds. A few countries are considering mandatory quota for biofuels. The countries that consider biofuels as not cost-effective for reducing greenhouse gas emissions are not willing or reluctant to take these measures and stress the need for more research to improve this cost effectiveness for biofuels.

Most legislative problems can be overcome by changing the legislation. This is a process that takes time and some countries have started it too late. This is also true for the argument of limited production capacity.

The technical problems mentioned are all related to end-use. For some countries they can be overcome by improving the fuel qualities of the biofuels by means of some more research and development. The incompatibility of the cars and engines with biofuels in a few countries is more difficult to overcome in the short-term.

The limited amount of biomass in certain countries could be offset by imports of biomass. Many countries do not consider imports of biomass, not even from within the EU. This is a political decision, probably because of economic reasons: the money spent for the implementation of biofuels would flow for the most part to other countries.

When it comes to sustainability, the current biofuels are better than their fossil counterparts, but they have some drawbacks. Promotion of biofuel research can lead to so-called second-generation biofuels, which have a better performance with respect to sustainability. Besides promoting research, requiring minimum sustainability requirements for biofuels, as proposed by the Netherlands, could be a viable policy measure.

The security of supply issue, such as in Denmark where this argument of the Directive is not relevant because of the national oil reserves, is not a matter of a barrier that can or needs to be removed, but it is more a question of strategic or political decision.

5. Conclusions

The EU Member States had to report in 2004 on their progress in implementing the EU Biofuel Directive. This overview on the reports available in March 2005 has learned that five Member States (Belgium, Italy, Luxembourg, Poland and Slovenia) have not reported yet and several others have not completely reported all the information that was requested by the Directive. The reports are also very different in the amount of detail reported and their length varies from 1 to 35 pages.

From the available country reports it can be concluded that the EU will not reach the target of 2 per cent of biofuels for transport in 2005, which was the objective of the EU Directive for the promotion of biofuels. Still, the EU biofuel consumption will be quite considerable in 2005, approximately 1.5 per cent, mainly because large transport fuel consumers like Germany, France and Spain have committed themselves to the reference value of the Directive.

The countries that have set a lower national target than the reference value give various reasons for this deviation. The main ones are that biofuels are considered not cost-effective for reducing greenhouse gas emissions, that the fuel end use is problematic and that there is limited amount of feedstock in certain countries. Besides, the current biofuels have some negative environmental aspects. Furthermore, there are legislative barriers and there is currently limited production capacity. Some of these barriers can be removed fairly easy, especially these latter two.

Some of the mentioned barriers are more difficult to remove because they are more fundamental and depend on political choices. A few countries mention that they have a limited potential of biomass and can therefore not adopt the reference value of 2 per cent. These countries do not consider or mention imports of biomass or biofuels, probably because they do not consider this to contribute this to the security of energy supply. Interestingly, the interpretation of "security of supply", which was an important argument for the creation of the Directive, seems to vary between countries. It varies from very narrow perspectives, eg national energy self-sufficiency, to wider ones, such as energy-sufficiency on a European level, and to broad perspectives, such as

diversity of energy suppliers. The Directive is not very clear on this part, but the Commission Green Paper shares the broad perspective.

Another difficult barrier is the argument that the use of biofuels is not cost-effective compared to other options for reducing greenhouse gas emissions. This is true for the current biofuels, but the motivation for the Directive was not only to reduce greenhouse gas emissions, but also to reduce the dependence on oil, which also has a cost. Many countries mention the need for so-called second-generation biofuels that will be more cost-effective. These biofuels will probably also remove some other barriers, such as some negative environmental performances of current biofuels and the technical barriers for end-use of the current biofuels.

As mentioned earlier, many countries mention the need for second-generation biofuels. This includes both the countries that do and the countries that do not adopt the Directive's reference value. Thus, all these countries agree on the usefulness of these second-generation biofuels,whereas they are very different in their current implementation of biofuels. It can be concluded that the different European countries do not only have different climatic and market conditions when it comes to energy supply and transportation, but also different political views on the use of biofuels. This makes an analysis of the success factors and barriers for large-scale biofuel implementation based only on the country reports impossible. A wider scope is necessary to determine especially the success factors for large-scale implementation of biofuels for transport. This could be the included in or be the main topic of the "road map" for large-scale implementation of biofuels for transport, as proposed to establish within the Network of Excellence project "Overcoming barriers to bioenergy".[10]

June 2006

Supplementary Memorandum by The Energy Research Centre for the Netherlands

EUROPEAN BIOFUEL POLICIES IN RETROSPECT

Preface

This report gives an overview of the current developments regarding biofuel policies in various EU Member States. It was written as a contribution to a study, which will provide a thorough review of the complicated and sector-overarching issue of biofuels in India and South East Asian countries. This study is carried out within the framework of the ProBios (Promotion of Biofuels for Sustainable Development in South and South East Asia), which aims at promoting biofuels in the view of sustainable development in the South and South-East Asia. The project is co-ordinated by Winrock International India, and ECN, together with CIEMAT, is a partner in this project. The complete biofuels study carried out as art of the ProBios project will be published in the course of 2006.

The ProBios project is funded by the EU-Asia Pro Eco Programme. Asia Pro Eco is designed to strengthen the environmental dialogue between Asia and Europe through the exchange of policies, technologies and best practices that promote more resource-efficient, market driven, and sustainable solutions to environmental problems in Asia. The programme aims to support a series of preventive and corrective actions, which materialise in technical solutions that contribute to both quality of life and economic prosperity in Asia.

The authors would like to thank Marc Londo, André Wakker, and Xander van Tilburg of ECN for their valuable comments on this report.

Abstract

Despite the benefits of the production and use of biofuels in he fields of agriculture, security of energy supply and the environment, in India and surrounding countries, the barriers to the use of biofuels are still substantial. The project ProBios (Promotion of Biofuels for Sustainable Development in South and South East Asia) aims at promoting biofuels in the view of sustainable development in the Southern and South eastern Asian countries The first stage of this project concerns a study, which will provide a thorough review of the complicated and sector-overarching issue of biofuels in India and surrounding countries. This study is a joint activity of WII, ECN and CIEMAT. This report comprises a contribution to this study and describes past experiences with their policy context for a selection of EU countries, with the purpose of identifying conclusions from the European experience that may be valuable for Indian and South East Asian policy makers and other biofuels stakeholders.

[10] As proposed in the project meeting of Work Package 3 "Liquid biofuels for transport" in January 2005.

Summary

Despite the benefits of biofuels in the fields of agriculture, security of energy supply and the environment, barriers to the use of biofuels are still substantial in India and South-East Asia. In order to get an insight in policy issues and barriers for biofuels, it is useful to draw lessons from past experiences. Several European countries have already introduced biofuels into their market before the EU Directive was issued. Some have done so successfully, while others have struggled to create a stable market. This report describes past experiences with their policy context for a selection of EU countries, with the purpose of identifying conclusions from the European experience that may be valuable for Indian and South East Asian policy makers and other parties involved in the biofuels sector.

The success stories of France, Germany, Spain and Sweden have several common factors. The most important is a fiscal support for biofuels guaranteed for a longer term. The way these countries have give the fiscal support is different, as well as the amount given. France allows the tax exemption for a limited volume of biofuels and carefully calculates the amount of tax exemption to be given, whereas Germany on the other end gives a full tax exemption for unlimited volumes of biofuels. The second factor in common is that they all in a way had an organisation firmly lobbying for the introduction of biofuels. In France and Germany this was the agricultural sector, in Spain the multinational Abengoa. Also, in all countries at least the car manufacturers or the oil companies participated, making the distribution of the biofuel possible, either as pure biofuel or a blend. In Germany, where the oil companies initially did not participate, the car manufacturers provided cars suitable for biodiesel and many independent filling stations marketed the fuel, as they had a pump available when leaded petrol became prohibited. Equally important was the political willingness to support biofuels. In Sweden and Germany left-wing/green parties' environmental motivations were important for the political support for biofuels, whereas in France and Spain support of the agricultural sector was considered important by the politicians.

The Czech Republic, Poland and Slovakia all started with the introduction of biofuels as a measure to support the agricultural sector. They have used fiscal support, but have either changed or abolished it one or several times, which is detrimental for the biofuel industry. In addition to this uncertainty of policy, much of the announced legislation has been delayed and the production and use of biofuels has also been accompanied with a lot of bureaucracy. Also, especially in Poland, clear quality standards and quality control measures have been lacking. This led to a bad image for biofuels because consumers did not have confidence in fuel quality.

Malta, the UK and the Netherlands have had a different approach to the use of biofuels than countries like France and Germany. Their view was that the extra costs for biofuels did not out-weigh the benefits, keeping this option open for the long term. Still, these three countries have been actively developing their policy for biofuels with a view to the future and also under pressure of the EU Directive. Malta and the UK have chosen to make a start with a relatively small amount of biofuels, by giving only a modest tax exemption for biofuels. This is not only an effective way to make use of waste oils, but also effective in starting a biofuel market at minimal costs. The Netherlands and the UK have been actively pursuing and developing policy instruments to encourage the introduction of more cost-effective biofuels. The UK will probably not face many problems when these policies are implemented, because it already has a market for biofuels and guarantees three years of continuation of current fiscal support. In the Netherlands, uncertainty regarding future biofuel policies resulted in a poor investment climate for biofuels and fairly low confidence of market parties.

The history of biofuels policies in European countries shows that the following factors have been crucial for the introduction of biofuels in these countries:

1. Political commitment to biofuels.
2. Active market actors and/or lobbying groups initiating biofuels activities.
3. Financial compensation to bridge the financial gap between biofuels and fossil fuels.
4. End-user market for pure or blended use of biofuels.

Political commitment to biofuels for a longer period of time, is crucial for creating a favourable investment climate and market conditions. This political willingness should be translated into effective biofuels promoting policies that are:

— clear,
— non-bureaucratic,
— consistent for a longer period of time,
— specific for the national context to optimally utilise the country's assets.

Market parties taking the lead and willing to invest are very important for developing a biofuels market. Which parties may be the initiators and what partnerships they could involve is strongly dependent on the local context. The establishment of consortia between fuel suppliers, biofuel producers, farmers, industrial companies, oil companies, car manufacturers, research institutes, consumer associations etc. also largely determines what biofuels will develop and to what extent.

A longer-term fiscal support system, bridging the financial gap with fossil fuels, is a very effective means for creating favourable market conditions. The exact design of the fiscal support system (types of biofuels, pure biofuels and/or biofuel blends, differentiated levels of tax exemption, etc) has also clear consequences for the development of different biofuels and the resulting biofuel mix on a national market (eg Germany). However, possible risks of such as system are overcompensation and state budget implications, especially if there is no limit on the biofuels volume eligible for the tax exemption. This can be prevented through monitoring and introducing a maximum level of tax exemption and/or a maximum to the biofuels volumes that can make use of the exemption (eg Germany, France). Moreover, a fiscal support system cannot guarantee in advance that the targets for market penetration of biofuels will be achieved. Being aware of these drawbacks of fiscal support system, some EU Member States are considering or introducing mandatory biofuels targets to fuel suppliers (eg Germany, the Netherlands, United Kingdom). Certification of biofuels and setting sustainability requirements is currently subject of discussion as well in various European countries.

Another important prerequisite for successful introduction of biofuels is the presence or creation of an end-user market for biofuels. This may be a large market able to use biofuel blends, such as all passenger cars running on petrol or diesel. A possibility is to use vehicle fleets that are equipped with adapted engines for the use of (almost) pure biofuels, for example captive governmental fleets ("leading by example"). In any case, end-users of biofuels need the guarantee that biofuels or blends with biofuels can be used in their cars without damage. Therefore, generally the involvement of either the car industry (use of pure biofuels) or the oil industry (use of biofuel blends) or both is necessary for reliable and effective biofuel distribution and use. Also, it requires quality standards for biofuels and biofuel blends, since their absence (eg Poland) or their inapplicability (eg Spain) is an enormous barrier to market introduction. Furthermore, such standards facilitate European biofuels trade.

1. Introduction

Despite the benefits of biofuels in the fields of agriculture, security of energy supply and the environment, barriers to the use of biofuels are still substantial in India and South-East Asia. There is no financing mechanism in place, the awareness in the transportation sector of this clean technology is low, and the best technologies are not always available to Indian companies. On the biomass supply side, the Indian agricultural sector has a lengthy experience with biomass production. The increasing demand for biofuels would have positive economic implications for this sector. However, there are policy barriers to be overcome as well.

The ProBios project (Promotion of Biofuels for Sustainable Development in South and South East Asia) aims at promoting biofuels in the view of sustainable development in the Southern and South eastern Asian countries. The first stage of this project concerns a study providing a thorough review of the complicated and sector-overarching issue of biofuels in India and surrounding countries. This report constitutes a contribution to this study.

In order to get an insight in policy issues and barriers for biofuels, it is useful to draw lessons from past experiences. Several European countries have already introduced biofuels into their market before the EU Directive was issued. Some have done so successfully, while others have struggled to create a stable market. This report describes past experiences with their policy context for a selection of EU countries, with the purpose of identifying conclusions from the European experience that may be valuable for Indian and South East Asian policy makers and other biofuels stakeholders.

2. Brief Overview of Biofuels in Europe

In this chapter, the countries, whose biofuels policies will be discussed in detail further in the report, are selected. To give a representative overview, countries that have successfully introduced biofuels into their market are included, as well as examples from countries that are still struggling with the introduction of biofuels and either started on their own initiative or under pressure of the EU Biofuels Directive. As a basis for this selection, first a brief overview will be given of the history of EU policy on biofuels followed by the current production and use of biofuels in the European Union, both for biodiesel and bioethanol/bio-ETBE. Then, the national indicative targets for the share of biofuels in automotive fuel consumption in 2005 will be presented for each EU Member State.

2.1 *EU policy*

During the 1990s the production and use of biofuels started in several European countries and expanded significantly. At the same time, policy at a European level was initiated, mainly from the viewpoint of security of energy supply. EU policy focussed on the possibilities for tax exemption, but the Commission failed to get its proposals approved by the Member States. Then, the 1997 White Paper "Energy for the future: Renewable sources of energy" mentioned a possible 18 Mtoe[1] liquid biofuels in 2010. The 2000 Green Paper "Towards a European strategy for the security of energy supply" was the start for a more comprehensive policy, in which biofuels should contribute to a proposed ambitious target of 20 per cent alternative fuels (biofuels, natural gas, hydrogen) in 2020. This policy was more detailed in a proposal for a Directive in 2001, where targets for the three alternative fuels were proposed. Only the biofuel targets for 2005 (2 per cent) and 2010 (5.75 per cent) made it into an EU Directive in 2003, viz. the "Directive on the promotion of the use of biofuels or other renewable fuels for transport" (2003/30/EC, 8 May 2003).

In 2005 it became clear that the aim of the Biofuels Directive of 2 per cent would not be met, but would fall short at approximately 1.4 per cent. In February 2006, the European Commission released a communication comprising an EU strategy for biofuels (COM(2006) 34 final) based on the Biomass Action Plan (COM(2005) 628 final). This biofuels strategy aims at:

- Further promotion of biofuels in the EU and developing countries.
- Preparation for large-scale use of biofuels by improving their cost-competitiveness.
- Support of the research into second-generation biofuels.
- Exploration of the opportunities for developing countries for the production of biofuel feedstocks and biofuels.

In 2006 the Commission will bring forward a report on the implementation of the Biofuels Directive with a view to a possible revision of the Directive. In, order to bring the 5.75 per cent target for 2010 closer to realisation, this report will address the issues of setting national targets for the market share of biofuels and using biofuels obligations. Moreover, only biofuels whose production in the EU and third countries complies with minimum sustainability standards will count towards the targets (European Commission, 2006).

2.2 *Current markets for biofuels*

As mentioned above, several countries had already biofuel policy prior to the introduction of the EU Directive. In Table 2.1 an overview is given of the state of affairs regarding production and consumption of biofuels in the European Union, for both biodiesel and bioethanol (numbers for bio-ETBE are given between brackets). Countries for which the production and/or consumption volumes are negligible as well as countries for which data could not be found are not included in the table.

Table 2.1

PRODUCTION AND CONSUMPTION OF BIOFUELS IN EU25

[x 1000 tonnes)	*Biodiesel*				*Bioethanol (bio-ETBE)*			
	Production		*Consumption*		*Production*		*Consumption*	
Country	*2003*	*2004*	*2003*	*2004*	*2003*	*2004*	*2003*	*2004*
Austria	32	55			0	0		
Czech Republic	70	60	69 (2002)					
Denmark	41	70	Neg	Neg			Neg	Neg
Finland			Neg		6.3 (80)[3]		6.3[2] (0)	
France	357	348	321		82 (164.3)	102 (170.6)	77 (164)	
Germany	715	1035	800		0 (0)	20 (42.5)		
Italy	273	320						

[1] Tonnes of Oil Equivalent; this unit is used to compare different primary sources on energy basis.
[2] 7.9 million litres and an ethanol density of 0.80 kg/l.
[3] 108 million litres and an ETBE density of 0.74 kg/l.

[x 1000 tonnes)	*Biodiesel*				*Bioethanol (bio-ETBE)*			
	Production		*Consumption*		*Production*		*Consumption*	
Country	*2003*	*2004*	*2003*	*2004*	*2003*	*2004*	*2003*	*2004*
Latvia			2.5					
Lithuania		5			1.9			
Malta	0.026[4]							
Poland					60	36		
					(67)	(N/A)		
Slovakia	0	15	3.07		N/A	N/A	0	
Spain	6	13	66		160	194	152	
					(340.8)	(413.2)		
Sweden	1	1.4	5.4[5]	8.7[6]	52	52	117[7]	224[8]
					(0)	(0)		
United Kingdom	9	9		18.4[9]				

Sources: EurObserv'ER (2005), Deurwaarder (2005), European Commission (2006).

2.3 *Policy Targets*

In the past decade, production and use of biofuels has increased substantially in the European Union. In the last five years the production of biofuels quadruplicated to 2.4 million tonnes in 2004 (EurObserv'ER, 2005). This growth is expected to be stimulated further by the adoption of the EU Biofuels Directive (2003/30/EC, 8 May 2003). The Directive aims at contributing to reducing CO_2 emissions from transport, to improving the security of energy supply of the mainly oil-based transport sector, and to creating new opportunities for sustainable rural development in the EU Member States.

According to the Directive, the EU Member States are required to guarantee that a minimum share of biofuels is sold on their national markets for transportation fuels, including inland navigation. To this end, each Member State must set national indicative targets for the share of biofuels, in line with reference percentages of the Directive, 2 per cent substitution by biofuels in 2005, increasing to 5.75 per cent in 2010, based on energy content. The Member States are free to choose a strategy to achieve these targets, ie use of biofuels in pure form (in fleets), in blends with fossil fuels, or a combination of the two. However, there is no obligation for using biofuels and Member States may deviate from the reference values in the Directive when justified, for example due to limited availability of biomass feedstock for the production of biofuels. In addition, Member States must also report to the European Commission before 1 July of each year on the measure taken to promote the use of biofuels and, if needed, the reasons why the targets have not been met. Based on these progress reports, the European Commission might revise the Biofuels Directive, and possibly establish obligatory targets for the Member States.

Table 2.2 shows the national indicative targets for the share of biofuels in transport fuel consumption, for the year 2005. The year 2010 is not included in this overview, since most Member States have not adopted a 2010 target yet.

Table 2.2

NATIONAL INDICATIVE TARGETS FOR BIOFUEL CONSUMPTION FOR EU25 (2005)

Country	*2003 Biofuel use [per cent]*	*2005 Biofuel target [per cent]*
Austria	0.06	2.5
Belgium	0	2
Cyprus	0	1
Czech Republic	1.12	3.7 (2006)

[4] 30,000 litres and a biodiesel density of 0.88 kg/l.
[5] 0.2 PJ and an energy value of 37.3 MJ/kg for biodiesel.
[6] 0.09 TWh = 0.324 PJ and an energy value of 37.3 MJ/kg for biodiesel.
[7] 3.1 PJ and an energy value of 26.4 MJ/kg for biodiesel.
[8] 1.64 TWh = 5.9 PJ and an energy value of 26.4 MJ/kg for bioethanol.
[9] 21 million litres and a biodiesel density of 0.88 kg/l.

Country	*2003 Biofuel use [per cent]*	*2005 Biofuel target [per cent]*
Denmark	0	0
Estonia	0	N/A
Finland	0.1	0.1
France	0.68	2
Germany	1.18	2
Greece	0	0.7
Hungary	0	0.4–0.6
Ireland	0	0.06
Italy	0.5	1
Latvia	0.21	2
Lithuania	0 (assumed)	2
Luxembourg	0 (assumed)	N/A
Malta	0.02	0.3
Netherlands	0.04	2 (2006)
Poland	0.49	0.5
Portugal	0	2
Slovakia	0.14	2
Slovenia	0	N/A
Spain	0.76	2
Sweden	1.33	3
United Kingdom	0.03	0.3

Source: European Commission (2006).

2.4 *Selection of countries for review*

Countries that have successfully introduced biofuels into their markets are Germany, France, Sweden, Spain and Italy. Germany is the leading biofuel producer in the EU and very active in promoting biofuels by excise duty reduction for an unlimited amount of biofuels. France is the second producer of both biodiesel and bioethanol (used in form of ETBE) in Europe and uses tender systems for biofuels promotion. It has ambitious plans to become Europe's leading biofuels producer. Spain is Europe's leading producer of bioethanol, also used in the form of ETBE. It is also starting biodiesel production, although issues concerning feedstock production and quality standards cause some difficulty in the Mediterranean climate. Italy is an important biodiesel producer and has a tender system similar to France. It intends to increase biofuel volumes and shift from biodiesel to bioethanol, but not much information is available. Sweden is the only country that uses large volume of bioethanol without conversion into ETBE. Sweden is also the only country that imports a large amount of the biofuels it uses.

Countries that have a history in biofuels, but have not achieved to create a stable market of considerable size are the Czech Republic, Slovakia, Poland, Austria and Latvia. The Czech Republic and Poland have considerable biofuel volumes in their markets, but both are struggling to get a stable market. In the Czech Republic biofuel producers tend to export their biofuels because of unfavourable local economic conditions and domestic bureaucracy. Poland, which has already used bioethanol and ETBE for a long time, still faces political and legislative difficulties regarding biofuels. Slovakia has had considerable biofuels production in the past and has still a large production capacity, but faces barriers in the field of costs, politics and regulations. Austria is pioneer in biodiesel technology and produces large volumes of biodiesel, which were mainly used for export. It now intends to implement the EU Directive and there is currently no reason why they should not succeed. Latvia has introduced a small share of biofuels into the market, but not much information is available.

Most other EU countries have not much of a history on biofuels. This does not make their story irrelevant. The Netherlands and the UK have been very hesitative, but not ignorant on the topic of biofuels. Both countries had concerns on costs issues as well as sustainability issues. Both have now started introducing biofuels into their markets, but in different ways. Finally, the story of Malta is considered interesting. Malta did not have a priority policy for biofuels, because as a small island state it has on many topics different approaches than the rest of Europe. This has resulted in a rapid increase of the biofuels volumes in Malta.

Thus, for the final selection of countries for review Germany, France, Spain and Sweden are chosen from the group of countries that have successfully introduced biofuels into their market. Issues that are important in Italy are probably covered by including Spain and France. From the countries that introduced biofuels, but are still busy to create a stable market the covered stories of the Czech Republic, Slovakia and Poland are expected to give an insight in legislative difficulties for the introduction biofuels. The stories of Malta, the UK and the Netherlands complete the story of biofuels in Europe.

In the next chapters, current and past activities will be described for each selected country, as well as their policy goals and measures, followed by conclusions on the key drivers for and most important barriers against the development of biofuels in these countries.

3. France

France is the largest country in Western Europe with an area of ca. 544,000 km^2 and a population of 60.7 million inhabitants. The country has only limited indigenous fossil energy sources and is therefore partly dependant on energy imports. Since the mid 1970s, France has tried to reduce this dependence as much as possible by extensive use of nuclear energy (59 power plants in 2004). Two priorities of French energy policy are improving security of energy supply and reducing green house gas (GHG) emissions. Due to extensive use of nuclear energy CO_2 emissions are already low in comparison with other European countries. Since the built environment and the transport sector emit relatively much CO_2, the transition to using alternative energy sources specifically focuses on these sectors. Regarding renewable energy sources (RES), hydropower plays an important role in France. Biomass also has a relatively important share in French renewable energy production, for heat and electricity production as well as for the production of automotive fuels.

3.1 *Current and past activities*

First attempts to promote biofuels use in France were made in the early 1980s. The production and use of biofuels has really started to grow only since the early 1990s, when the production and use of bioethanol and biodiesel were encouraged by an initial high excise duty exemption (TIPP, interior tax on oil products). However, as a result of this high tax exemption, the production volume of biofuels became too high. In response to this situation of overproduction, an authorised maximum quantity, which is eligible to benefit from the tax exemption, was introduced in 2002.

At present, France is one of the important players on the European markets for both bioethanol/bio-ETBE and biodiesel. Biofuels have a share of ca. 1.2 per cent in transport fuels consumption, ie ca. 500,000 tonnes of biodiesel and ca. 200,000 tonnes of bioethanol (2005). Almost all bioethanol, mostly produced from beets, is converted into bio-ETBE, which is blended up to 15 vol- per cent into petrol. Biodiesel is mainly produced from rapeseed oil, and to a limited extent from sunflower oil. It is mostly used as a 5 per cent blend in regular diesel. The use of biogas as transport fuel is still in the development phase with several pilot projects in captive fleets such as fleets of municipal vehicles.

Very specific for the French situation is the strong partnership of actors involved in all parts of the biofuel production chain—from farmers to oil companies and this has been one of the important driving forces for boosting the development of bioethanol/bio-ETBE in France. Agriculture is important economically in France and it is well organised. Agricultural organisations such as the CGB (National confederation of beets producers) and AGPB (General association of cereals producers) have an important voice in the politics of fuel ethanol. They intended to take advantage of the availability of agricultural areas and of distillation capacities for the production of bioethanol, especially from beets. The agricultural lobby has been effective towards the oil companies, which were induced to participate in order to ensure their involvement in this new activity. This explains why, in 1994, the use of ethanol was given up to the benefit of ETBE production, which would involve the oil companies (TotalFinaElf). Various types of partnerships have been established between parties in the entire industrial chain, for example a joint venture between the oil company TOTAL, distilleries, and farmers. Bilateral agreements have been constituted as well, between distilleries, refineries, farmers, or bioethanol commercialisation groups. Important international players on the French bioethanol market are the Spanish group Abengoa, the largest bioethanol manufacturer in the European Union, and the Tereos Group (fusion of Union SDA and Beghin Say). The most important biodiesel manufacturers are Europe's number one Diester Industrie with an estimated production of over 300,000 tonnes (2004) and Novaol with an estimated production of over 250,000 tonnes (2004).

3.2 *Policy goals*

In its country report (2005) France adopted national indicative biofuels targets of 2 per cent in 2005 and 5.75 per cent in 2010, in line with the reference values in the EU Biofuels Directive. Recently the country has set more ambitious targets for the coming years, ie 5.75 per cent in 2008, 7 per cent in 2010 and 10 per cent in 2015, which indicates that France is planning to be two years ahead of the plan of the European Commission.

3.3 *Policy measures*

Since 1992, there has been a partial excise duty exemption for biodiesel and bio-ETBE. As of 2004, bioethanol directly blended in petrol is partly exempt from taxation. The level of the tax exemption is adjusted each year and is sufficient to bridge the financial gap between biofuels and traditional fuels. The maximum volumes, which these tax exemptions apply to, are adjusted each year as well.

In order to stimulate fuel distributors to blend biofuels in their fuels, the Finance Law 2005 has introduced an ecotax called TGAP ("General Tax on Polluting Activities") that applies to each cubic meter of fuel sold. Each fuel distributor is liable to a tax of 1.2 per cent of the value of the product (2005). This rate corresponds to the desired percentage of biofuels to be blended into regular fuels each year and applies to bioethanol blended in petrol as well as biodiesel blended in diesel. This percentage will increase each year in order to reach 5.75 per cent in 2010. Distributors do not have to pay TGAP if they can prove that this percentage was incorporated into the volume of fuel that they delivered.

France, besides Italy, is the only European country that makes use of a tender system, which aims at enabling international competition by letting international parties meet the established national demand for biofuels. In the French tender system, biofuel producers receive an official certificate (valid for six years) for the supply of biofuels to the French market. Foreign producers are able to benefit from the French excise duty exemption if they meet the conditions for supplying to the French market. Recently, the French government has issued several new tenders that are necessary for reaching the national biofuels targets in the coming years.

By the end of 2005, the French ministries of Agriculture and Industry, in consultation with various economic sectors, have agreed upon a Biofuels Action Plan consisting of 15 policy measures. Besides stimulating the production and use of traditional biofuels, France also aims at promoting new biofuels. Therefore, the tenders for methyl esters for 2006 and 2007 do not only apply to rapeseed methyl ester (RME) but to all oil crop-based esters (including ethyl esters). In the tender for 2008, also methyl esters derived from animal oils and biodiesel produced by synthesis processes are included.

Furthermore, France is also planning to diversify the application of bioethanol by promoting the direct blending into petrol, besides the blending of ETBE, which is now the most common application of bioethanol. As of February 2006, an industrial project will be set up in Rouen for the blending of 5 per cent ethanol in 300,000 tonnes of petrol. Fuel prices for both ethanol and ETBE will be published to improve market transparency for both applications. As from 2006, the French government will promote the use Flexible Fuel Vehicles (FFV), especially those that are able to use regular petrol as well as E85. Interdepartmental working groups will be established in order to investigate the development perspectives of these vehicles and the implementation in captive fleets, such as municipal vehicles. Car manufacturers have been requested to introduce a number of FFV types on the market.

Moreover, for France to reach its biofuel targets for the coming years, the EU standards for automotive fuels would have to be modified in order to allow higher-volume blending of biofuels than the current 5 vol- per cent. Awaiting this standard, France already wants to establish a national derogation (maximum of 10 vol- per cent blending as from the end of 2006). The French Petrol Institute (IFP) and car manufacturers are currently testing the technical feasibility of this blending rate in order to validate it.

3.4 *Conclusion*

According to the national biofuels targets adopted recently, France is very ambitious in the biofuels field, and even wants to be ahead of the plan of the European Commission. France has been effective so far in boosting the development of biofuels, mainly due to the strong partnerships along the biofuels production chain, the availability of agricultural areas and of distillation capacities for the production of bioethanol, and the initial high tax exemption. For further developing the biofuels sector, the country has identified several strategies in the Biofuels Action Plan, 2005. However, adaptations in the agricultural sector seem to be needed in order to increase the land area dedicated to growing biofuel crops, such as rapeseed and sunflower, to achieve the national biofuels targets in the coming years.

4. Germany

Germany has a surface area of 357,868 square kilometres and a population of 82.5 million. Its current borders were established in 1990 with the reunion of the West and East Germany. West Germany, officially the Federal Republic of Germany, was in 1952 one of the six founders of the European Coal and Steel Community, the precursor of the European Union. Germany's main energy sources are coal, natural gas, oil and nuclear, of which only for coal (including brown coal) the major part is extracted domestically. The nuclear contribution is being phased out. The consumption of petrol and diesel for transport was 2275 PJ in 2004.

4.1 *Current and past activities*

After the introduction of biodiesel in Austria and France, in 1990 in Germany the UFOP, a union for support of oilseed- and protein plants, was founded as an alliance between farmers and oilseed breeders. In the next years, pilot production of biodiesel started and tested in car fleets. In 1995, the first production at commercial scale was started and German car manufacturers started adapting their cars for biodiesel. In 1996, the marketing of leaded petrol was prohibited and as a consequence there were free tanks available for pure biodiesel. Within a few months more than 600 public filling stations marketed pure biodiesel. None of these filling station belonged to the large oil companies, these were the independents and the ones from a German's farmers trade association and service provider. In 1997 a fuel standard for biodiesel was created.

In 1999 the German government introduced an ecotax for fossil diesel in addition to the mineral oil tax, while pure biodiesel received full tax exemption. In 2000 two new biodiesel plants were commissioned and more followed in the next years. In addition, part of the biodiesel (circa 20 per cent) is imported from France, Austria, Denmark, Poland and Czech Republic. The sales of biodiesel increased from 130 kton in 1999 to 800 kton in 2003 and pure plant oil was used in 5 kton in 2003.

Starting January 2004, the German tax policy changed allowing full tax exemption for biofuels blended with mineral fuels. As a result, the oil companies started to blend 5 per cent of biodiesel in mineral diesel and also ETBE entered the market. Biodiesel is also still sold in pure from at circa 1,900 filling stations and it is still used in captive fleets. In 2004 the amount of biofuels sold was: 1,050 kton of biodiesel, 5 kton of pure plant oil and 65 kton of bioethanol in the form of ETBE, together accounting already for 1.8 per cent of the total transport fuel sales. In 2004, bioethanol was imported, but several plants to produce bioethanol from grains, mainly rye, were under construction. For 2005, sales of biodiesel are projected at 1,650 kton, for bioethanol/ETBE it is unknown.

The new taxation rules of 2004 have triggered a wave of investment in the biodiesel industry, creating an additional 740,000 tonnes of production capacity by the end of 2005, bringing the total production capacity to around two million tonnes. More biodiesel plants are built, raising the capacity to three million tonnes of biodiesel in 2006 or 2007. Together with a capacity of 500,000 tonnes of bioethanol, the market share of biofuels in Germany could already reach the 2010 target of 5.75 per cent biofuels in 2006 or 2007.

4.2 *Policy goals*

In 1998, a Federal Initiative for Bioenergy was launched, an organisation chaired by a member of parliament. This organisation formulated three objectives as key actions against climate change, of which one included minimum shares for renewable energy in the transport sector.

However, the main governmental driving force for biofuels has been the ministry of consumer protection, food and agriculture, from 2001–05 led by Renate Künast of the Green Party. It sees biofuels and bioenergy in general as a key future technology set with the underlying idea that national welfare can be increased by internalising external environmental cost. In addition it is regarded as beneficial for the security of energy supply and it can be a means to support agricultural and economically weaker areas, such as Eastern Germany.

Germany has set a target of 2 per cent biofuels in 2005, in line with the EU Directive. The coalition of Social Democrats and Greens, which ruled Germany from 1998–2005, showed clear intentions to develop the biofuel market further to higher shares of biofuels in order strengthen the security of energy supply and reduce greenhouse gas emissions. The new government formed in 2005 of Social Democrats and Christian Democrats stated in their coalition agreement that markets for biofuels will be further developed in order to reach a 5.75 per cent market share for biofuels for transport in Germany in 2010, also in line with the EU Directive.

4.3 *Policy measures*

Before 2004, the German law defined clearly that mineral-oil taxation applied only to mineral-oil based fuels such as petrol and diesel. Therefore, logically any fuel derived from other sources such as biodiesel was free from taxation. Thus, biofuels enjoyed full tax exemption from the very beginning, and no specific law had to be defined and negotiated. However, this applied only for biofuels that were used in pure form, ie not mixed with mineral-oil based fuels. This meant that in practice it could only be used for biodiesel and pure plant oil, because other for other biofuels there were no economically available technologies for the biofuels to be used in pure form.

In addition, the red-green coalition government introduced in 1999 an additional eco-tax for fossil fuels, based on the objective to reduce Greenhouse Gas emission and to transfer the related costs to the polluters. Each year from 1999–2003 this tax added 0.06 DM/litre (ca. 0.03 €/1) to the mineral-oil taxation, to a total amount of 0.30 DM/litre in 2003. Of course, this eco-tax does not apply to biofuels.

Under pressure of several organisations, the government changed the Mineral Oil Duty Act, effective January 2004. Now the act specifically states that biofuels and fractions of biofuels blended with fossil fuels are exempted from duty until 2009. It also states that the tax relief for biofuels must be adjusted in case of overcompensation, ie in case the excise duty relief causes biofuels to become much cheaper than fossil fuels. Such an adjustment is expected in 2006.

The German government has stated in their coalition agreement that they will implement obligatory targets for mixing in biofuels instead of the current system of tax relief. This statement has led to the speculation that biofuels will be taxed and has caused concern especially among vendors of pure biofuels. However, representatives from both coalition parties have said that this measure should not lead to higher prices of biofuels or petroleum fuel, whether marketed as blend or as pure fuel.

Research, development and demonstration of second-generation biofuels is supported and will continue to be supported by the new government. Capital grants of up 35 per cent for the investment in commercial plants are also given. This is only possible for plants in certain East German regions that qualify for regional selective assistance. For other regions the EU does not allow this, because then it is regarded as market distortion.

Currently, there is the issue of alcohol legislation to be dealt with. A law that is aimed at potable ethanol production at small or medium size plants is affecting the large-scale production of bioethanol for transport as well. It requires a high guarantee deposit at customs for every hectolitre alcohol produced and requires that a custom officer always accompany a plant manager when he enters his facility. This is an obstacle for bioethanol production, but the government is looking at how to overcome this.

4.4 *Conclusion*

The introduction of biofuels in Germany can rightly be called a success story. Germany will easily comply with the 2 per cent target from the EU Directive. But it is not an easy task to discover the critical success factors, as it seems that there are many.

Three factors were responsible for the start of the biodiesel industry:

— The vision of German farmers and breeders for the opportunity of a "rapeseed revolution", made visible by the foundation of UFOP.

— The ambition of early investors to produce biodiesel at high quality.

— The (unintentional) favourable taxation laws, which levies taxes on petrol and diesel, but not on biofuels.

In the first phase (1990–95) a biodiesel production process was developed, the biodiesel was tested in captive fleets and the first commercial biodiesel plant was built. Then, a growth of biodiesel production and sales were made possible by:

— Volkswagen and other car manufacturers giving warranties to the end-users.

— The political support because of the Green party entering the government, resulting in the eco-tax for fossil transport fuels.

— The sudden availability of fuel pumps, because leaded petrol was prohibited.

In this phase (1996–2003) the biodiesel industry expanded rapidly and a stable market was created. Besides use in fleets, more and more biodiesel was sold at petrol stations. Although the biodiesel sector expanded rapidly, there were still some concerns that the EU indicative target of 5.75 per cent in 2010 could not be met in Germany, because:

— Biodiesel requires large amounts of land and not much more land might be available in Germany.
— Other biofuels than biodiesel could not enter the market, because the law did not allow de-taxation for biofuels used in blends with mineral fuels.
— Euro IV and Euro V emission norms for cars might not be met by using pure biodiesel.

Therefore, the taxation law was changed, allowing also detaxation for biofuels blended with mineral fuels. Only now, the oil industry got involved and is selling blends with 5 per cent biodiesel in diesel and blends with ETBE, made from bioethanol, in petrol. Also, support for research, development and demonstration of second-generation biofuels is continued in order to have BTL-fuels, which require lower amounts of land and can easily meet emission norms.

So, it seems that the strange coalition of the Greens, the agricultural community and the car manufacturers is largely responsible for the success of biofuels. In total six decisive factors were identified. Besides these, other factors have played a role, such as the active promotion of biodiesel to the public and the studies of the environmental benefits of biodiesel, both mostly done by the UFOP. Also later, other issues also played a role, including an increasing oil price, but then a firm biofuel industry was already established.

Although many regard the development of biofuels in Germany as a success, others argue that the introduction of biofuels has gone too fast. The latter prefer to wait for the second-generation biofuels, because they will be cheaper. They argue that the amount of money spent so far is too much considering the environmental benefits gained. However, others say that although the biofuels programme might have cost a lot, it also has created jobs and has, therefore, saved a significant amount of money for the government because of saving money for allowances. And also, that the current biofuel market has paved the way for the second-generation biofuels.

5. Spain

Spain is situated on the Iberian Peninsula in Southwest Europe, has a surface area of 504,782 square kilometres and has 41.1 million inhabitants. It has been a member of the European Union since 1986. Approximately half of the energy used in Spain is oil based. Spain is scarce in domestic energy sources, only coal is won domestically in significant amounts. The consumption of petrol and diesel for transport was ca. 1150 PJ in 2001.

5.1 *Current and past activities*

Spain is currently the biggest bioethanol producer in the European Union. In 1995 the industrial and technical company Abengoa, now a world player in bioethanol production, and the oil companies Repsol and Cepsa created "Ecocarburantes Españoles". This first Spanish bioethanol plant in Cartagena with a capacity of 80,000 tonnes per year started production in 2000. In 2002 a second plant was built with a capacity of 100,000 tonnes per year. Both plants have been running at full capacity. The feedstock is barley and wheat and the bioethanol is transformed with isobutylene into ETBE in three ETBE production units of Repsol and Cepsa. ETBE is used as an additive to petrol and replaces MTBE, which was used in the past. Since isobutylene is a refinery by-product, there is only a limited amount of it available. Therefore, new bioethanol plants will produce bioethanol to be used directly mixed into petrol.

The bioethanol production increases significantly with the third Spanish bioethanol plant, named *Biocarburantes de Castilla y León* on line in Salamanca. The plant is a cooperation of Abengoa and Ebro Puleva (Spain's leading food processing group) and has a capacity of 160,000 tonnes of bioethanol per year. The feedstock will be mainly barley and also some wine alcohol. In 2005 the bioethanol production and use was ca. 164,000 toe (ca. 260,000 tonnes, or 6.9 PJ).

Spain had no biodiesel production or use prior to 2003. It started with a pilot project using waste cooking oils, which resulted in a production of 6,000 tonnes of biodiesel in 2003. In 2004 several biodiesel plants were operational and the biodiesel production was 13,000 tonnes, but the production capacity was already circa 80,000 tonnes. More biodiesel plants were under construction with a combined capacity of 200,000–250,000 tonnes per year. In 2005, the biodiesel use ca. 135,000 toe (ca. 150,000 tonnes, or 5.7 PJ). Total amount of biofuels used in 2005 was 12.5 PJ, circa 1.1 per cent of total petrol and diesel use.

5.2 *Policy goals*

The original Spanish policy on biofuels, set for the period 2000–10, aimed at 500,000 tonnes oil equivalent of biofuels in 2010, which is approximately 1.7 per cent of total transport energy use. An important driver for this policy was its foreseen creation of jobs.

After the adoption of the EU Biofuel Directive, Spain has notified the Commission that it has set its national indicative target at 2 per cent for 2005. Also in line with the Directive, in the August 2005 adopted "Plan for Renewable Energy 2005–10" the amount of biofuels will rise to 2,200 ktoe in 2010, approximately 6 per cent of the foreseen amount of transport fuels used in Spain in 2010. Besides the current feedstocks of barley, wine alcohol and waste vegetable oil, it is foreseen that that virgin plant oils could account for approximately half of the target for 2010. Since these are hardly used now, mainly because of their high local production costs, measures are proposed to promote virgin plant oil production.

5.3 *Policy measures*

Under a 1994 law bioethanol projects could be allowed a tax exemption based on the fact that they constitute "innovative projects for technological development of less contaminating products". The two commercial bioethanol plants received this tax exemption. However, under EU law at the time, Spain used a very liberal interpretation of the Mineral Oil Directive. Under this Directive, tax exemptions and other financial support could only be given to "pilot projects", ie projects that demonstrate or test new fuels, new distribution and new uses of fuels.

By a December 2002 change in the law on Tax, Administrative and Social Measures, all biofuel pilot plants receive a full detaxation for five years and all industrial plants receive a full detaxation until at least December 2012. This also applies to the amount of biofuels used in mixes with fossil fuels. However, partial taxation maybe applied to biofuels if the comparative trend in the production costs of petroleum products and biofuels so warrants.

Spain has also transposed the EU Directive into national legislation already in 2003. In fact, in March 2005, Spain and Lithuania were the only two countries that the Commission did not consider to take action against. Besides transposing the EU Directive they had both communicated everything required to the Commission and adopted the reference target of 2 per cent.

To reach the 2010 target, a significant growth of biofuel use is required. Several barriers should be overcome to achieve this growth of biofuel use:

— High biofuel cost to consumers compared to petroleum based fuels.

— CAP reform may limit the supply of primary agricultural inputs.

— Disadvantaged cereals and oilseed production compared to Northern Europe.

— Preparation for the general distribution channels of fuels is necessary.

— Car manufacturers' engine warranties are necessary.

— High market price of oils for food use, higher than what can be paid for biofuel use.

The following measures are proposed in the "Plan for Renewable Energy 2005–10" to over-come these barriers:

— A ten-year guarantee of fiscal support for commercial biofuel plants.

— Develop all available possibilities within the new CAP, in particular the ones that refer to European and national assistance for the production of biofuel crops.

— Development and selection of new oilseed types, adapted to the agricultural characteristics of Spain.

— Development of logistics, both for feedstock collection and biofuel distribution.

— Technical developments for the mixture of biofuels and conventional fuels.

— Certification and monitoring of biofuel quality standards.

— Develop a normative that forces the use of biofuels.

Further, research into cultivation and processing of lignocellulosic crops will also be stimulated.

5.4 *Conclusion*

The main elements, which explain the development of bioethanol in Spain are:

- The leading role played by a private company (Abengoa) specialized in energy and environment projects associated with oil companies. This resulted in the choice for ETBE, so that oil companies could play a major industrial role and in the creation of a distillery in which they are shareholders.
- The high level of tax exemption (100 per cent), granted by the public authorities motivated by environmental considerations.
- The regional policy of the autonomous regions, motivated by the importance of the agricultural sector.
- The Common Agricultural Policy, under which the production of barley benefits from set aside indemnities.

All three arguments for the use of biofuels, reduction of greenhouse gas emissions, security of supply and development of the agricultural sector, have played a role in the introduction of bioethanol in Spain. The development of the agricultural sector may have been the most important one, not so much because of an agricultural lobby, but more from the viewpoint of regional development. The choice for ETBE instead of directly using bioethanol was strongly influenced by oil companies.

Biodiesel production started much later than bioethanol production, because:

- There was not an influential actor (like Abengoa) pursuing the introduction of biodiesel in Spain.
- The taxation on diesel is not as high as on petrol (and also lower than the diesel tax in most other European countries) and the biodiesel production is generally too expensive in Spain, even with full detaxation.
- The quality standard for biodiesel is based on rapeseed feedstock, the main feedstock used in Europe. However, the climate in Spain is not suitable for cultivation of rapeseed. It is suitable for sunflower, but with sunflower it is more difficult to meet the biodiesel quality standard.

Biodiesel is currently produced mainly from cheap waste vegetable oil streams. However, for 2010 it is foreseen that biodiesel from local virgin plant oils will make an important contribution. This requires a significant amount of agricultural land and a careful selection of an oil seed crop suitable for the Spanish climate. Import of biofuels is not mentioned in Spanish policy documents concerning biofuels.

6. Sweden

Sweden is a country in Northern Europe with nine million inhabitants. It has a surface of 450,000 km^2, of which more than half consists of forests. Sweden is richly endowed with renewable energy sources, including large resources of bioenergy, hydropower and wind power. Broadly speaking, Sweden's energy supply mix consists of somewhat more than 40 per cent oil, nearly as much renewable energy and 20 per cent nuclear power. Swedish energy and environmental policy strongly focuses on boosting the share of renewable energy in the total primary energy mix for reasons of security of energy supply and reduction of greenhouse has emissions. The use of bioenergy as a substitute for fossil fuels has especially increased in district heating systems and manufacturing processes.

6.1 *Current and past activities*

After the Second World War, bioethanol was produced for the first time for the automotive fuels market in Sweden again in the middle of the 1980s. Farmers (Swedish Farmers Organisation, SLR), with government financial support, engaged in a pilot wheat-based ethanol plant, using a new technology developed by a Swedish engineering company. The ethanol was sold by a Swedish oil company as a low-volume blend with petrol and sold in the Stockholm area for a few years. In the 1990s, the possibilities of an outlet for farm crops into the transport sector as well as the environmental concern created a political support for ethanol produced from grains, however, the ambition of producing ethanol from wood in the longer term already existed at that time. During the 1990s, the use of ethanol as an alternative fuel grew moderately. In this period, several public transportation companies initiated test projects with ethanol driven buses. During the second half of the 1990s, Flexible Fuel Vehicles were introduced as well.

In Sweden, the promotion of biofuels is now a component of the government's strategy of long-term sustainable development, including the promotion of renewable energy sources and cleaner transport. In 2001, the country has started a strategy for switching to green taxes. Under this strategy, increased taxes on energy and environmentally harmful emissions are offset by reduced taxes on labour. One year later, the tax strategy

for alternative fuels was introduced, which made tax relief possible either for pilot projects, which qualified for full exemption from excise duties, or in the form of a general exemption from CO_2 tax for CO_2 neutral fuels. Since 2004, CO_2 neutral fuels are exempt from both CO_2 tax and energy tax. Besides specific policies aiming at boosting the use of bioenergy in various sectors, such as transport, the Swedish government has also actively promoted the introduction of environmentally friendly vehicles, such as those running on biofuels.

The past five years, there has been a considerable growth in the use of biofuels in Sweden, especially for bioethanol, which accounts for almost 90 per cent of biofuel use (5.9 PJ in 2004). Ethanol is produced from grain and from by-products of paper pulp production. Biodiesel/RME (0.3 PJ in 2004) and biogas (0.5 PJ in 2004) are also widely used in the Swedish transport sector. This brings the total biofuels share in total transport fuel use to 2.3 per cent in 2004, calculated on the basis of energy content. In 2003, this share was already 1.3 per cent, but the use of bioethanol and RME almost doubled in the period 2003–04, which is also true for the period 2002–03.

Unlike France and Spain, Sweden does not convert bioethanol into bio-ETBE in order to distribute it. In Sweden, about 85 per cent of all fuel bioethanol is used in low-level blends, ie petrol with a 5 per cent bioethanol content. At the end of 2003, about half of all 95-octane petrol contained 5 per cent bioethanol. About 15 per cent of fuel bioethanol is used in a pure or an almost pure form (E85). The number of bioethanol filling stations is growing rapidly. In 2004, 29 public refuelling stations for ethanol E85 came into operation, bringing the total to 131. In April 2005, the number of Flexible Fuel Vehicles, which can run on either petrol or E85, amounted to 15,000 cars, an increase of 67 per cent compared with 2003. The number of light and heavy vehicles able to run on biogas/natural gas has also increased substantially. At present, around 25 per cent of the Swedish buses are running on biofuels.

Recently import of bioethanol has strongly increased and now accounts for most of the bioethanol used as fuel in Sweden. In 2004, four times more bioethanol was imported than produced domestically. It is imported from Brazil and other South American countries as well as France, Spain and Italy. This is because the domestic production capacity is not sufficient to meet the increasing biofuel demand and because imported ethanol is usually much cheaper compared to domestic production, especially sugar-cane ethanol from Brazil.

6.2 *Policy goals*

The use of biofuels in Sweden is rising, which is mainly the result of increased imports of bioethanol, and, in 2004, the country has already exceeded the 2 per cent reference value recommended by the European Union for 2005. Therefore, Sweden has established a target for 2005 that is higher than the indicative target of the Directive, ie 3 per cent of total petrol and diesel consumption. However, there is uncertainty as to what will happen to imports of bioethanol and RME if demand from other countries increases in the future, which may lead to higher biofuel prices. A national target of 5.75 per cent for 2010—in accordance with the reference value of the European Commission—has been announced by the Swedish government in its policy plan "Svenska miljömål—ett gemensamt uppdrag" (Swedish environmental goals—a joint assignment). This plan states 15 environmental goals, including "clean air", and one of the strategies to achieve this is promoting the use of biofuels.

6.3 *Policy measures*

In 2004, the tax strategy for alternative fuels was changed so that from 2004 to 2009 CO_2-neutral fuels are exempt from both CO_2 tax and energy tax. However, changes to avoid over-compensation can be made at any time, as is required by the European Commission, and, for the same reason, possibilities of replacing the tax relief by other incentive systems, such as a quota obligation system combined with tradable certificates, are currently being studied. In addition, from 2002–08 it is possible to obtain a tax reduction for the purchase of environmentally friendly company cars. In 2005, at least 25 per cent of all newly purchased government vehicles had to be environmentally sound, ie (partly) fuelled by biogas, bioethanol or electricity. This target has been increased to 35 per cent for 2006. Another means to reduce environmental impact of transport is a trial environment/congestion charge in the City of Stockholm. Environmentally friendly vehicles, running on alternative fuels, will be exempt from this charge.

In addition to tax strategies to support the use of biofuels in transport, several implementation issues are currently being studied and debated. For example, the Swedish Road Administration (Vägverket) was asked to review the possibilities for all diesel fuel to contain up to 5 per cent RME and to investigate the environmental and health impacts of the vehicle emissions of such a biofuel blend. Besides this, the SRA also examined the requirements for a Swedish regulation allowing the retrofitting of private cars for alternative fuels, without conflicting with the EU car producer responsibility for cleaner emissions. Furthermore, Sweden

is an advocate of increasing the low admixture level for ethanol in petrol to 10 per cent so that the biofuel targets can be achieved more cost-effectively. At present, the European Commission is reviewing the fuel specifications laid down on the Directive on fuel quality, which now prohibits the admixture of more than 5 vol- per cent of ethanol in petrol. In addition, the Swedish government would have to increase the maximum blending rate of RME in diesel from 2 per cent–5 per cent.

Besides financially supporting and improving the implementation of biofuels, the Swedish government also supports research, development and demonstration measures for developing more energy-efficient and more cost-effective biofuel production processes, such as a pilot plant for studying bioethanol from forest raw materials, which was inaugurated in May 2004. The plant was designed to verify and optimise the chosen technology and to provide a basis for a processing technology for the production of ethanol and lignin, which is commercially viable for a demonstration plant.

6.4 *Conclusion*

For Sweden, environmental reasons are an important driving force for boosting the use of biofuels in transport. The use of alternative fuels and cleaner technologies in transport is incorporated in a general long-term strategy towards sustainable development. The stakeholders for biofuels in Sweden are planning to increase domestic production capacity for mainly biogas and RME, since bioethanol can be imported at a lower cost compared to domestic production. Sweden is the only country that is importing biofuels on a large scale, and these imports largely explain the strong growth of biofuel use, especially bioethanol, in the past years. There is a risk of increasing biofuel prices, if other countries are to cover their increasing biofuel demand (partly) by imports as well. In the longer term, Sweden hopes to produce more biofuels domestically by producing second-generation biofuels based on lignocellulosic biomass from short rotation forestry.

7. Czech Republic

The Czech Republic was founded as an independent country on 1 January 1993, after the split of the former Czech and Slovak Federal Republic. The Czech Republic has ca. 10 million inhabitants and joined the European Union on 1 May 2004. In the country there is a large availability of agricultural land and woodland. Biomass is still traditional solid fuel both in household heating systems mainly in rural areas and in district heating systems. Biomass is also used in electricity production and in the transport sector. In 2004, the total transport fuel use (petrol and diesel) amounted to ca. 240 PJ. In Czech Republic there is strong political support for the development of renewable energy in various sectors. The government aims at increasing the share of renewable energy in total primary energy use to 4–6 per cent in 2010 and 8 per cent in 2020. Biomass is expected to play the most important role in the growth of renewables.

7.1 *Current and past activities*

The Czech Republic has a long tradition in production and use of biofuels in transport, but only in the field of biodiesel, not bioethanol. In the early 1990s the Czech Ministry of Agriculture launched the "Oleoprogram" (Oil programme) to promote the development of the production of rapeseed oil methyl esters (RME) and its use as an automotive fuel. In the years 1992–95, financial aid was allocated to producers of RME in the form of subsidised loans without or with only very little interests to support the build-up of manufacturing capacity. Due to these grants, RME production plants with an annual capacity of ca. 60,000 tonnes were successfully established within a very short time. Additional public resources have been made available and are being dedicated exclusively to promoting RME and biodiesel production. A biodiesel blend, ie a blend of diesel and RME containing 31 per cent RME by volume, is produced for the domestic market from 1997 onwards. This product can be used in all diesel engines and is distributed separately from conventional diesel at refuelling stations. At present there are 14 RME producers in the Czech Republic, which have a total production capacity of approximately 150,000 tonnes of RME annually.

Since 2001, the legislative framework for support of the production and use of biodiesel has undergone some changes. Until this year, the higher production costs of biodiesel components were offset by the payment of direct subsidies to manufacturers of RME and fuel blends. From 2001 to April 2004, compensation was granted in the form of price rebates for oil rape grown on set-aside land. A central role was dedicated to the State Agricultural Intervention Fund (Státni zemìdìlský intervenèní fond—SZIF), which purchased rapeseed cultivated on set-aside land, ensured its storage, and sold it to RME producers for a defined price, which ensured the competitiveness of the biodiesel blend (31 vol- per cent RME). The subsidy for the production of RME was calculated in such a way that it enabled the supply of biodiesel to the fuel market at a 10 per cent lower fuel price as compared to fossil diesel. In addition, RME producers received direct support for

processing rapeseed oil for non-food uses. Moreover, distributors received subsidies for the blending of RME, and sellers received tax exemptions for the sale of biodiesel. In the period 2001–04, the production level of RME was mostly in the range of 60,000–70,000 tonnes per year. However, in 2001, the production level was exceptionally low, ie only 39,600 tonnes of RME.

After the accession of the Czech Republic to the European Union, the country was granted a transitional period for the state aid for domestic RME production until 2006. A new system of subsidies was introduced in 2004, which limits subsidised production to 100,000 tonnes of RME in 2005. The level of subsidy is determined based on world fuel prices. As from July 2004, there is a lower excise duty on blended fuel/biodiesel, ie the RME incorporated in fuel blends carries zero excise duty. At present, the administrative procedures for biofuels producers to claim excise duty back from the financial office for their sales of RME are complicated, bureaucratic and time-consuming. For this reason, exporting biofuels has become more attractive to biofuel producers. In 1999 and 2000 Czech Republic was still a net importer of RME and biodiesel, but as from 2001, exports increased dramatically, with a net export peak in 2001 of ca. 68,000 tonnes of biodiesel and RME, mainly to Germany.

In contrast to the situation of biodiesel, the production of bioethanol/ETBE from grain for use as automotive fuel has so far been limited to pilot projects to test its potential market opportunities. This is in spite of the fact that financial aid and legislative conditions have been in place since the late 1990s to enable and promote the production of bioethanol for alcohol fuel blends in order to reduce transport emissions and pollution and to utilise agricultural surpluses. Currently the whole production of bioethanol takes place in facilities dedicated to the food and drinks industry. In order to avoid frauds in alcohol/bioethanol production for use in the transport sector, the current Czech legislation requires special facilities to be built dedicated to the production of bioethanol for transport purposes to avoid its misuse.

7.2 *Policy goals*

In the frame of the EU Biofuels Directive, the Czech government published a country report in 2004 indicating the level of their indicative targets and the motivation for them. In this report, the country set a very high preliminary target of 3.7 per cent for the consumption of biofuels in 2006, which exceeds the reference value set by the European Commission (2 per cent in 2005). For 2010, the indicative target is set at 4.5 per cent,[10] which is below the reference value for that year, ie 5.75 per cent. Main motivations for this are the accession to the European Union and the creation of new opportunities in rural areas (non-food use of agricultural land) and of new jobs as a result of increased local biofuel production. Other reasons mentioned are increasing energy self-sufficiency and improving the environment.

The country report stated that the preliminary targets would become definitive in the course of 2005, since they depend on the possibilities of the State budget and on agricultural production. However, in the second country report, published in 2005, the Czech government lowered its ambitions for the first phase (2006). In the first country report, a very strong growth of bioethanol was anticipated in order to achieve the target, ie increasing the production from zero in 2004 to 174,000 tonnes in 2006. In the second country report, this expectation was lowered to a more realistic level of 20,000 tonnes of bioethanol in 2006.

According to the second country report, the shares based on energy content of biodiesel and bioethanol would be 2.32 per cent and 0.58 per cent in 2006, respectively. This would bring the biofuels target for the Czech Republic for 2006 to ca. 1.7 per cent in total diesel and petrol sales, which is below the reference value indicated by the European Commission for 2005. However, in 2010, the expected share of biofuels of ca. 5.6 per cent in total diesel and petrol sales,[11] mainly the result of an enormous growth in bioethanol production between 2006 and 2010, would be close to the reference value of 5.75 per cent for that year.

7.3 *Policy measures*

In the Czech Republic, several policy measures are currently in place transposing the EU Biofuels Directive into national legislation. First, the Decree No 229/2004 Coll. specifies which biofuels may be supplied to the Czech market and the forms and quality in which they are to be supplied. Second, the Act No 86/2002 Coll. (on protection of the air) lays down an obligation for the producers, importers and distributors to place on the fuel market a minimum amount of biofuels or other fuels produced from renewable resources. Third, the

[10] These targets are composed from separate targets for RME and bioethanol. For 2006, the share of RME in diesel sales is set at 2.75 per cent and the share of bioethanol in petrol sales is set at 5.2 per cent. For 2010, the share of RME in diesel—sales is set at 3.1 per cent and the share of bioethanol in petrol sales is set at 6.6 per cent.

[11] The second country report mentions separate biofuel targets based on energy content for 2010, ie 5.47 per cent for biodiesel in total diesel sales and 5.78 per cent for bioethanol in total petrol sales.

Government Order No 66/2005 Coll. establishes the system for placing biofuels into free circulation on the market in the Czech Republic. It takes over the indicative reference values set by the European Commission and translates them into national production targets.

RME/biodiesel

The compensation of the higher production costs and lower energy efficiency of biodiesel comprises a subsidy for non-food use of rapeseed for the production of RME (Government Order No 148/2005) and a reduced rate of excise duty (Act No 353/2003). In the biodiesel blend containing 31 vol- per cent RME, the RME incorporated in the blend is free of excise duty. Besides this blend, which has been on the Czech fuel market for many years, market conditions for placing pure RME on the market have been created, and this fuel has been introduced recently. The quality of Czech RME is regularly monitored by the aid provider SZIF according to the European standard EN 14214 (for fatty acid methyl ester, FAME), which replaced the Czech standard ČSN 656507/Z1 after EU accession. The quality of the 31 vol- per cent RME/biodiesel blend is guaranteed according to the Czech standard ČSN 656508. The Czech government is drafting new legislation and setting up a new system which will make the use of biofuels in transport possible as of 2007, after the transitional period for the present support system for RME will end. As of 1 January 2007, it is expected that the partial refund of excise duty—under considerably simplified conditions—will enter into force for 5 vol- per cent RME biodiesel blends.

Bioethanol/bio-ETBE

Wider use of bioethanol is planned from 2007, when new bioethanol production facilities and distribution systems should become operational. For bioethanol, a compensatory system has been created as well, which is currently being notified by the European Commission. First the use of bio-ETBE blended up to 15-vol per cent in petrol, following the European standard En 228, is envisaged. However, there are no production facilities available yet, mainly due to technical problems. Bioethanol also likely to be marketed in direct form, ie up to 5 vol- per cent blended in petrol. In addition to the above market opportunities for bioethanol, it is expected that fuels with high bioethanol content will also be used, such as E85 (containing 85 per cent bioethanol, 10 per cent petrol and 5 per cent additives) and E95 (for fuel containing 95 per cent bioethanol and 5 per cent additives). However, the extent to which such fuels are used depends on the number of vehicles adapted to run on them and on the network for distributing these fuels.

7.4 *Conclusion*

The Czech Republic is very ambitious in the field of biofuels, mainly motivated by the rural development resulting from local biofuels production. The past 15 years, the country has been very successful in stimulating biodiesel production and use through state aid, but this financial support system is gradually being changed after EU accession. Legislative and technical issues might cause the country to fail in reaching its biofuel targets. There is an increasing tendency in rapeseed production and processing into RME but this extension very much depends on the final form of the new Czech biofuels legislation and on its implementation. Currently, there is a trend towards exporting biofuels. This development is undesirable since it only partly contributes to the Czech objectives for producing and using biofuels, and, moreover, biofuels producers are now profiting from the billions invested by the state since 1992 into boosting domestic biofuels production to succeed on foreign fuel markets. In order to change this trend, the new Czech legislation to be introduced should be less complicated and bureaucratic, for example by implementing a simpler system for refund of excise duty, making the domestic market more attractive to Czech biofuel producers.

8. Poland

Poland is situated in Central Europe, has a surface area of 312,683 square kilometres of which approximately 60 per cent is agricultural land and 30 per cent forests. Poland has 38.6 million inhabitants and it has been a member of the European Union since 2004. More than half of the energy used in Poland comes from coal. Poland has the world's fifth largest proven reserves of hard and brown coal and it is a net exporter of coal. It also has some domestic natural gas resources. The consumption of petrol and diesel for transport was 318 PJ in 2001.

8.1 *Current and past activities*

Poland is the only country among the new EU Member States to have developed the biofuel sector in a significant way. In the beginning of the 1990s a huge overproduction of alcohol, resulted from a necessary surplus production of cereals, potatoes and beet molasses, made Poland decide to produce petrol with bioethanol as additive. A new fuel standard in 1992 made a wider usage of bioethanol possible. A specific tax exemption from 1993 onwards gave a further boost to the use of bioethanol, either mixed in as 5 per cent bioethanol in petrol or mixed as the bioethanol-derivate ETBE. The use of bioethanol was 27 million litres in 1994 and rose to 110 million litres in 1997, mainly in the form of ETBE, but also bioethanol. Petrol with ETBE or bioethanol was also replacing the priory used leaded petrol. After 1997 the bioethanol has declined to 49 million litres in 2004. However, there are currently 20 Polish producers of dehydrated bioethanol with a combined production capacity of approximately 500 million litres of bioethanol. Also, there are ca. 100 small agricultural distilleries. The Polish oil company Orlen has a refinery with an ETBE production capacity of 100,000 t on ETBE per year.

In the period 1994–97, a research project testing biodiesel from Polish rapeseed was carried out, which led to a proposal for a national biodiesel standard. This standard was never adopted, but the draft enabled potential producers of biofuel to develop the technology needed to produce fuel of the appropriate quality. At the same time a Polish company undertook the production and sale of diesel with biodiesel. However, this was discontinued after a few months, because the production proved unprofitable. The excise duty reliefs at the time did not apply to biodiesel/diesel blends. However, pure biodiesel was not subject to excise duty under the tax regulations then in force, but nevertheless, it was not economically attractive because its price was two to three times higher than that of fully taxed diesel. In the period 2000–04 several research programmes were done in the field of biodiesel, mostly on high blends (20–30 per cent) of biodiesel in city buses and non-road applications. From December 2004 the Trzebinia refinery started commissioning a biodiesel production plant with a capacity of 100,000 tonnes per year.

The total biofuel production in 2004 was 1 PJ, approximately 0.3 per cent of total petrol and diesel consumption, compared to 0.6 per cent in 2002. Poland is the only EU country where biofuel production decreased sharply. This can be explained by several delays of a law that should promote biofuels and fierce political debate about this law.

8.2 *Policy goals*

Because of the political and economic transformation processes started after the fall of the Berlin wall, Poland's Greenhouse gas emissions have decreased by 30 per cent over the period of 1988–2002. Poland has even a surplus of CO_2 credits available for sale under the Kyoto protocol. Therefore, environmental reasons to use biofuels are not strong in Poland. However, biofuels, especially bioethanol and biodiesel, are recognised as a chance for restructuring the Polish agricultural sector. In addition, the extent of heavy-metal contaminated land is considered as a possible place for energy crops.

In August 2001 the Polish parliament developed a strategy for the development of renewable energy that included the development of biofuels by the year 2010. In this strategy the share of renewable energy source is to be increased to 7.5 per cent in 2010 and 14 per cent in 2020. Special attention was paid to legal and economic aspects of the use of biofuels in Poland.

In 2002, on the initiative of the co-ruling PSL, the Polish Peasant Party with much support the agricultural sector, the agricultural ministry prepared a bill for the stimulation of biofuels. The bill would improve energy security and create 100,000 jobs. The latter was the main argument for the bill, because the level of unemployment in Poland was around 18 per cent. However, the proposed bill became the subject of a huge political debate in 2002 and 2003. The proposed bill included an obliged minimum admixture of 4.5 per cent of bioethanol (or in the form of ETBE) into petrol starting in July 2003 and increased to 5 per cent from January 2006. The biofuel components in these mixtures would be exempted from excise tax. It allowed only biofuels produced from Polish feedstock to be used and would set a minimum price for these biofuel crops.

The Polish government faced open resistance from oil companies, car producers, consumers and even from the Ministry of Finance. The opponents of the law included the Polish oil company Orlen, which already added bioethanol and ETBE to petrol. Their arguments against the law were:

- The high obligatory minimum biofuel level.
- The fact that only in Poland produced feedstock material was allowed for the bill and that was against EU regulation and also that this clause would invalidate the law at the moment of the EU accession.
- The controversial government prerogative to set a minimum price for crops used in biofuels.

— There were no clear standards for biofuels in Poland and many vehicles on the road would not be able to drive on high blends of biofuels mixed into diesel or petrol.

— A decrease in budget revenues coming from excise and VAT taxes.

— The argument that mainly a small number of large producers and owners of distilleries would profit from the bill and that these were often linked to the bill's champions, the PSL party.

— The denied right to choose their fuel for the consumers.

The bill was approved by parliament, but it was vetoed off by the President in January 2003 with the arguments that, after consultation of experts, he had doubts of technical character and said it has legislative faults. He urged the parliament to adopt a few changes to the bill such as gradual introduction of biofuels, offering consumers the right of choice, and creation of effective inspection systems. This decision caused farmers to start roadblocks and the PSL-party called to override the presidential veto and threatened to oppose the EU accession in the upcoming referendum if a biofuel law was not in place before the accession.

Eventually, changes were made to the draft bill, which now required 3.5 per cent of bioethanol (or in the form of ETBE) in petrol from October 2003, 4–5 per cent from January 2004, and for each following year the Polish Council of Ministers will determine the percentage. The minimum share of biodiesel in diesel will be set at a later date. The feedstocks for the biofuels still had to be from Polish origin, but only until Poland joined the EU. The president approved the bill in as late as November 2003 and it should have entered in force in January 2004. However, experts still argued that "the law is not working" and the Polish Constitutional Court did not ratify it. The Ministry of Agriculture and Ministry of Economy were working on changes to the law in 2004, but in June 2005 it was still in the revision phase. Expected changes concern the minimal share of biofuels, laboratories testing quality of biofuels and mixtures, monitoring and quality control and indication at the fuel pumps what amount of biofuels is mixed into the fuel.

In the official reports to the European Commission Poland has laid down its indicative targets for biofuel use at 0.5 per cent for 2005, 1.5 per cent for 2006 and 5.75 per cent for 2010. Poland's motivation for the fairly low 2005 target is that it does not have more budget for biofuels and that the target has to be realistic for producers of biofuels and petroleum fuels. The target for 2006 is motivated with the same reasons, but it can be higher than the one for 2005, because it is expected that before 2006 the quality standard for the use of biodiesel and for the use of biofuels in blends higher than 5 per cent will be ready.

8.3 *Policy measures*

The Polish government is of the opinion that the key strategy of promoting the use of biofuels is to select an appropriate level of excise duty, in accordance with technological progress in the field of vehicle and fuel production. The government of Poland find it essential that such measures are constantly monitored, as tax exemptions have to be adapted to changing circumstances. A system of duty reliefs and exemptions has been operational in Poland since 1993, but initially this only applied to the admixture of bioethanol or ETBE to petrol. The amount of duty relief was determined on a yearly basis after approval of the annual budget.

From 1997 there was an excise duty relief of 91 PLZ per 1,000 litre (ca. 0.03 €/l) for petrol containing 4.5 per cent to 5 per cent bioethanol and 61 PLZ per 1,000 litre (ca. 0.02 €/1) for petrol containing 3 per cent of ETBE. In May 2004 the tax relief system has undergone modifications bringing it into line with the European Union legislation and the new Polish biofuels law. Biodiesel is now included. There are now three different excise duty relieves, one for blends of 2–5 per cent biofuels in petrol or diesel, one for blends of 5–10 per cent and one for higher blends or pure biofuels. For the first time, this allows blends of biofuels as low as 2 per cent to qualify for duty exemption, but the structure of the three different excise duty relieves make higher blends more attractive from an economic point of view.

However, with these duty exemptions in place, it is still not possible to bring biodiesel or biofuels in blends higher than 5 per cent into the market, because the necessary laws on quality requirements and analysis methods are not in place yet. These are expected to come in force by the end of 2005 or in 2006.

8.4 *Conclusion*

The driving forces for the start of the use of bioethanol in Poland were:

— surplus of agricultural production,

— strong agriculture and agro-industry lobby.

In a later stage, some other factors should have influenced the biofuel use in Poland positively:

— Necessary compliance with the EU Biofuel Directive as part of the acquis of the EU accession.
— Increase of oil price and the consequent awareness of the need for more security of energy supply.
— The huge amount of unexploited bio-resources, available at lower cost than in Western Europe.

However, the use biofuels has declined in Poland over the past few years, because of:

— (Still) Unstable legal framework and taxation and slow changes to it. Poland is known to have one of the most bureaucratic systems in Europe.
— Limited financial government resources to promote biofuel.
— The lack of clear quality standards and analysis and control methods for most biofuels and blends of biofuels and petroleum fuels.
— A bad image of biofuels in society, based on the supposed poor quality of biofuels and incompatibility with car engines, which was advocated widely by the opponents of the biofuels law during 2002 and 2003.

All in all, it is clear that Poland wants to stimulate the use of biofuels, because of the boost it will give to the agricultural sector. However, limited government budget for biofuels, a heated political discussion and the Polish bureaucracy have so far delayed a successful large-scale introduction of biofuels. A comprehensive biofuels law was finally adopted in 2003, but the necessary tax exemptions, quality standards, controlling mechanisms etc. were not ready for it yet.

9. Slovak Republic

The Slovak Republic was founded as an independent country on 1 January 1993, after the split of the former Czech and Slovak Federal Republic. It is a small Central European country with ca. 5.4 million inhabitants. The cultural, industrial and economic centre of the country is the capital city Bratislava. The Slovak Republic joined the European Union on 1 May 2004. Like most other new Member States, agriculture is a very important economic sector in Slovakia. Because of its poor domestic energy resource base, the country imports most of its primary energy supply. The transport fuel demand amounted to ca. 77 PJ in 2003. One of the priorities of the Slovak Energy Policy, adopted in January 2000, is to increase the utilisation of the domestic potential of renewable energy sources.

9.1 *Current and past activities*

Although Slovakia has abundant biomass resources available, a clear market for bioenergy is still lacking, ie at present biomass only provides 0.2 per cent of energy in Slovakia. The available biomass resources consist mainly of industrial wood residues and forestry wood residues (north/central), straw and other agricultural residues (south-west/east), rapeseed, and wet biomass like animal manure and sewage sludge.

Although Slovakia has so far under-utilised their biomass potential, the country does have experience in producing biofuels. In the period 2001–03 Slovakia had a biodiesel production capacity of 62,000 tonnes per year. In 2001, 30,290 tonnes of biodiesel were actually produced and used in Slovakia, ie a share of 1.6 per cent in total transport fuel consumption. In 2002, the production of biodiesel dramatically decreased to only 6,267 tonnes, of which approximately a quarter was exported. In 2003, even less biodiesel was produced, only 3,573 tonnes. This strong decrease of biodiesel production was due to the abolition of state subsidies, which caused many companies that originally produced biofuels to restrain their production and either stop the construction of new capacities or convert their business activities. Data on bioethanol production and consumption are not known but there is only a very limited volume of domestic ethanol for the production of ETBE.

9.2 *Policy goals*

For reasons of reduction of energy import dependency and utilisation of the large available area of woodland, development of the biomass sector is one of the main priorities of the Slovak renewable energy policy. This policy aims at reaching a renewables share of 4 per cent in total primary energy supply in 2005.

Slovakia has set national indicative targets in line with the reference values of 2 per cent for 2005 and 5.75 per cent for 2010 as well as targets for the years in-between. For achieving the 2 per cent target, minimum volumes of biofuels to be used are 46,922 tonnes of biodiesel or 63,500 tonnes of bioethanol, blended in diesel or petrol,

respectively. In order to reach the 5.75 per cent target, at least 151,762 tonnes of biodiesel or 205,384 tonnes of bioethanol should be consumed, by the end of 2010.

Although Slovakia seems to have accepted the reference values set by the European Commission, "the quantification of national targets in 2005 and 2010 will be conditioned by availability of biofuels and investment preparedness of interested companies." according to the country's national report on the implementation of the Biofuels Directive (Slovakia, 2004). The definitive national indicative targets for the period 2005–10 will be defined in the National Programme, which is currently being elaborated.

9.3 *Policy measures*

Slovakia has indicated that it wants to follow a "step-by-step" approach for the introduction of biofuels on the national transport fuel market. In this regard, the country especially stresses good management over fuel quality, taxes and state budget. Slovakia also emphasises the importance of building relations between companies in the entire biofuels production chain. Concrete policy measures are currently being developed.

Since Slovakia lacks bioethanol production capacity, it intends to start with blending 5 per cent of biodiesel into diesel (B5) with reduced excise tax ("red diesel"), which is used in agricultural and forestry production, in railway transport and in public transport. Rapeseed oil is the predominant feedstock for biodiesel production, but the use of recovered cooking oil has started as well. Higher concentrations may be used in captive fleets.

For this first phase of biofuels introduction to get started, the Act No 98/2004 on consumer tax from mineral oils would have to be revised first. According to the Law No 239/2001 of 22 May 2001 on taxes from mineral oils, fuels produced from renewable energy sources (bioethanol and biodiesel) are free of taxes. The law enables mixing of oil fuels with biofuels. However, mixed fuel is charged with taxes on the same extent as fuels from mineral oil what prohibits its sale.

Currently, the following blends of regular fuels and biofuels are allowed on the Slovak market:

— diesel blended with 5 vol-per cent biodiesel,
— biodiesel blended with 5 vol-per cent diesel, and
— petrol blended with 15 vol-per cent ETBE.

A financial support scheme, in addition to excise duty exemption for biofuels and biofuel blends, seems necessary for the Slovak biofuels market to develop. Although biodiesel is exempt from excise duty, its supply price remains uncompetitive. The policy measures to be developed should also include technical standards to guarantee the biofuels quality.

9.4 *Conclusion*

Slovakia has experience in producing and using biofuels and has biofuels production capacity available. However, it is clear that a financial support scheme is indispensable for maintaining and further developing biofuel production and use. Promotion of new investments in bioethanol/ETBE production and pilot programmes for production and application of biofuels could offer new perspectives for Slovakia, as well as intensive R&D in second generation biofuels since Slovakia has large potential in waste wood and agricultural residues. Slovakia intends to set up a national biofuels programme, but at this moment the concrete policy measures are still unclear.

10. Malta

Malta is an island state south of Sicily in the Mediterranean with a surface area of 316 square kilometres and 400,000 inhabitants. It has been independent since 1964 after 150 years of British rule and has joined the European Union in 2004. Its only energy sources are oil and oil products, which are imported by a state-owned company and amounted 34 PJ in 2001. A large amount of agricultural products is also imported. The consumption of transport fuels was 6 PJ in 2004.

10.1 *Current and past activities*

Edible Oil Ltd., a private company started trials to produce biodiesel from waste industrial (cooking) oil already in 1999. In 2003 their production of biodiesel was 30,000 litres, which is 0.02 per cent of total transport fuels, and this was used in a demonstration project in vehicles of the Governments heavy plant. In 2004 400,000 litres of biodiesel were produced from waste oil, of which 180,000 litres were used for road transport, which

amounts to 0.1 per cent of total road transport fuels. The remainder was used for industrial purposes. According to Edible Oil Ltd. in 2005 they have produced and sold 1.4 million litres of biodiesel (ca. 0.8 per cent of total transport fuels), used in the company's vehicles, government vehicles and sold at their single public pump.

Interest has been expressed by a number of other private enterprises in importing biofuel and setting up additional manufacturing facilities. However, Edible Oil Ltd.'s refining plant has already a capacity of 15,000 tonnes or 15 million litres. Estimates of collectable waste cooking oil are in the order of 3,000–7,000 tonnes per year, enough to produce biodiesel for 1.5–4 per cent of total transport fuel use. In 2004 only 500 tonnes were collected and in 2005 approximately 1,000 tonnes. Collection has been somewhat difficult due to lack of local participation. Additionally, also some waste oil was imported.

10.2 *Policy goals*

Malta is a country with negligible potential in biofuels from agriculture, because of the limited freshwater resources (50 per cent of potable water is supplied from desalination), high population density and poor soil fertility. On the other hand, Malta is totally dependent on imported fuel for all its energy needs. Therefore there is a strong motivator to find means to increase fuel diversity and to use renewable and indigenous energy sources. For alternative fuels, the use of LPG, LNG/CNG and electrical vehicles are considered, as well as biofuels. However, industrial and domestic waste is the only substantial source of biomass. In this respect, Government policy is as follows:

- To reduce the quantity of waste and to encourage higher levels of reuse.
- To increase recycling and composting.
- Further development of energy recovery technologies (anaerobic digestion).
- Safe disposal of residues that cannot be otherwise managed.

Material recovery and composting is given a higher ranking than energy recovery in this strategy. The strategy envisages composting of biodegradable waste with targets for reducing land filling as far as possible. As far as biomass from wastewater is concerned, investigations will be concentrating on electricity generation from biogas generated during the treatment process. With regard to these facts Malta states that biofuels can be produced and used more cost-effectively elsewhere (other than transport). However, there is potential for waste cooking oil to be collected and converted to biodiesel. For the end of 2005, the national indicative target for biofuels in road transport is 0.3 per cent. No further outlook on the future use of biofuels is given yet.

10.3 Policy Measures

With an act effective from the beginning of 2005 Malta has incorporated the Biofuel Directive into its national law. This act allows the use of biofuels and blends of biofuels and mineral fuels and requires the "Malta Resources Authority" to monitor the effect of the use of biofuels in diesel blends above 5 per cent by non-adapted vehicles. The act also requires the "Malta Resources Authority" to report regularly on the progress of biofuel use in Malta and to give policy recommendations. Herein, they should consider the overall climate and environmental balance of the various types of biofuels (and other renewable fuels) and may give priority to the promotion of those fuels showing a very good cost-effective environmental balance while also taking into account competitiveness and security of supply and other national energy policy objectives. The regulation also imposes reporting duties on importers and producers as well as other obligations with regards to the sale and labelling of biofuels. Finally, the act has set a national indicative target for the end of 2005 of 0.3 per cent.

During November 2004, the government announced that as from 2005, the biomass content (ie the percentage element) in biodiesel is exempted from the payment of excise duty. Also, an increasing number of government departments and agencies have started using biodiesel. Furthermore, policy measures and incentives have also been taken for electrical vehicles.

10.4 *Conclusion*

Malta has no possibilities for biomass production and its only biomass is industrial and domestic waste. However, the government has a priority list on how to deal as efficiently as possible with waste. As a result only waste cooking oil will be used for the production of biofuels. This has been started successfully in what seems a good cooperation between the government and a private company. The government has stimulated the production of biodiesel by using biodiesel in its vehicles.

The government has been very conservative in setting the target for 2005. The actual use of biofuels in 2005 was approximately three times as high as the 0.3 per cent indicative target for 2005. Also, it seems that there is a potential for biodiesel from domestic waste cooking oil to contribute to 1.5–4.0 per cent of total fuels for transport in Malta, which is more than the estimate from the 2004 EU Commission Staff Working Document. Herein it is estimated that Malta's potential of biofuels for road transport at 0.95 ktoe per year, which corresponds to 0.7 per cent of the total transport fuel consumption. This figure, for which the exact sources are not known, had so far been taken as the maximum potential for biofuels in Malta.

Government policy on importing biofuels is unclear. It seems that the past and current promotion of biodiesel from domestic waste cooking oil is not so much driven by the desire for biofuels or the Biofuel Directive, but more by the perspective to make better use of domestic waste and reduce the pollution of waste water with waste cooking oil.

11. The Netherlands

The Netherlands is a small Western European country located near the North Sea with a total area (land and sea) of 41,500 km^2. The country is densely populated and has ca. 16 million inhabitants. In the Dutch energy supply system, natural gas plays an important role, for the production of both electricity and heat. The Netherlands aims at achieving a renewables share in electricity production of 9 per cent in 2010, according to the EU Renewable Electricity Directive. Currently, the share of renewables is 6.1 per cent, of which two-third is contributed by bioenergy. For the total energy supply the share of bioenergy amounts to ca. 1.7 per cent. At present, the main contribution comes from co-firing and waste incineration, and according to the "Action Plan biomass" of the Dutch Ministry of Economic Affairs, these will remain the most important sources the next five years, supplemented by growing amounts of other sources, especially bio-based CHP plants.

11.1 *Current and past activities*

Within the context of reducing CO_2 emissions and increasing the use of renewable energy sources, the Dutch government acknowledged the importance of climate-neutral energy carriers—for transport but also for other sectors—by setting up the GAVE (gaseous and liquid climate-neutral energy carriers) programme in the late 1990s. This programme aims at accelerating the introduction of such energy carriers and was implemented by Novem (the Dutch Agency for Energy and the Environment) on behalf of three ministries, ie Spatial Planning, Housing and the Environment; Economic Affairs; and Transport, Public Works and Water Management. The first phase of the programme (1998–2000) aimed at exploring the perspectives for introducing new, clean, gaseous and liquid energy carriers on the Dutch market by means of demonstration projects, and if these possibilities existed, what would be the most attractive ones. The introduction of these energy carriers should contribute to achieving an accelerated trend breach in reducing CO_2 emissions and making the energy supply system more sustainable. The next phase of the programme (2001–2010) focuses on demonstrating production chains for the most promising options following these steps: establishing alliances between stakeholders, developing blue prints for the demonstration phase, realising demonstration projects, and finally, introducing production and use on the market. The activities of the programme, for both development projects and demonstration projects, received (partial) financial support. At present, the GAVE programme focuses at supporting the government and relevant market parties in their efforts within the framework of the EU Biofuel Directive.

The GAVE programme never really reached its original goal of supporting demonstration projects. The biofuel projects that came into the market were local initiatives resulting in the use of 4 million litres of biodiesel in 2003, mainly pure plant oil for road transport and biodiesel for recreation vessels. These are fiscally supported on a project basis. Several plans for large biodiesel plants were never realised, as financers were unfamiliar with biofuels and there was no Dutch policy for biofuels.

With a general fiscal support for biofuels effective in 2006, two companies have started marketing biofuels: Argos Oil has started mixing in 5 per cent of bioethanol in petrol and Shell markets petrol with ETBE. These biofuels are imported. Due to uncertainty about future biofuels policies, market parties have been hesitant to invest in new biofuel production installations for a long time. The recent increase in development of project plans has resulted in the establishment of two biodiesel plants so far.

11.2 *Policy goals*

The Dutch government decided to actively promote the use of biofuels, mainly with the aim of reducing transport-related CO_2 emissions and thus bringing the climate objectives closer to realisation. However, the Dutch government first issued several studies in order to find out which biofuel production chains were the best ones and should be promoted. After many years of studies, it was concluded that the current biofuels, pure plant oil, biodiesel and bioethanol, were not cost-effective in reducing greenhouse gas emissions. Only the so-called second-generation biofuels, such as Fischer-Tropsch diesel from biomass and bioethanol from lignocellulosic waste or crops, were identified as a promising option for biofuels. However, the production processes for these biofuels are still being developed and the Dutch government stimulates these developments, although not to such extent as eg in Germany.

Thus, for some time, the Dutch government did not intend to promote the current biofuels, pure plant oil, biodiesel and bioethanol. However, under pressure of rapeseed oil producers, local governments and especially the EU Directive, the Dutch government has decided to make a start with a market biofuels and set a target for 2 per cent of biofuels in 2006, to be realised by mixing in bioethanol (or ETBE) into petrol and biodiesel into diesel. Pure plant oil is still only stimulated on a project basis, as this is not regarded as an important biofuel for large-scale use.

In March 2006, the government policy for 2007 and onwards was announced. In 2007 fuel suppliers will be obliged to ensure that at least 2 per cent (energy basis) of their annual fuel sales consist of biofuels. In the coming years, the obligatory target will gradually be increased towards a minimum target of 5.75 per cent in 2010.

11.3 *Policy measures*

Prior to 2006 biofuels were only fiscally supported on a project basis and the budget for this support was relatively small, at least not high enough to have a significant market penetration of biofuels. In September 2005, the Dutch government announced its biofuels policy for the coming years aiming at the 2 per cent biofuels share in total transport fuel sales. Although initially imposing a mandatory biofuels target to the market was not considered a realistic possibility for the short term, the government nevertheless decided to oblige fuel suppliers to blend 2 per cent biofuels in their total fuel sales, as of 2007.

In 2006, which is considered a transitional year, there will be fiscal support for biofuel blends in order to compensate for the financial gap with regular petrol and diesel. The tax exemption is granted for a maximum biofuels volume incorporated in a blend of 2 per cent. If the biofuels proportion is below 2 per cent, the level of tax exemption will be adjusted accordingly. Biodiesel and bioethanol will be eligible for this tax exemption, but pure vegetable will be excluded since it cannot be blended with regular diesel and must be used in adapted vehicles. Instead, pure vegetable projects may apply individually for a tax exemption within the context of innovation programmes. This decision resulted in protests from small (potential) pure vegetable oil producers.

The biofuels obligation in place as of 2007 applies to both petrol and diesel to guarantee that the development of biofuels will be initiated in both markets. To increase flexibility in complying with the targets, fuel suppliers are allowed to trade their surpluses or shortages, based on a mutual statement. Fuel suppliers that do not comply with the obligation will get a financial penalty. Although first generation biofuels will be needed to comply with short-term biofuels targets, the government actively aims at promoting second-generation biofuels. Within the obligation system, this can be done by awarding more credits to biofuels according to their CO_2 reduction performance, or by setting a required share in the biofuels mix for second-generation biofuels. In addition, the government is considering the possibility of imposing minimum sustainability requirements and of setting up an international certification system for biofuels. Furthermore, the Dutch government has allocated a budget of €60 million for the period 2006–10. This support aims mainly on the development of advanced biofuel production technologies. Projects applying for a subsidy should meet the following criteria:

- Achieve an improved greenhouse gas balance and lower land-use.
- Market potential and chance of success, taking into account cost reductions as a result of technological learning ("learning curve").
- Subsidy-effectiveness.
- Other environmental benefits.

11.4 *Conclusion*

The Netherlands did not have a tradition in producing or using biofuels, but has long had intentions to promote them within the context of the Kyoto protocol and the EU Biofuels Directive. It considers biofuels to be a component of a long-term transition towards a more sustainable transport sector and energy supply system. After many years of advisory studies, the intention was not to support the production of the current available biofuels, but to stimulate only the more cost-effective second-generation biofuels, which, however, were not on the market yet. Research for second-generation biofuels has been stimulated, but not with the same persistence as eg in Germany. In the mean time, private initiatives for pure plant oil and biodiesel received only support on a small scale. Repetitive requests for more stimulation of biofuels were not acknowledged, frustrating enthusiastic entrepreneurs.

Now that the Dutch government has decided to give fiscal support for biofuels for 2006, two companies have started marketing biofuels. There is yet no large-scale production of biofuels in the Netherlands. This slow start is due to the fact that the government was unsuccessful in providing the long-term guarantees to market parties that are necessary to develop a stable domestic biofuels market. Frequent changes in government support in another sector, renewable electricity, have neither done any good to investors' confidence in the government policies. Recently the government policy for 2007 and onwards has finally been announced, creating a longer-term framework for support for biofuels. The design of the second phase aiming at the introduction of second-generation biofuels is, however, still under consideration.

12. United Kingdom

The United Kingdom is situated in North Western Europe and has a surface area of 242,534 square kilometres and has 59.3 million inhabitants. It consists of England, Wales, Scotland and Northern Ireland. It is a member of the European Union since 1973. The UK's main energy sources are natural gas and oil and to a lesser extent coal and nuclear. The UK is currently shifting from being a net energy exporter to becoming a net energy importer. The consumption of petrol and diesel for transport was 1551 PJ in 2001.

12.1 *Current and past activities*

Biofuel use in the UK started directly after the government gave partial duty exemptions for biofuels. In July 2002 a duty exemption of 20 pence per litre (ca. 0.30 €/1) was granted for biodiesel. This is a fairly low tax exemption and, therefore, only the cheapest biodiesel can be brought into the market. This is mainly biodiesel from waste vegetable oils, which is produced in small plants. Also, some soy and palm oil is imported, as well as some rapeseed methyl ester (RME). In the remainder of 2002, 2.7 million litres of biodiesel were sold. In the next year, 19.5 million litres of biodiesel were sold, which was approximately 0.04 per cent of total road transport fuels. In 2004, 21 million litres and from January to May 2005 approximately 10 million litres biodiesel were sold. The biodiesel is used in blends at or below 5 per cent and these are currently available at over 100 filling stations in the UK, including a number of major supermarket sites.

Although the production and sales of biodiesel have not increased much from 2003 to the first half of 2005, this is about to change, because of new production capacity coming on line. In Scotland, Argent Energy's plant with a capacity of 50 million litres of biodiesel from waste vegetable oils and tallow has started production in March 2005. Biofuels Corporation's biodiesel plant, also from waste oils, with a capacity of 250,000 tonnes (ca. 284 million litres) in Seal Sands, Middlesbrough, is in its final stages of commissioning. Greenergy's plant with a capacity of 100,000 tonnes biodiesel per year from waste oils and rapeseed oil at Immingham at the east coast is currently being built. All three plants are built by foreign manufacturers.

A duty tax exemption for bioethanol came in force in January 2005. Before that bioethanol sales were negligible, but from January to May 2005 already 28.7 million litres bioethanol were sold (ca. 0.04 per cent of total yearly transport fuels). These are exclusively imports and mainly from Brazil. Greenergy oil company is the main importer and the bioethanol is blended into petrol up to 5 per cent and marketed via supermarket filling stations. There are plans for domestic bioethanol plants, but these depend on more assurances from the government in supporting domestic bioethanol production.

12.2 *Policy goals*

UK policy on biofuels started late compared to many other countries in Europe. In its White Paper "Our energy future" from 2003, the UK government includes biofuels as one of the means to achieve its environmental, security of supply, competitiveness and social goals for a long-term energy strategy. Besides biofuels, also increased car efficiencies, hybrid vehicles and alternative fuels natural gas, LPG and hydrogen

should contribute to clean low carbon transport. As for biofuels, the UK is particularly interested in supporting the development of bioethanol and biodiesel production from biomass such as farm wastes, forestry residues, coppice crops and domestic waste, because these can potentially deliver bigger carbon savings and wider environmental, farming and rural employment benefits than biofuels made from food crops.

The UK Government's approach to the promotion of biofuels is aimed at the long-term. Therefore, it wants to consider carefully the most appropriate mechanisms to ensure the greatest carbon savings possible from biofuels at the lowest cost. These include considerations on enabling the direct processing of biofuels into the oil refineries and some form of renewable fuel obligation. This takes time to develop and implement, but the UK regards this as time well spent and allowing greater benefits over the long term. However, the UK recognises that the industry must start somewhere while the government deliberates future measures and, therefore, the current partial duty exemptions for biodiesel and bioethanol have been put in place. These are fairly low compared to other countries and the British industry has called for a higher level of incentive.

However, according to the UK government, the cost of the current incentive already outweighs the benefit and biofuels are currently an expensive method of carbon abatement. Also, according to the UK's economic analysis, higher incentive levels would currently largely result in imports, including from outside the EU. This would limit the potential benefits to the UK and broader EU agricultural and rural sectors. In addition, there is strong concern that that this could lead to further deforestation in South East Asia and South America.

With the low duty rates being introduced, the UK government estimates that biodiesel and bioethanol could account for up to 5 per cent of total fuel use by 2020. For 2005, it has set a target of 0.3 per cent, because of the low starting point of biofuel use compared to other countries.

12.3 *Policy measures*

The Hydrocarbon Oil Duties Act from 1979 originally did only tax mineral fuels and not biofuels. Although biofuels were not used in the UK at that time, the act was changed to include mineral fuel substitutes, such as biofuels, in 1995 in order to prevent tax losses to the state and in order to comply with 1992 regulations from the EEC. However, subsequent EEC regulations did allow exemption of the fuel tax for of biofuels. From July 2002 the excise duty on biodiesel was lowered by 20 pence per litre (ca. 0.30 €/1), compared to fossil diesel. When taking into account also the reduction of the amount of Value Added Tax (VAT), the reduction is almost 0.35 €/1. Effective from January 2005 an identical duty relief (but compared to petrol) was introduced for bioethanol. Both duty relieves are guaranteed for three years rolling, which means that they are currently valid until the end of 2008.

The duty relief for bioethanol does not apply to ETBE. The government is still assessing the environmental, health and safety implications of the use of ETBE. There will be no tax exemption for pure plant oil in the UK. There was some confusing about this issue because so far it seemed that also pure plant oil was exempted from tax. This has now been cleared and producers have to pay the usual taxes, even with retroactive effect. This is a drastic measure, but the pure plant oil production was very small.

Capital grants for the investment in commercial plants can be given under the "regional selective assistance". The EU allows this only for certain regions, because otherwise it is regarded as market distortion. The Argent Energy's plant received from the Scottish Executive £1.2 million (ca. € 1.8 million) on a total investment of £15 million. For Biofuels Corporation's plant in Seal Sands an equal amount has granted by the UK North East Regional Development Agency. The government is considering "enhanced capital allowances" for biofuel plants, which allows profitable write-offs. Also this measure would be subject to the EU approval.

The UK Government has also been leading by example in promoting and using biofuels. The Government Car and Despatch Agency (GCDA) uses a 5 per cent biodiesel blend in its London-based delivery vehicles and many local authorities and police authorities are using biodiesel in their fleets. The government also supports R&D projects on the development of advanced production methods for biofuels.

The government has conducted a feasibility study and consultative process to explore the prospects for a Renewable Transport Fuels Obligation (RTFO) as a possible mechanism to promote renewable fuels into the long term. This would place a legal obligation on transport fuel suppliers to supply a specified biofuels proportion of their road fuels to their customers. The study is due to conclude shortly.

The UK is also exploring the possibilities for the use of biomaterials (eg rapeseed oil) in conventional oil refineries. The product of this process would be conventional diesel or petrol and the only difference would be that the inputs to the process would be a mixture of mineral and biomaterials. This could give a lot of the benefits of conventionally processed biofuels without the cost and complication of separate fuel blending and

distribution arrangements. It would also allow considerable economies of scale. However, apart from the technical issues to be addressed, also the taxation policy should be changed, because currently the fiscal regime focuses on the output of the refineries and not on the input.

12.4 *Conclusion*

Only around 2000 the UK started its promotion on biofuels. Before then there was no specific policy on biofuels. As they were not regarded as a cost-effective means to reduce greenhouse gas emissions and security of energy supply was not much of an issue, because of the UK's oil and gas reserves. Also, it was expected that promotion of biofuels would result mainly in imports and would not contribute to rural development in the UK. Under pressure of small entrepreneurs and the EU Biofuel Directive, partial tax exemptions were given first for biodiesel and later for bioethanol. These exemptions are lower than in most other European countries and as a consequence only the cheapest biodiesel and bioethanol is introduced into the market. In the case of biodiesel the feedstock is mainly domestic waste vegetable oil. In the case of bioethanol this is mainly import from Brazil.

The policy for biodiesel seemed to have its intended effect: domestic biodiesel production flourished with the least amount of support and at the same time effective use of a waste stream. However, without extra support, the industry expects that biodiesel sales will stabilise at around 250,000–300,000 tonnes annually, which is less than 1 per cent of UK road fuel use. The partial duty exemption for bioethanol has resulted exactly in what the government feared: large imports from Brazil. Apparently, the Brazilian bioethanol can be delivered at a price where it is profitable, even with the existing import duty (0.192 €/1 for undenatured alcohol and 0.102 €/1 for de-natured alcohol). For domestic bioethanol production the current measures seem to be not enough. Based on current sales of biofuels in the UK, it seems that the UK will reach its aimed target of 0.3 per cent of biofuels.

The UK is still hesitative about its approach to biofuels. The UK is considering its long-term strategy on biofuels and is has executed a public consultation, called "Towards a UK strategy for biofuels". It seems already that the UK does not want to given higher tax exemptions for biofuels, because of the costs involved, but also because this would create over-compensation for biofuels from cheap feedstocks, such as waste vegetable oil. The government is looking for other potentially cheap methods such as a biofuel obligation or direct blending of biomass streams at the oil refineries. Furthermore, its view on biofuel import is still unclear. It seems that sustainability requirements for imports are a serious option. Effectively, the UK is delaying its important choices, possibly awaiting actions from the European Commission. However, it has made a start using biofuels and is, thus, ready to pick up the pace if and when the political decision to spend more money on biofuels is made.

13. Conclusions and Recommendations on European Biofuel Policies

In the preceding chapters, the history of biofuel policy and recent developments in the frame of the EU Biofuels Directive have been described in detail for ten EU Member States that have achieved different degrees of success of biofuels market penetration. In this chapter, main conclusions for each Member State will be presented, as well as for each group of countries:

1. Successful market introduction: France, Germany, Spain, and Sweden.
2. Developing a stable market: Czech Republic, Poland, Slovakia.
3. Starting with introduction of biofuels: Malta, the Netherlands, United Kingdom.

Based on the conclusions presented here, policy recommendations will be given for Indian and South East Asian policy makers and other biofuels stakeholders.

13.1 *Successful market introduction: France, Germany, Spain, Sweden*

The experience in France clearly shows the effectiveness of high levels of tax exemption and strong partnerships between parties involved in all segments of the biofuel production chain, especially farmers and oil companies. However, it also became clear that without any limitation on the biofuel volumes eligible for tax exemption, state expenses for the promotion of biofuels could not be controlled. This was the reason for the introduction of a maximum volume of biofuels that could make use of the excise duty exemption. This volume, as well as the level of tax exemption, is adjusted every year to avoid over-compensation.

In Germany, the agricultural sector played an important role in the development of the biodiesel sector. In contrast to the French situation the large oil companies were not involved. The role of the car manufacturers, who started adapting their cars for the use of pure biodiesel, was crucial. Furthermore, fuel pumps suddenly became available as leaded petrol was prohibited. The fact that pure biofuels, being non-mineral oil based fuels, enjoyed full tax exemption from the very beginning was important for the growth of the biodiesel sector. Biofuel blends only entered the market after the introduction of proportional tax exemption applicable for blends of biofuels and mineral oils in January 2004. This also resulted in the involvement of the oil industry. However, also the German government monitors the impacts of this excise duty relief and will adjust it in the case of over-compensation. Germany is considering the implementation of obligatory targets for blending biofuels to replace the current system of tax relief.

In Spain the start-up of its bioethanol sector was initiated by the co-operation between Abengoa and two oil companies, whose influence led to a logical choice for producing ETBE. Full tax exemption combined with the importance of the agriculture in regional development policies created favourable conditions for bioethanol/ETBE in Spain. In comparison with bioethanol, biodiesel production started to develop much later, since there was no influencing actor taking the initiative and full tax exemption was not sufficient for biodiesel to make it financially attractive in comparison with mineral diesel. Finally, the quality standard for biodiesel is not suitable for the Spanish situation, since it is based on rapeseed feedstock, which cannot be grown in Spain. For other feedstocks, such as sunflower, which can be grown in Spain, it is more difficult to meet the biodiesel quality standard.

The experience of Sweden shows that it is also possible to successfully apply low-volume bioethanol blends, without converting bioethanol into ETBE first, which is done in France and Spain. In contrast to most countries where biofuels play a relatively important role, the development of the biofuels sector in Sweden is mainly driven by environmental considerations, and it is combined with promotion of the use of cleaner technologies in transport such as environmentally friendly cars. Sweden is the only country that is importing biofuels on a large scale, and these imports largely explain the strong growth of biofuel use, especially bioethanol, in the past years. However, there is a risk of increasing biofuel prices, if other countries are to cover their increasing biofuel demand (partly) by imports as well.

These success stories have several common factors:

— longer-term fiscal support,
— initiating organisations,
— political willingness.

The most important is fiscal support for biofuels guaranteed for a longer term. The way these countries have given the fiscal support is different, as well as the amount given. France allows the tax exemption for a limited volume of biofuels and carefully calculates the amount of tax exemption to be given, whereas Germany on the other end gives a full tax exemption for unlimited volumes of biofuels. The second factor in common is that they all in a way had an organisation firmly lobbying for the introduction of biofuels. In France and Germany this was the agricultural sector, in Spain the multi-national Abengoa. Also, in all countries at least the car manufacturers or the oil companies participated, making the distribution of the biofuel possible, either as pure biofuel or a blend. In Germany, where the oil companies initially did not participate, the car manufacturers provided cars suitable for biodiesel and many independent filling stations marketed the fuel, as they had a pump available when leaded petrol became prohibited. Equally important was the political willingness to support biofuels. In Sweden and Germany left-wing/green parties' environmental motivations were important for the political support for biofuels, whereas in France and Spain support of the agricultural sector was considered important by the politicians.

13.2 *Developing a stable market: Czech Republic, Poland, Slovakia*

As a result of government support, the Czech Republic has been very successful in stimulating biodiesel production and use. However the current financial support system is gradually being changed after EU accession, which creates less favourable economic conditions for biofuels. Currently, there is a trend towards exporting biofuels as domestic legislation (ie the system for refund of excise duty) is too complicated and bureaucratic.

In Poland the surplus of agricultural production and the strong agriculture and agro-industry lobby were the driving forces for the development of the bioethanol/ETBE sector. Although the government considers an appropriate level of excise duty exemption a key measure for promoting the use of biofuels, limited availability of financial government resources forms a barrier. In addition, if there is a lack of necessary laws on quality requirements and analysis and control methods, tax exemption only will not be sufficient to bring (more)

biofuels to the market. Furthermore, Poland is an example of how an unstable legal framework and taxation, and time-consuming processes to change this as a result of political discussion and bureaucracy, lead to instability, or even a decline, in the biofuels market.

The situation in Slovakia also shows the clear impact of changes in the financial support system, in this case abolition of state subsidies, which caused many industrial parties to restrain or even stop their business activities in the field of biofuels.

The Czech Republic, Poland and Slovakia all started with the introduction of biofuels as a measure to support the agricultural sector. They have used fiscal support, but have either changed or abolished it one or several times, which is detrimental for the biofuel industry. In addition to this uncertainty of policy, much of the announced legislation has been delayed and the production and use of biofuels has also been accompanied with a lot of bureaucracy. Especially in Poland, clear quality standards and quality control measures have been lacking. This led to a bad image for biofuels as consumers did not have confidence in fuel quality.

13.3 *Starting with introduction of biofuels: Malta, the Netherlands, UK*

Being a small island state totally dependent on imported fuel for all its energy needs, the approach of Malta differs from other EU countries, since for Malta increasing fuel diversity and to use renewable and indigenous energy sources is the main driving force for developing biofuels. Since the country has negligible potential for producing biofuels from agricultural crops, industrial and domestic waste is the only substantial source of biomass available. The government has a priority list of how to deal as effectively as possible with the waste. As a result waste cooking oils are collected and utilised for the production of biodiesel, which is stimulated by the government by using it in its vehicles.

The government of the Netherlands considers the use of climate-neutral energy carriers, such as biofuels, as an integral component of a long-term strategy towards a more sustainable transport sector and energy supply system. Although the country has no tradition in producing and using biofuels so far, it aims at strong promotion of biofuels the coming years, within the context of the Kyoto protocol and the EU Biofuels Directive. However, the government had not provided longer-term guarantees to market parties regarding future developments in the legislative framework for a long time. Recently, the biofuels policy for 2007 and onwards was announced including mandatory targets for the period 2007–10 and active support of second-generation biofuels.

The United Kingdom also includes biofuels as one of the means to achieve its environmental, security of supply, competitiveness and social goals for a long-term energy strategy. However, the UK is still hesitative in its approach to biofuels. It does not want to give higher tax exemptions to biofuels because of the higher costs and the risk of over-compensation. In addition, the partial duty exemption in place has already resulted in undesirable imports of cheap bioethanol. The government is currently exploring other ways for the longer term to promote the use of biofuels, such as a Renewable Transport Fuels Obligation (RFTO), which would place a legal obligation on fuel suppliers to sell a specified biofuels proportion. Just like in the Netherlands, political decisions will have to be made before the domestic biofuels market can really develop.

Malta, the UK and the Netherlands have had a different approach to the use of biofuels than countries like France and Germany. Their view was that the extra costs for biofuels did not out-weigh the benefits, keeping this option open for the long term. Still, these three countries have been actively developing their policy for biofuels with a view to the future and also under pressure of the EU Directive. Malta and the UK have chosen to make a start with a relatively small amount of biofuels, by giving only a modest tax exemption for biofuels. This is not only an effective way to make use of waste oils, but also effective in starting a biofuel market at minimal costs. The Netherlands and the UK have been actively pursuing and developing policy instruments to encourage the introduction of more cost-effective biofuels. The UK will probably not face many problems when these policies are implemented, because it already has a market for biofuels and guarantees three years of continuation of current fiscal support. In the Netherlands, uncertainty regarding future biofuel policies resulted in a poor investment climate for biofuels and fairly low confidence of market parties.

13.4 *Policy recommendations*

The history of biofuels policies in European countries shows that the following factors have been crucial for the introduction of biofuels in these countries:

1. Political commitment to biofuels.
2. Active market actors and/or lobbying groups initiating biofuels activities.
3. Financial compensation for the financial gap between biofuels and fossil fuels.
4. End-user market for pure or blended use of biofuels.

Political commitment to biofuels

Political commitment to biofuels for a longer period of time is crucial for creating a favourable investment climate and market conditions. This political willingness should be translated into effective biofuels promoting policies that are:

— clear,
— non-bureaucratic,
— consistent for a longer period of time,
— specific for the national context to optimally utilise the country's assets.

Active market actors and/or lobbying groups initiating biofuels activities

Market parties taking the lead and willing to invest are very important for developing a biofuels market. Which parties may be the initiators and what partnerships they could involve strongly depends on the local context. The establishment of consortia between fuel suppliers, biofuel producers, farmers, industrial companies, oil companies, car manufacturers, research institutes, consumer associations etc. also largely determines what biofuels will develop and to what extent.

Financial compensation to bridge the financial gap between biofuels and fossil fuels

A longer-term fiscal support system, bridging the financial gap with fossil fuels, is a very effective means for creating favourable market conditions. The exact design of the fiscal support system (types of biofuels, pure biofuels and/or biofuel blends, differentiated levels of tax exemption, etc) has also clear consequences for the development of different biofuels and the resulting biofuel mix on a national market (eg Germany). However, possible risks of such as system are overcompensation and state budget implications, especially if there is no limit on the biofuels volume eligible for the tax exemption. This can be prevented through monitoring and introducing a maximum level of tax exemption and/or a maximum to the biofuels volumes that can make use of the exemption (eg Germany, France). Moreover, a fiscal support system cannot guarantee in advance that the targets for market penetration of biofuels will be achieved. Being aware of these drawbacks of fiscal support system, some EU Member States are considering or introducing mandatory biofuels targets to fuel suppliers (eg Germany, the Netherlands, United Kingdom). Certification of biofuels and setting sustainability requirements is currently subject of discussion as well in various European countries.

End-user market for pure or blended use of biofuels

Another important prerequisite for successful introduction of biofuels is the presence or creation of an end-user market for biofuels. This may be a large market able to use biofuel blends, such as all passenger cars running on petrol or diesel. Another possibility is to use vehicle fleets that are equipped with adapted engines for the use of (almost) pure biofuels, for example captive governmental fleets ("leading by example"). In any case, end-users of biofuels need the guarantee that biofuels or blends with biofuels can be used in their cars without damage. Therefore, generally the involvement of either the car industry (use of pure biofuels) or the oil industry (use of biofuel blends) or both is necessary for reliable and effective biofuel distribution and use. Also, it requires quality standards for biofuels and biofuel blends, since their absence (eg Poland) or their inapplicability (eg Spain) is an enormous barrier to market introduction. Furthermore, such standards facilitate European biofuels trade.

May 2006

Memorandum by Food and Drink Federation

The Food and Drink Federation (FDF) represents companies with a wide variety of interests in the biofuels sector—some produce biofuel and others procure large volumes of agricultural raw materials that can be used for biofuel production. Our principal concern at this time is that financial incentives aimed at encouraging the development of the biofuel sector may indirectly disrupt agricultural commodity markets and lead to raw material supply shortages and price increases for domestic food and drink manufacturers. Given the link between these sectors, we believe that decision-makers must take the food and drink manufacturing industry's views into account when designing biofuels policies. What follows is our response to the seven questions set out in your terms of reference document.

Biofuels Targets, Economic Instruments and Biofuels Obligations

In 2001, the European Commission set a goal that by the end of 2005, 2 per cent of the energy used in transportation should come from biofuels, rising to 5.75 per cent by 2010. Despite double-digit annual grow rates in biofuel production since 2004, the Commission forecasts that the incorporation rate will only reach 3.3 per cent by 2010.

Biofuels production has concentrated in the seven member states that provide partial or compete tax exemptions to producers—Austria, France, Germany, Italy, Spain, Sweden and the United Kingdom (UK). Germany remains the European Union's (EU) leading biodiesel producer. This is largely due to a total tax exemption which applies for all biofuels. France, which is in second place, saw production continually decrease between 2001 and 2004, despite having a partial tax exemption in place for certain products. Its fortunes were reversed with the introduction of production quotas in September 2004. Italy is the EU's third most important producer, where the Government provides a total tax exemption for up to 300,000 tonnes of biofuel. A similar story exists in the bioethanol sector. The EU's leading producers are Spain, France and Sweden and the success of these industries rests on the back of tax exemptions, production quotas and investment subsidies.

In fact, Government support has been provided for the creation of biofuel industries wherever they have been started in the world. In all cases we know of, government support is also provided on a continuing basis for the production of bioethanol. In Brazil, the world's number one bioethanol producing country, government subsidies were provided to the industry for more than 25 years. The sector is now supported by a compulsory incorporation rate of 26 per cent. The world's number two producer, the US, supports its bioethanol industry with partial tax exemptions which are fixed on a six year time span, but there is no mandatory incorporation rate. Based on the Brazilian experience, it is clear that in creating national demand for biofuels via the introduction of mandatory incorporation targets, a government can reduce its reliance on other more costly policy measures such as tax exemptions. However, a sophisticated analysis would be required to determine what the necessary preconditions are for making such a policy shift successfully.

FDF members have long been concerned that financial incentives aimed at encouraging the development of the biofuel sector may indirectly disrupt agricultural commodity markets and lead to raw material supply shortages and price increases for domestic food and drink manufacturers. In the working document attached to the EU's Biofuel Strategy, we note that cereals prices are estimated to increase by 6–11 per cent by the year 2010, and oilseed prices by 5–15 per cent, as a direct result of developments in the biofuels sector. The negative consequences of this for our international competitiveness are obvious. What is often overlooked however, is the impact on intra-EU competition brought about by each member state's ability to determine their own fiscal and tax incentives for biofuels production. This policy independence enables significant distortions to be created within the "European single market" for agricultural commodities.

Given the link between the food and biofuels industries, we believe that decision-makers must take the food and drink manufacturing industry's views into account when designing biofuels policies. Decision-makers must also be prepared to pre-empt and respond to supply and price situations which threaten the competitiveness of domestic food and drink manufacturers vis-à-vis their international competitors or distort the European single market. Appropriate actions could include:

- nullifying the Blair House Agreement which limits the amount of oilseeds that can be grown on set-aside land;
- abolishing the current set-aside obligations which prevent EU farmers from producing more arable crops for human consumption;
- reducing tariffs or expanding import quotas, thereby enabling more arable crops to enter the EU market; and
- introducing initiatives aimed at diversifying the raw material supply base for the biofuel production industry.

Biofuels Production and Trade

Tariffs on imports of biofuels will be reduced in the future as a result of the World Trade Organisation negotiations and various bilateral trade agreements, such as that currently being negotiated with the MERCOSUR bloc. Decisions regarding the degree to which the domestic biofuels industry is exposed to foreign competition must be taken with care. At present, Brazil's bioethanol producers are twice as competitive as producers in the United States and three times more competitive than the average EU producer. Therefore, at this time, the domestic industry would find it difficult to compete with large scale imports from

the MERCOSUR bloc of the US. Accordingly, market access concessions for bioethanol should be balanced and tied to developments in the EU market rather an absolute amount determined by arbitrary means. At the same time, decision-makers must carefully consider the indirect impact of bioethanol imports on agricultural commodity prices in Europe.

Technical Barriers

Around 80 per cent of the EU's biofuel production is biodiesel, and approximately 75 per cent of this is made with rapeseed oil. A number of factors have contributed to this imbalance but perhaps none more contrived than the iodine standard contained in the European Committee for Standardisation's specification for biodiesel-EN 14214. This standard limits the types of oils that can be used in biodiesel production for outdated scientific reasons concerning fuel viscosity.

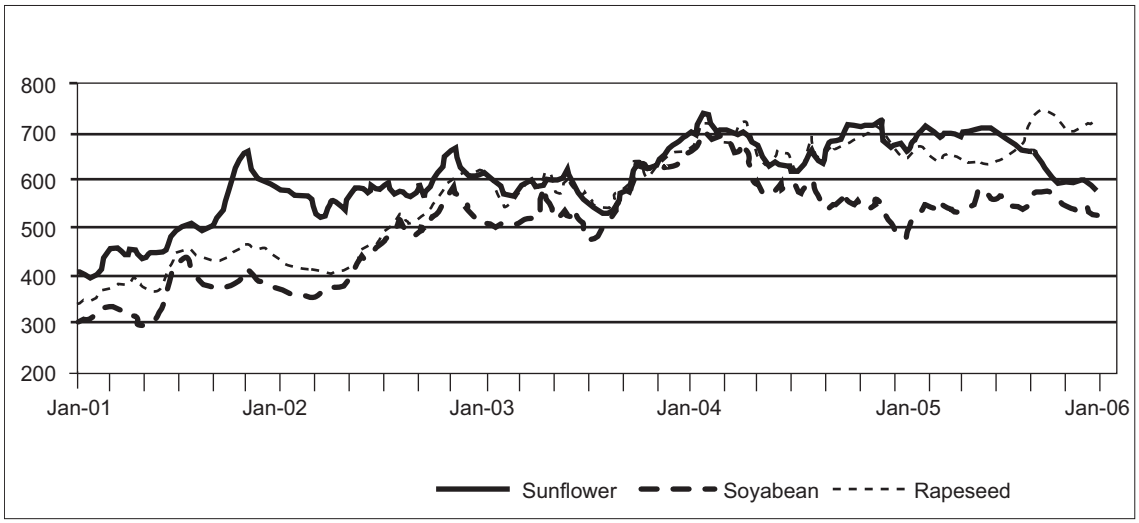
Rapeseed oil is a key ingredient in margarine, spreads, mayonnaise and salad cream. European food manufacturers have seen a 215 per cent increase in rapeseed oil prices since 2001 and this is largely due to developments in the biodiesel industry (see figure 1). This has clearly had a negative impact upon manufacturers' international competitiveness and played into the hands of producers of competing products such as butter and vinaigrette. It has also upset the single market for these manufacturers as the rapeseed oil price increases have varied across the EU depending on the incentives that exist for biodiesel production in each country.

FDF believes that a revision of the current iodine rules is long overdue. A new iodine threshold should be determined which meets the legitimate needs of the fuel and vehicle manufacturing industries at the same time as ensuring the widest possible range of biodiesel ingredients. The current situation, which ensures that rapeseed oil is the main ingredient for biodiesel production in the EU, is inefficient given the array of other raw materials that could be used; unsatisfactory for food manufacturers for the reasons set out above; and threatens to undermine biodiversity and rural landscapes in Europe.

Looking Ahead

FDF members support the overall EU and UK commitment to promote renewable energy sources as a contributor to sustainable growth. We believe that a high-level strategic debate about the long-term future of the EU biofuels industry is necessary. The issues of fuel and food security must be given careful consideration, and a delicate balance must be struck between short- and long-term incentives, objectives and viability. Given the link between the food and biofuels industries, we believe that decision-makers must take the food and drink manufacturing industry's views into account when designing biofuels policies.

Price for Liquid Oils (USD/tonne - c.i.f. Rotterdam)



Source: Reuters

MARKET SITUATION FOR RAPESEED OIL

— "Higher biofuel production should further stimulate world commodity prices, but with the exception of sugar, vegetable oils and oilseed meals, the impact of the additional biofuel production is relatively small: 0.6 per cent to 2.8 per cent by 2014 on top of the impact through higher production costs in agriculture." *OECD—23 Jan 2006*.

— "Demand for rape oil within the EU in 2005–06 will rise by 26 per cent in order to supply the burgeoning EU biofuel industry, according to the latest figures from German oilseeds analyst Oil World. High demand for biofuels in the EU and rising prices could 'contribute to a decline by 0.1 million tonnes in rape oil consumption in the food sector in Oct/Sep 2005–06', the report said." *Agra Europe—12 October 2005*.

— "Robust rapeseed and rape oil demand growth in prospect for 2005–06: Rape oil demand to increase over 1.1 Mn T after almost 1.5 Mn T this season, owing to biodiesel." *Oil World—October 2005*.

— "According to our estimates, rape oil demand in the EU-25 for non-food use has soared to 2.65 Mn T in Oct/Sep 2004–05, more than doubling within three years. The European rape oil demand shaping up for 2005–06 will presumably turn the EU into a net importer of rapeseed and/or rape oil." *Oil World—September 2005*.

19 June 2006

Memorandum by Forestry and Timber Association

BIOMASS WOOD/SMALL ROUNDWOOD BIOMASS PRICES IN THE UK

SYNOPSIS

Forestry thinnings when supplied as seasoned dry chip (>35 per cent moisture) at £45/£55 per tonne (ca.) delivered in small loads (>5 tonnes by blower lorry or farm trailer) can be competitive and recover costs for the grower/harvester. Overall available volumes in this sector are growing but they are still small. The main volume market is however in the supply of wet chip (>50 per cent moisture) at £25 per tonne (ca.) delivered in lorry loads (<15 tonnes with walking bed discharge or similar). Forestry thinnings are not at present a competitive supply source at £25 per tonne; nor are they acceptable to grower/harvester, nor by the buyer who has available choices of alternative biomass from other supply streams. Supply side issues of harvesting productivity and competitiveness for forestry are summarised below.

Demand always drives supply and prices (for biomass) are almost always determined at the margin. While there is a welcome and gradual hardening of biomass prices, it is not yet aligned to other commodity prices, mainly because of the abundance of potential UK supply and the immature state of the market.

Some suggestions are made how to grow this overall demand and we discuss "ability to pay" breaking points.

FACTS

Woody biomass is produced as either "small roundwood", or as "woodchip" or as "pellet". Prices (£ per tonne on weighbridge ticket) are paid either at forest roadside or are delivered to the boiler installation. Moisture content is critical. It can be wet, ie as cut (typically 48 per cent average) or dry, as seasoned woodfuel. Seasoned means a moisture range of between 22 per cent minimum (very hard to achieve in our climate) and 35 per cent maximum, which is the figure that many of the Austrian boilers (the most widely installed in the UK) work to.

DEMAND

Roundwood

Drax are currently paying £12 per tonne roadside as cut (£25 per tonne delivered). This compares with £17.60 per tonne roadside (220,000 tonnes from England & Wales) that was paid by St Regis before their closure and the loss of this market (May 2006).

The wood panel board manufacturers (WPIF) currently pay more or less the same price as Drax.

— Egger pay between £9.50/£11 per tonne roadside;

— Kronospan pay £12/£13 per tonne with fortnightly payment.

These prices from the panel board makers have risen in the last 12 months. For a long period they were as low as £6 per tonne roadside. This has brought some relief to the hard pressed UK woodland owners, who are increasingly avoiding, postponing or are closing the gate on beneficial woodland management.

Chips

Delivered and chipped prices (seasoned) are approximately £45–£55 per tonne for seasoned quality woodchip, with 35 per cent moisture content or less.

Woodchip (wet) with unrestricted moisture content as cut, usually 45 per cent plus, are £21 to £25 per tonne delivered. In England, these supplies are mostly derived from arboricultural arisings and recovered wood (Slough Heat & Power uses 330,000 tonnes).

Short Rotation Coppice chip is also delivered at these prices where they are available (mostly in S Yorkshire & Notts), as are some forestry thinnings, in particular in Yorkshire.

The mid £20's delivered price is also the current offer price for the three MW dedicated biomass power stations which are in build or through planning (Llynfi (10MW, Green Ren En Ltd), Lockerbie (22MW Eon), Wilton (40MW Sembcorp) and this is the price on which their business plans appear to have been built.

There is some circumstantial evidence of woodchip delivered prices at £35 per tonne for some specifications in some locations. If seasoned, this would be a very poor price for the user; if wet, it would be a satisfactory price for the grower/harvesting company!

Pellets

Pellets at typically 11 per cent moisture are sold for between:

— £80 per tonne delivered (co firing scale eg Alcan at Lynemouth) and

— £130 to £200 (domestic scale—approx price charged by Welsh Biofuels).

There are four small scale UK pellet mills, plus Balcas Ltd (Northern Ireland), which has a capacity of 50,000 tonnes in Enniskillen and Balcas are planning to build a further mill (£20 million) in Invergordon with a capacity of 100,000 tonnes. They are leading the way in building the UK market, alongside the smaller regional manufacturers.

There is a strong importing base across the entire eastern seaboard of the UK with pellets coming into Port of Blyth (Transped), Teeside (Talloil), Hull and others. These pellets are coming from Germany, Sweden, Finland, Denmark, various former Soviet Baltic states, Russia and France. We have seen Norwegian "super pellets"and material sourced from as far afield as Australia and the Malaysian rubberwood industry.

Discussion

Moisture Content

1. Moisture content is critical for the smaller range of boilers which do not have moving grates. The capital cost of moving grates is more expensive (up to 50 per cent more). Moving grates are at present considered economic only for the larger installations (over 300KW).

2. Dry material is obviously preferable, but it comes at a considerable cost, both of double handling and of seasoning of up to 12 months in the forest, (but of only six weeks, if clamped in a certain way after chipping). An ingenious clamping technique has been developed for SRC by Coppice Resources Ltd and this process may be suitable for forestry chip.

3. Forced air, "sacrificial" and other drying methods are available at a cost. One company is looking at a model using waste streams to provide the heat for drying chip and pellet feedstocks derived from virgin forestry material. Drax is also pioneering this process using their own substantial quantities of waste heat.

Supply vs demand

1. £50 per tonne seasoned, chipped and delivered permits material to come forward out of our woodlands even with the current manual chain saw harvesting practises and with standard forwarding equipment, which is in common use throughout the country. This price would recover the majority of harvesting costs on most

sites, but this price is only available for small volume deliveries at the smaller installations. Current total UK woodchip volumes for these installations are less than 10,000 tonnes per annum at present. Even if this figure doubles every year, as we would like to see happening, it will take five years to reach the volumes currently being taken by Slough Heat & Power or to replace the lost tonnage of St Regis. Smaller installations alone cannot take up the volumes, which the Biomass Task Force and Forestry Commission would like to see coming forward in the short term, ie 2 million tonnes.

2. Boiler installations are progressing exponentially, because of the considerable savings that can now be achieved with current biomass running costs, against the current costs of oil and of gas (in some areas). Most installers have large numbers of live enquiries in the smaller range (100Kw -.5Mwth) which require the seasoned dry material. We also need to track those larger proposed projects which fall into the wet chip bracket. For example, these can take between 1,500 tonnes (Dursley, Glos) to 60,000 tonnes (NE England) per annum. We need to know when and how many projects are moving to the planning approval stage. Most of these potential projects are known to the Carbon Trust, their approved consultants (eg Future Energy Solutions/AEA Technology) and the local bioenergy dedicated organisation, like Thames Valley Energy, Northwoods, Highland Wood Energy, Marches Wood Energy, Yorkshire First, South West Woodfuels etc.

3. Although there is a growing market for seasoned material, we must recognise the commercial and volume constraints that do not exist. We must not back away from the challenge of being able to deliver from the forest industry (wet) chip, priced, in the mid £20's per tonne, including delivery cost, difficult though this challenge is likely to be.

4. In other countries (NE America, Denmark and Germany) this delivered price is achieved on a wide scale by using state of the art harvesting machinery. These are usually three man teams and the equipment capital cost, including road licensed trailers, will be in excess of £500,000 for each team. Outputs of 100 tonnes per day are common practice there with teams of this size. There is very little of such equipment currently in use in the UK and outputs of 20 to 40 tonnes are common outputs for our traditional harvesting teams with existing equipment.

5. There are many unmanaged woodlands with reasonable access and with good standing volumes, particularly in England, where the new state of the art equipment can operate efficiently. On these sites, we ought to be able to achieve the sort of prices currently being achieved in other countries. These exemplar countries use their biomass more effectively than we do and they achieve better per cent renewables than we are achieving in the UK(cf Denmark 27 per cent & UK 2.6 per cent).

Gaps and Issues to be Addressed

1. We need to establish with the four international manufacturers, exhibiting at the International Forestry Fair (21–23 September at Ragley, Worcs), what their operating costs are likely to be in the UK and get them marketing hard to a target number of new contractor teams (we suggest 80), in order to be able to make a significant contribution to renewable targets. Tilhill/JRiley have a brush harvester operating in the NW.

2. We need to ask FC Technical Development Branch to publish better guidance; a literature review of their publications shows that most of their best work (still valid, except for current cost updating) is over 15 years old and it does not study modern equipment and systems. We understand they are in discussion with partners to set up regional pathfinder projects which are managed on a day to day basis and are monitored and reported on.

3. The SRC current offer prices (£26 per tonne) are accepted by the existing SRC growers (Sir Ben Gill and others) who were induced to commit approx 3,000 hectares for failed Arbre project and who have no alternative outlet. Our view is that the £25 price is an insufficient incentive price to achieve extensive new hectares of SRC (or SRF) planted by landowners across the UK. We need to understand what the price per tonne should be to motivate landowners who are sitting on the fence and in order to get significant new planting moving. We suspect it will be somewhere between £30 and £35 per tonne. SRC attracts a one-off establishment grant of £1000 per ha and an energy payment of 45 euros per ha. There is discussion of a further payment of 60 euros per ha as a security payment and the Energy Crops Scheme is closed. Its successor is now under discussion at DEFRA.

4. This figure, wherever it ends up (say £35 per tonne for wet material), will then become a baseline target for cost effective harvesting from our woodlands. This higher price will then make us competitive in the volume market for the MW boilers as opposed to the small volumes for the KW boilers where we can currently compete.

5. We need to look carefully at the operational costs for reducing moisture content and the pros and cons of this. The Duchy of Cornwall are doing an interesting experiment this summer on whole tree harvesting being seasoned at roadside before chipping. 12 month pre-cutting and seasoning is a heavy fiscal burden for the woodland owner.

6. We need to classify varieties of sites and the potential woodfuel thinning volumes to relate better with the reality on the ground. Too much of FC work so far has been desktop, making insufficient allowance for recoverable branchwood actually obtained and they are the first to agree this.

7. We need to look carefully at ability to pay for all categories and sizes of boiler, while understanding always that it is demand that drives price. Prices are always determined at the margin. We are quite clear that woodchip prices will rise gradually above £50 per tonne for these KW small installations. Specific issues that need to be faced are sensible delivery modules, mechanisms and equipment, ie better systems than farm trailers and conveyors.

8. We are less clear where affordability actually lies for the MW installations. These are usually 10MW upwards, in order to deliver sufficient economies of scale. Our expectation is that the mid £30's per tonne price is attainable. However there is no point in aiming to produce at this higher rate if it is unaffordable at current wholesale grid price. If that is so, then we need to plan to stay with the mid £20's per tonne price, where the market currently is.

9. Having got specific proposals, supported by evidence, the idea of a progressive thinning grant should also be pursued. This needs to access RDPE/EU funds and also include the "public benefit" category of uneconomic sites. We need to show other EU exemplars (ie Finland and Eire) to support this case.

10. We must both develop a better consensus on ROCs and also on the Climate Change Levy and EU Emissions Trading. ROCs are the tricky carrot which is on offer; CCL/ET is the really big stick to deliver change. They interact and it is unlikely that they will be allowed to remain as they are now. Many politicians and civil servants consider ROCs have not delivered as expected, though this Government is both wedded to and totally committed to retaining the principle. Can ROCs be made suitable for biomass or should other and better mechanisms be considered as better instruments of policy? This may not be in the best interests of meeting carbon targets when the UK is falling so badly behind our EU partners. Nor may they be in the best interests of the growers and our harvesting teams trying to achieve critical mass.

22 June 2006

Memorandum by Increment Ltd

To what extent has the imposition of biofuel obligations by Member States reduced the biofuel industry's need for fiscal support?

1. No country actually has a biofuels obligation up and running in the EU. In fact the UK was the first to announce a biofuel obligation with the Renewable Transport Fuel Obligation (RTFO) in November 2005. Many EU countries have set national targets but this is not technically the same as an obligation.

2. An obligation is the most sensible way to create and support a market that is based on public goods (in this case primarily environmental improvements) as they tend to be irrational markets, which biofuels currently are when you compare the production costs to that of fossil fuels. Most countries have tried to stimulate a biofuel industry through tax breaks which is an unstable way of doing so as a tax break can be removed, particularly if there is a change in Government. A prime example of this is Germany, where the German biofuel market has been radically altered by the announcement of the removal of a tax break to be replaced by an obligation system following a change in Government.

3. This means an obligation is the most market orientated way of creating a biofuel market. The reason for this is because it pretty much removes the intervention of Government.

4. An obligation also means a Government does not need to offer fiscal incentives through tax breaks to stimulate the market, as the market is obligated to achieve the target or face a penalty. In fact, an obligation based on a biofuel product that costs more to produce than fossil fuels is fiscally positive to Government as it increases the VAT it receives. The higher cost of production will be passed down the chain to the consumer, which on the face of it would be seen as a political no go area given the consumer reaction and propensity to strike when fuel prices rise. However, a 2 per cent biofuel obligation rising to 5 per cent will have a limited impact on the price of fuel at the pump, especially when compared to the daily volatility the market has come to see in oil prices and therefore pump prices. This can be show using the following table:

Impact on Pump Prices of an Obligation

	Petrol	*Bioethanol*	*pence per litre* 1%	2%	5%
Base Cost	30	35	30.05	30.10	30.25
Distribution Cost	5	10	5.05	5.10	5.25
Duty	48.32	48.32	48.32	48.32	48.32
VAT	14.58	16.33	14.60	14.62	14.67
Price per Litre	97.90	109.65	98.02	98.14	98.49
Difference to petrol		11.75	0.12	0.23	0.59

Source: Increment, HGCA Industry Sources.

5. It is important to note that production costs move greatly for both petrol and bioethanol depending on the input cost, and that this is just a worked example. As an illustration however, it clearly shows the impact of an obligation on pump prices.

6. Clearly one of the key requirements is that the buy-out or penalty of not meeting the obligation is greater than the cost of meeting the obligation. The UK has set the buy-out at 15 pence per litre which at present production economics is large enough to encourage biofuel incorporation. Taking into consideration that bioethanol currently has a 20 pence per litre tax break until 2008–09 at least, in effect means that the penalty is actually 35 pence per litre.

7. Take a fuel supplier, who supplies 100,000 litres of petrol fuel. In 2010, they will be obligated to supply 5 per cent with biofuel which equates to 95,000 litres of petrol and 5,000 litres of bioethanol. Under current production economics, a litre of petrol costs around 35 pence to produce and distribute, while bioethanol would be nearer 45 pence.

Scenario 1:

FUEL SUPPLIER MEETS THEIR OBLIGATION:

	Volume of Fuel Litres	*Cost of Production* £
Petrol	95,000	7,915,400
Bioethanol	5,000	366,600
Total		8,282,000

Source: Increment, HGCA, Industry Sources

Scenario 2:

FUEL SUPPLIER DOES NOT MEET THEIR OBLIGATION AND BUYS-OUT:

	Volume of Fuel Litres	*Cost of Production* £
Petrol	100,000	8,332,000
Bioethanol	5,000	75,000
Total		8,407,000

Source: Increment, HGCA, Industry Sources

8. The two scenarios clearly show that a fuel supplier who decided to only sell pure petrol and buy-out their obligation will have greater costs than a company which meets its obligation. In fact, the price of bioethanol can rise to nearly 70 pence per litre to produce and distribute assuming all other costs remain the same, before the buy-out price no longer works. Even if the tax break for bioethanol is removed then at current production economics the fuel supplier would still be better off meeting their obligation.

9. An obligation will also allow an easier way of measuring the environmental superiority of the fuel through carbon accreditation. The primary reason for this is because the obligation can be set at a particular part of the fuel chain, in the UK's case this is likely to be fuel distributors. By doing so, it will be easier to check what volume of biofuels are entering the market and also where they have come from. It would also make sense to stipulate that all biofuels have to be fully accredited so that a carbon number can be attached to each litre of

biofuel. This would also link in with carbon trading. A biofuel market based on tax breaks is arguable less easy to monitor and control as there are multiple points along the fuel chain where biofuels can enter the market.

10. The system of an obligation will also allow the facilitation of carbon trading, something that tax breaks cannot do as there is no quantity required to be blended and therefore no base level to monitor from. By placing an obligation on companies at a particular point in the fuel chain, companies can choose whether to achieve their targets or to buy-out (pay a penalty). In the UK for example, the RTFO will allow the trading of Rentable Transport Fuels Certificate (RTFC) where companies that use more biofuel than they are obligated to, can sell the surplus to a company that uses too little. This will fit in well with both the UK's and the EU's desire for Emissions Trading to help meet their Kyoto targets.

30 May 2006

Memorandum by The Integrative Cell Biology Laboratory, Durham University

Introduction

The problem

Crop plants offer the potential for industrial-scale renewable energy supplies, as coal and mineral oil supplies become depleted and prices rise. The political and economic pressures to develop sustainable sources of energy, to meet the demands of an increasing world population with ever greater demands for energy, are intensifying. Plants that produce energy-rich natural products such as oils and starches represent important contributors to developing a sustainable energy supply. Oils can be converted to biodiesel, a product that can be added to conventional diesel fuel; and starches can be converted to bioethanol, a petrol substitute. These products are "carbon neutral"—in other words, they do not contribute to global warming when they are burned, as they are made in the plant from carbon dioxide taken up from the air. Any CO_2 that is released back into the atmosphere is only replacing that taken out to make the oils and starches in the first place. Plants can also be burned directly as "energy crop", but the plant biomass is less energy dense than oils or ethanol.

A key to the commercial uptake of this technology is the price of biofuels. At the moment they are relatively expensive. There is also a need to produce energy crops on diminishing acreages, as land use becomes limited due to population growth. This points to a need to increase the yield of oils and starches in crops, to maximize productivity and reduce the unit cost. Our research has identified genes in plants that act as "molecular switches", to activate starch and oil production in seeds. These switches can also be used to activate oil and starch production in plant tissues that normally don't accumulate these products. This opens the possibility of increasing crop yield, either through conventional plant breeding techniques, or, potentially, through the use of GM technology.

Starch and oil production

US is the biggest starch producer (51 per cent of world output), and the EU is second largest at 17 per cent (ca. €3 billion). The EU supplied around 32 per cent of world native (ie chemically unmodified) starches in 2000, making it the leading supplier. It also exports ca. 30 per cent of the world modified starches, and 13 per cent of total glucose and isoglucose volumes. Combined unmodified and modified starch exports by the US are less than 40 per cent those of the EU, even though it is a leading producer. The EU imported in 2000 ca. 20,000 tons of native (unmodified) starches, and the US imported ca. 150,000 tons, though the EU also imported ca. 30,000 tons of tapioca (cassava) starch from Thailand. In maize, by-products (protein, oil, fibre) are also valuable, and contribute significantly to the value of the overall economics of starch production. Potato economics is determined largely by the starch component, as the principal by-products (protein, fibre) are of low value.

The oleochemical uses of seed oils include the manufacture of polymers (eg nylon 11-11, which is produced from castor oil), lubricants and renewable fuels such as biodiesel. Legislative pressures (such as carbon credits) are likely to boost the market for use of seed oils as renewable resources, particularly in the fuel and engine lubricant sectors. For example, there is increasing demand for seed oil-derived polymers as carriers for engine lubricants used in high temperature situations.

Biofuels offer ecological advantages in resource conservation and climate protection as compared to fossil fuels. However, biofuels are currently more expensive to produce than fossil fuels. Regardless of the oilseed crop or the use of the derived oils, there is a need to increase the yields of seed oils in order to deliver economic benefits, and CGT is well positioned to provide the oilseed industry with proprietary tools to achieve this strategic goal.

Our Research

We have developed strategies for increased starch and oil production in plants, using genetic and DNA microarray techniques. Of particular interest is the fact that we have identified a gene mutation in the experimental weed Arabidopsis thaliana, that leads to very high levels of starch production in vegetative tissues (the hypocotyl and stem). Starch normally only accumulates in these tissues to very low levels. Storage oil also accumulates. Arabidopsis is a member of the same family as the brassicas, including oilseed rape and turnip. We described the mutant as the turnip1 mutant of Arabidopsis.

Under normal circumstances, starch and oil accumulate to significant levels only in the seed, as part of the normal developmental process that prepares the seedling for germination. We have discovered that a mutation in the promoter (the regulatory sequence) of the gene encoding a transcription factor, known as *Leafy Cotyledon1* or LEC1, leads to the unusual activation of its expression in vegetative parts of the seedling after germination. In other words, the normally tight repression of LEC1 expression in tissues other than the seed is lost. Associated with this is a phenotypic (developmental) and biochemical change to the seedling, resulting in the swelling of the seedling hypocotyl, and an abnormal accumulation of starch and storage lipids in the swollen structure.

Link with other research

The *Leafy Cotyledon* class of genes (LEC1 and LEC2 and FUSCA3, FUS3) have been identified as key regulators of late embryogenesis (Parcy *et al*, 1997; Lotan *et al*, 1998; Luer*B*en *et al*, 1998; Stone *et al*, 2001). LEC1 encodes a transcription factor subunit related to the HAP3 subunit of the CCAAT binding factor family (Lotan *et al*, 1998) whilst FUS3 and LEC2 encode B3 domain transcription factors (Luer*B*en *et al*, 1998; Stone *et al*, 2001). Loss-of-function mutations in each of these genes result in embryos that are desiccation-intolerant and are defective in the production of storage products. The mutant embryos also initiate post-germination processes, including premature activation of the shoot apical meristem, indicating a role for these genes in inhibiting premature germination (Meinke *et al*, 1994). The cotyledons of the mutants show leaf-like features such as the presence of trichomes, suggesting that these genes also function in the determination of organ identity.

As well as being key regulators of late embryogenesis, LEC genes have been shown to regulate aspects of early embryo development in plants. The suspensor, a file of cells that connects the embryo to the maternal tissues of the seed, require LEC proteins to develop correctly. This is shown by the fact that the suspensors of lec mutant embryos develop abnormally, and in the case of lec1-2 fus3-3 double mutants the suspensor can continue to proliferate and form secondary embryos, suggesting that LEC genes may act to maintain suspensor cell fate and inhibit the embryonic potential of the suspensor.

LEC1 expression is normally limited to embryogenesis whilst LEC2 and FUS3 are also expressed at low levels post-germination, in the seedling. Ectopic expression of LEC1 or LEC2 under the control of the CaMV 35S promoter has been shown to be sufficient to induce embryonic characteristics in vegetative tissue, suggesting that these genes regulate embryogenic competence (Lotan *et al*, 1998; Luer*B*en *et al*, 1998; Stone *et al*, 2001).

Significance of our research

Previous work then has shown that over-expression of LEC1 in transgenic Arabidopsis plants can lead to the formation of embryos on vegetative structures such as leaves, but this is often a lethal phenomenon for the plant, and this so-called "somatic embryogenesis" as a consequence of strong over-expression of LEC1 is a low-frequency event. The somatic embryos that do form have been noted to accumulate storage products such as oils and protein, though not starch in large amounts.

We speculate that the difference between the effects of transgenically over-expressing LEC1, and over-expression due to the observed promoter mutation in the turnip mutant, is due to differences in the level of over-expression, or possibly also the tissues in which over-expression occurs. This opens the opportunity to regulate the expression of LEC1 and, potentially, related genes in crop plants to increase the yields of starch and other storage products such as oils. This has the potential to increase crop productivity and reduce costs, and so improve the economic viability of biofuels as a renewable energy source.

Our research has been provisionally accepted for publication in the peer-reviewed journal *Plant Physiology* (Casson and Lindsey), and the manuscript is being revised before final acceptance.

We have gone on to identify other genes that, when over-expressed, lead to a similar activation of storage product accumulation in non-seed tissues (SA Casson and K Lindsey, unpublished work). These genes therefore also represent valuable tools to increase crop productivity for starch and oil.

26 June 2006

Memorandum by Lyondell

Introduction

Lyondell Chemical Company is one of the world's largest chemical companies with consolidated 2005 revenues in excess of 18 billion US dollars and manufacturing assets worldwide. Employees number around 10,000. Lyondell is a major producer of fuel ethers for use as clean burning motor gasoline (petrol) components. This includes bio-ETBE: (ethyl tertiary butyl ether) produced from renewable bioethanol feedstock. Lyondell's presence in the United Kingdom comprises a major manufacturing facility at Stallingborough, Lincolnshire, and an office in Maidenhead, Berkshire.

As a recognised leader in the field of clean burning transport fuels, Lyondell has advised extensively on the use of fuel ethers in gasoline to minimise harmful emissions, while extending tight supplies of finished gasoline. Since the Company's initial production of fuel ethers in the 1970s, Lyondell technologists have provided support and consultation to governmental authorities on transport fuel emission reductions and, more recently, on biofuels policy and regulation. Lyondell is a member of the European Fuel Oxygenates Association (EFOA), a CEFIC sub-group, a member of the UK Environmental Industries Commission (EIC), a member of the Renewable Energy Association (REA), and an associate member of the All Party Parliamentary Climate Change Group.

Summary

This memorandum sets out Lyondell's response to the questions raised by the Committee Lyondell believes that:

1. Member State policy and regulation should balance support of national interest with an over-arching objective of developing a vibrant and free flowing biofuels market within the EU. (paragraph 1.1)

2. Excise tax relief is a "carrot" to attract investment and flexible obligation the "stick" to secure widespread compliance (paragraph 2.1). Application of excise tax relief can lead to market fragmentation and constraint of trade if qualified by specific national production or consumption locations. In general, flexible obligation is a more appropriate means of fostering growth within a freely traded and open market.

3. Any "buy-out" price applied to the obligation schemes should be set at a significant premium to the basic obligation cost in order to provide confidence to the investor community. (paragraph 2.2)

4. Flexible obligations can offer an appropriate incentive to widespread biofuel consumption without recourse to onerous price inflation to the consumer. (paragraph 2.3)

5. Flexible obligation schemes may not be enough to promote investor confidence and that a protracted period of excise tax relief may be required. (paragraph 3.2)

6. The preferred route to incorporate bioethanol within the gasoline pool is through low cost chemical conversion to bio-ethers, of which bio-ETBE is the most prominent. In respect of the bio-ethers sector, which currently consumes nearly 80 per cent of bioethanol destined for the EU gasoline sector, production efficiency is greatest in The Netherlands and France. (paragraph 4.1 and 6.6)

7. Unconstrained EU access to global markets is of paramount importance in building a sustainable and vibrant free market, and in acting as an essential catalyst to the improvement of EU production efficiency and market liquidity. (paragraph 5.2)

8. The most pressing need is for an EU drive to harmonise and simplify biofuels regulation across the EU, and to act against initiatives which unreasonably constrain trade and free flow of products within the EU. (Paragraph 7.1)

9. Future biofuels policy and regulation should be closely co-ordinated with other relevant EU policy. Local air quality has benefited significantly since the introduction of fuel ethers in the 1970's, and could be further improved by the incorporation of bio-ethers to reduce toxic emissions. (Paragraph 7.4)

1. *Biofuel Targets: Which Member States have been most succesful in meeting their biofuel targets: and how have they achieved this?*

1.1 The EU statistics of Member State market penetration versus national indicative targets sets out the current position. (Appendix 1). However, Lyondell recommends that a number of additional factors need to be considered in order to generate an accurate assessment of Member State progress to date, and the potential for further advances within the EU reference period leading up to, and beyond 2010. These factors include the following:

— A systematic comparison of the degree of challenge posed by Member States in setting their national indicative targets, and of the timeframe committed to their attainment.

— The extent to which delivery of national indicative targets can reasonably be met from local feedstock and existing production capacity, as distinct from dependence on volatile global markets or the timely approval of capital investment.

— Political profile and intervention in providing support at a Member State level, and the extent to which these practices are influential in either promoting biofuels across the EU as a whole, or which serve to constrain cross-border trade and co-operation within the EU. Lyondell believes that Member State policy and regulation should balance support of national interest with an over-arching objective of developing a vibrant and free flowing biofuels market within the EU.

1.2 Notwithstanding the above call for a sufficiently broad assessment of progress to date, additional specific comments are provided below in relation to Germany, France, Sweden and the UK, which have delivered differentially against national indicative and EU Directive targets.

1.3 Germany

Germany is a good example of a Member State operating a biodiesel market supported by attractive levels of excise tax relief. In such instances, the state of relative market maturity, and the familiar administration and regulation associated with it, has eased the introduction of programmes in support of EU Directive policy and targets.

Further reference to the German market reveals that successful delivery against national indicative targets has been achieved almost exclusively (85 per cent) within the diesel sector. It should be noted that the German federal government has recently proposed legislation to reduce excise tax relief applied to biodiesel effective from the autumn of 2006, thus lowering significantly the economic incentive for aggressive market growth in future years.

In the gasoline sector, Germany has also made early progress through the application of excise tax relief on biofuels at the last bulk distribution point under excise control. Qualification for tax relief has not been restricted to German supply source, thus facilitating the development of an unrestricted market and product flow between EU Member States.

A recent proposal of legislation by the German federal government has further clarified future government policy on biofuels, which will principally take the form of a flexible obligation scheme tied to an overall quota for transport fuels, and with minimum separate quotas for substitution in diesel and gasoline markets. Significantly, the application of excise tax relief is likely to be removed for biofuels in the gasoline sector from January 2007, with the exception of E85, which will retain its tax relief status until 2015. In taking this policy direction, Germany is adopting an increasing trend by Member States for the stimulation of market growth by flexible obligation, and application of penalties for non-compliance. Lyondell is generally supportive of the initiative, but opposes the inclusion of separate quotas for the gasoline and diesel sector. We believe that the relative growth of biofuels within these separate sectors should be guided by market forces and technology development, and not by government imposition.

In spite of the progress already made, we believe that significant further market penetration could have been made, particularly in the gasoline sector, by the introduction of simplified administration of regulation and biomass certification, consistently applied by regional customs offices. Lyondell has encountered significant regulatory and administrative obstacles to successful growth in the German market.

1.4 France

France is unquestionably the most politically committed Member State to its biofuels programme, and has set ambitious substitution targets which exceed EU Directive targets with respect to both level and term of biofuel incentives. The French government has demonstrated consistent political support to a nationally specific programme from the highest level. Such political support is accompanied by a series of government tenders under which excise tax relief is available until at least 2011, but is allocated only to production from specific manufacturing sites. Lyondell welcomes the level of commitment generated by this scheme, but opposes the restricted qualification for tax relief aligned to selected manufacturing locations. Member State policy and regulation should at all times be consistent with an open and free flowing EU market. We believe that this is most beneficially achieved by application of tax relief at the point of refinery or approved terminal blending facility, without restriction to Member State source or production.

In parallel with the tender process, a so-called polluter tax (TGAP) has been introduced as a flexible obligation scheme, and may be expected to completely replace excise tax relief when sufficient investment and market momentum has been satisfied.

It is worth noting that France has a favourable coalition of political and industrial interests which is unprecedented among Member States. The agricultural lobby has traditionally received strong support from a government which is faced with growing pressures of EU CAP reform. Both parties have rallied behind the promotion of biofuels as a means of easing economic pressures and safeguarding jobs within the agricultural sector.

Support from the oil industry has been aided in the form of powerful backing by the largest French oil company Total, which has helped to champion the cause of bio-ETBE, an ether derivative of bioethanol produced by the company in substantial quantities. When blended into conventional gasoline (petrol) bio-ETBE possesses considerably superior properties to bioethanol with respect to technical and emissions performance. Most significantly, gasolines containing bio-ETBE are completely compatible with vehicle and fuel distribution systems, unlike bioethanol which requires dedicated blending and distribution systems and operation (see response to question 6). Total has also strongly promoted biodiesel of which it is a major French producer.

Lyondell has experienced an eight-fold increase in its French bio-ETBE business since initial production in 2004.

1.5 Sweden

Sweden has adopted a more radical energy substitution policy of bioethanol imports directed towards E85 blends and flexi-fuel vehicles in a programme supported by government, oil and automotive industries. Tax incentives are applied to subsidise commercialisation of vehicle technology, and a number of local incentives have been introduced to bolster demand.

1.6 United Kingdom

In spite of a low level of substitution, and the delayed introduction of government policy scheduled for 2008, the UK is nevertheless significant in introducing a policy which integrates essential principles of carbon assurance and sustainability with a free market flexible obligation scheme (RTFO). Successful implementation of the policy will require considerable attention to the development of robust and internationally recognised mechanisms for "well to wheel" product differentiation and valuation. However, the policy outline provides imaginative and relevant leadership to future EU policy direction.

In its current form, we believe that UK policy is inadequate inasmuch as the "buy-out" price tied to RTFO is an insufficient driver for consistent commitment by the oil industry. The investment community and biofuel component suppliers are therefore exposed to significant risk.

2. *Economic Instruments. What financial instruments or incentives have proven to be most effective in meeting national targets for biofuel market share?*

2.1 Almost all Member States have used the option of excise tax relief to stimulate the introduction of biofuels at a national level. Applied constructively, excise tax relief should be viewed as "a carrot" to attract investment, the objective of which should be to provide solid support for efficient EU capacity capable of satisfying international standards of sustainability and carbon assurance. A basic level of investment will be necessary to balance EU dependence on supply from volatile global markets. In comparison, the flexible obligation mechanism can be viewed as "the stick" to secure widespread compliance, but can also act to stimulate investment if the "buy-out" price acts as a sufficient disincentive for opportunistic oil industry withdrawal.

2.2 Lyondell strongly recommends that any "buy-out" price applied to the scheme should be set at a significant premium to the basic obligation price in order to provide confidence to the investor community. Any oil industry withdrawal from the scheme, irrespective of cause or duration, will be interpreted by critics as a betrayal of a government commitment to the lowering of GHG emissions, and an abdication of a policy to reduce dependence on fossil fuels.

2.3 Lyondell supports the increasingly widespread introduction of flexible obligation schemes, especially since they are consistent with the principle of open markets and product free flow. In view of the recent and limited introduction of such schemes, it is clearly premature to judge their success in promoting biofuels penetration.

However, we believe that flexible obligations can offer an appropriate incentive to widespread biofuel consumption without recourse to onerous price inflation to the consumer.

2.4 Flexible obligation schemes can incorporate essential principles of carbon assurance and sustainability, if safeguarded by robust methodology and practical administration. We support the view of the REA that a sophisticated EU system for quantitative certification of carbon credits should be delayed until such time as the underlying biofuels market has attained a sufficient level of maturity and liquidity.

2.5 R&D support may also be appropriate in support of efficient, second generation biofuel technology. Lyondell particularly welcomes the development of lignocellulose technology to provide lower cost EU bioethanol feedstock for the production of bio-ethers. Bio-ethers account for approximately 80 per cent of bioethanol destined for the EU gasoline market today.

3. *Biofuel Obligations. To what extent has the imposition of biofuels obligations by Member States reduced the biofuel industry's need for fiscal support?*

3.1 As outlined in our response to questions 1 and 2, Lyondell favours the introduction of flexible obligation schemes to incentivise widespread growth of biofuels substitution across the EU. We believe that such mechanisms are consistent with the principles of an efficient free market, and allow operational and market fluctuations to be captured by application of trading credits within a liquid commodity market.

3.2 Lyondell believes that the introduction of flexible obligation schemes may not provide sufficient predictability in the scale and consistency of biofuels market consumption to underpin EU investment as an offset to import dependence from volatile global markets. We believe that a protracted period of excise tax relief may be required to run in parallel with flexible obligation until investor confidence and commitment has been demonstrably satisfied. Excise tax support available under such a scheme should be set at a level designed to reward efficient new investment, and should specifically not subsidise inefficient energy consumption and carbon profile.

4. *Production of Biofuel. Which countries have the lowest biofuel production costs and why? What steps have Member States taken in research and development to reduce the production costs of biofuels?*

4.1 Lyondell is unable to provide a comprehensive response to the initial question, which requires detailed consideration of integrated cost on a "well to wheel" basis. However, the following comments may add specific perspective:

- The preferred route to incorporate bioethanol within the gasoline pool is through low cost chemical conversion to bio-ETBE. This confers superior technical and economic performance on gasoline compared with direct blending of bioethanol.
- With respect to the bio-ethers sector, which currently consumes nearly 80 per cent of bioethanol destined for the EU gasoline sector, production efficiency is greatest in The Netherlands and France. This is primarily the consequence of the large capacity available from two units which are capable of delivering 685,000 tonnes and 710,000 tonnes respectively (as bio-ETBE). In general, bio-ethers are produced in large scale, efficient units with access to navigable water and bulk distribution infrastructure. We recommend any review of costs and efficiencies, and by association energy consumption and carbon dioxide emissions, should extend to considerations of total delivery cost, and not just production cost.
- A sophisticated evaluation of biofuels industry cost should include consideration of comparative costs per unit reduction in carbon dioxide emissions. In addition, account should be taken of the considerable economic penalty incurred by direct blending of bioethanol within existing specifications and commodity gasoline distribution systems, when compared with bio-ethers. As a consequence, an analysis of production capacity and product mix may be influential on overall cost review.

4.2 In general terms, Lyondell is aware of a number of Member State R&D programmes directed towards process development and increased efficiency, particularly in the field of second generation technology. However, we recommend direct contact with the relevant EU and Member State Science and Technology departments and institutions for a comprehensive review.

5. *Trade in Biofuel. Which Member States import the greatest volume of biofuel and why? What impact have imports of cheap biofuel had on domestic production in the European Union?*

5.1 We believe that official EU statistics should offer the best source of reliable data in response to the initial question posed.

5.2 In response to the second part of question 5, and with specific relation to the gasoline sector, import availability and price from the principal source of Brazil have fluctuated significantly according to domestic Brazilian demand and world energy prices. The bioethanol market is relatively illiquid, and is poorly developed as a reliable trading platform. Nonetheless, Lyondell believes that unconstrained EU access to global markets is of paramount importance in building a sustainable and vibrant free market, and in acting as an essential catalyst to the improvement of EU production efficiency and market liquidity. In general, Member States which allow the import of lower cost denatured (as opposed to undenatured) bioethanol purchase the greatest quantities outside the EU.

6. *Technical Barriers. What are the technical requirements that have acted as barriers to the introduction of biofuel into national fuel markets?*

6.1 Lyondell's response to question 6 is confined to the gasoline sector in which it has specific experience and expertise.

6.2 The current EU gasoline standard EN228 was developed in 2003–04 as a result of extensive co-operation between oil, automotive and fuel additive companies operating in Europe. It seeks to offer a framework within which the design and properties of EU gasoline allow optimization of efficiency between refinery operation and vehicle performance. EN228 includes provision for the blending of bioethanol to a level of 5 per cent volume maximum, and bio-ethers to a level of 15 per cent volume.

6.3 The challenge faced by the incorporation of bioethanol into conventional (hydrocarbon) gasoline under EN228 is one of fundamental molecular structure, which is substantially different to that of its host. Bioethanol is substantially miscible with conventional gasoline, but its molecular form sits uncomfortably in the company of gasoline, and is prone to rejection. In practice, this manifests itself in two principal deficiencies as a gasoline component:

- High sensitivity to bioethanol extraction from gasoline into the water phase normally associated within commodity gasoline distribution systems. Consequences can include gasoline volume loss and diminished quality (potentially falling outside specification), substantial growth and contamination of waste water requiring disposal, corrosion of metallic components, and a potentially catastrophic effect on vehicle drivability.
- Disproportionate increase in gasoline volatility relative to the base gasoline. Such an increase in volatility requires expensive and technically challenging adjustment to gasoline design and production in order to meet prevailing gasoline standards. In general, an increase in gasoline volatility can be directly correlated with increased emissions of volatile organic compounds (VOC's), which are precursors to low level ozone and air quality deterioration.

6.4 There are two practical solutions to the above consequences of molecular disparity between bioethanol and gasoline:

- Customised production of low volatility base gasoline, and creation of a dedicated distribution system for the exclusive supply of gasolines containing bioethanol, as practiced in parts of the US. This solution is economically unattractive from a capital and operating cost perspective, and relies on an inefficient and energy intensive mode of distribution which is contrary to the fundamental EU objectives of energy conservation, reduced carbon dioxide emissions, and improvement in air quality.
- Low cost conversion of bioethanol to bio-ethers. Almost 80 per cent of bioethanol destined for EU gasoline is converted in this way to produce products whose molecular characteristics are substantially similar to those of conventional gasoline, and whose technical properties and emissions performance are considerably superior to those of both conventional gasoline and bioethanol. Bio-ethers are completely compatible with conventional distribution systems.

6.5 A review of the EU Fuel Quality Directive is currently in the consultation phase, and is scheduled for completion during the second half of 2006. In consideration of the above comments, Lyondell strongly recommends that relaxation of gasoline volatility specifications sought by some bioethanol industry participants is specifically rejected in the interests of air quality, and to avoid market distortion between competing products and technology.

6.6 Lyondell believes that bio-ethers represent a clearly attractive and rapidly available source of biofuel for the EU market. There are a number of fundamental technical obstacles to the direct blending of bioethanol into the commodity gasoline pool. However, all of these obstacles can be removed by straightforward chemical conversion to bio-ethers, of which bio-ETBE is the most prominent Nearly six million tonnes of European bio-ethers production can be made available at low cost and short lead-time by conversion of existing fuel ethers capacity: Approximately 1.8 million tonnes of this capacity has already been converted.

6.7 In spite of the fundamental technical obstacles affecting bioethanol as a gasoline component, we continue to support the development of second generation technology as a means to provide low cost, competitive feedstock to the bio-ethers industry, and acknowledge the opportunity of E85 and flexi-fuel technologies for the application of local fleet operations served by controlled and dedicated distribution systems.

7. *Looking ahead. Should the European Union take further action to promote biofuel production; and if so, what action is required?*

7.1 Review of the EU Biofuels Directive 2003/30, currently under way, provides an opportunity to strengthen policy in support of biofuels development at EU and Member State level, and to stiffen penalties for non-compliance. Nonetheless, it is Lyondell's view that the most pressing need is for an EU drive to harmonise and simplify biofuels regulation across the EU, and to act against initiatives which unreasonably constrain trade and free flow of products within the EU. Examples requiring attention include the following:

— Inconsistent requirement and uncoordinated application of customs documentation for biofuels and components under excise control.

— Inconsistent and uncoordinated certification of biomass, and valuation of energy substitution between—and even within—Member States.

7.2 The above measures would facilitate unconstrained market growth and, by association, should promote EU production. Lyondell believes that priority needs to be placed on measures which ease market development, and permit investment to be made in efficient technology and production for the benefit of the EU as a whole.

7.3 We would also support active EU engagement in the independent assessment of methodology, and definition of policy and regulation associated with internationally recognised schemes for sustainability and carbon assurance.

7.4 Future biofuels policy and regulation should be closely co-ordinated with other relevant EU policy. Local air quality has benefited significantly since the introduction of fuel ethers in the 1970's, and could be further improved by the incorporation of bio-ethers to reduce toxic emissions.

12 June 2006

Appendix 1

EU STATS ON NATIONAL INDICATIVE TARGETS FOR BIOFUEL

Member State	*Consumption (%, energy content)*			*Targets (%, energy content)*				
	2003	*2004*	*2005 (ref. value 2%)*	*2006*	*2007*	*2008*	*2009*	*2010 (ref. value 5%)*
Austria	0.06	0.06	2.5	2.5	4.3	5.75	5.75	5.75
Belgium	0	0	2	2.75	3.5	4.25	5	5.75
Cyprus	0	0	1					
Czech Republic	1.09	1		3.7 or 1.52	4.67			5.55
Denmark	0	0	0	0.1				
Estonia	0	0	2	2				
Finland	0.11	0.11	0.1					
France	0.67	0.67	2	2	3	4	5	5.75[1]
Germany	1.21	1.72	2					5.75
Greece	0	na	0.7	2.5	3	4	5	5.75
Hungary	0	0	0.6					4

[1] French government information sources report the following targets: 5.75 per cent in 2008, 7 per cent in 2010 and 10 per cent in 2015. It appears that these revised targets were adopted too late to be included in France's most recent report to the Commission.

Member State	*Consumption (%, energy content)*			*Targets (%, energy content)*				
	2003	*2004*	*2005 (ref. value 2%)*	*2006*	*2007*	*2008*	*2009*	*2010 (ref. value 5%)*
Ireland	0	0	0.06	1.14	1.75	2.24		
Italy	0.5	na	1					2.5
Latvia	0.21	0.07	2	2.75	3.5	4.25	5	5.75
Lithuania	0	0.02	2					5.75
Luxembourg	0	na	0	2.75				5.75
Malta	0.02	0.10	0.3					
Netherlands	0.03	na	0	2	2			5.75
Poland	0.49	0.3	0.5	1.5				5.75
Portugal	0	0	2					
Slovakia	0.14	0.15	2	2.5	3.2	4	4.9	5.75
Slovenia	0	0.06	0.65	1.2	2	3	4	5
Spain	0.35[2]	0.38	2					
Sweden	1.32	2.28	3					5.75
UK[3]	0.03	0.04	0.2			1.7	2.6	3.5
EU25	**0.5**	**0.6**[4]	**1.4**					

National indidicative targets: Members States were required to set 2005 targets in 2004 and are required to set 2010 targets in 2007. There is no requirement to set for intermediate targets.

Memorandum by The Margarine and Spreads Association

I write with regard to the House of Lords Inquiry into the European Commission's EU Strategy for Biofuels. As an industry we are fully supportive of the objectives of the Government and European Commission in this area. We would however like to take this opportunity to raise our key issue of "crowding out" for the margarine and spreads sector in relation to the current policy. This will also impact other food sectors within the UK, due to the significant increase in demand for land.

A wide range of raw materials can constitute feedstock supplies for the biodiesel industry however a number of factors have resulted in rapeseed oil being the main supply and therefore resulting in crowding out for our industry. The factors of key concern are as follows:

— The current biodiesel standard (EN 14214), which excludes most oils except rapeseed oil. A review of this standard would allow the use of oils other than rapeseed oil.

— The underuse of by and waste oil products. A review of the current legal framework regarding animal fats and by-products would facilitate the use of these materials for biofuels production.

Fuel tax exemptions and mandatory biofuels incorporation carry important implications throughout the entire food, feed and non-food chains and are both possible sources of distortions. As a consequence the demand for rapeseed oil has increased dramatically, as has the land space required to grow it. Our estimates are that 13.6 million hectares of land are required for target compliance production in 2010. Given that total arable land in EU is c. 82 million hectares, 13.6 million hectares represents approximately 16.5 per cent of total arable land within EU. This estimate of 16.5 per cent of arable land is substantially higher than compulsory set aside of 10 per cent and therefore the entire biofuel production can not solely take place on set aside land. It will therefore "crowd out" food production.

As background, rapeseed oil is the preferred oil for the margarine and spreads sector for a number of reasons. Firstly, it provides the desired properties for consumer acceptance and due to the unsaturated nature of the oils the margarine and spreads industry has played a positive role in the nation's health by reducing saturated fat intake. Secondly, rapeseed oil can be guaranteed as GM free. This is also the reason why it is used by the biofuel industry as currently, there is little consumer acceptance for GM biofuel in UK.

[2] Revised figures from the figure in the biomass action plan, taking into account new information from the Spanish authorities.

[3] UK figures for 2005 onwards assume 50-50 split between ethanol and biodiesel.

[4] Assuming that consumption in Greece, Italy, Luxembourg and Netherlands was the same in 2004 and 2003.

Executive Summary

1. The Margarine & Spreads Association (MSA) fully supports efforts to tackle climate change, but by doing so the most sustainable (from an economic, environmental and social perspective) solution has to be found. A study by RWI[1] (Rheinisch-Westfaelisches Institut fuer Wirtschaftsforschung) shows however that the current focus on a limited number of feedstocks, mainly rapeseed and palm oil, does not constitute the most sustainable way forward.

2. The margarine and spreads sector uses a number of the main feedstocks associated with biodiesel production as a food ingredient. MSA therefore have concerns that by growing non food crops on land previously used to grow food crops it will result in insufficient volumes of edible oil for the food industry. The ingredients of key concern are oils: primarily locally produced rapeseed oil. The 5 per cent blend obligation will create a demand for c.1 million tonnes of biodiesel,[2] which exceeds current UK production. The pressure on land space will cause a shortfall in supply which will both push up prices and result in an increase in imports.

3. The RWI study estimates that 13.6 million hectares of land are required for target compliance production in 2010. Given that total arable land in EU is c.82 million hectares, 13.6 million hectares represents approximately 16.5 per cent of total arable land within EU. This estimate of 16.5 per cent of arable land is substantially higher than compulsory set aside of 10 per cent and therefore the entire biofuel production can not solely take place on set aside land.

4. Given the link between our industry and the use of rapeseed oil for biodiesel we believe that the European Commission and the UK Government must consider the food industry when formulating new biofuel policies. Regulatory impact assessments should be conducted before any new policy is introduced and these should include sections which examine the potential consequences for domestic food manufacturers, both in terms of their food production and the energy they use. In addition, given the global nature of this issue the impacts need to be assessed in a global context.

5. We would also encourage the Commission to recommend more study on the impact of biofuels to the food production chain before setting policy, or creating incentives or targets.

Biofuel Targets, Economic Instruments, Biofuel Obligations and Production of Biofuel

6. Biomass and biofuel are currently part of a range of solutions to tackle climate change. We would support their use where it makes sense environmentally and provides the most cost-effective option in making a positive contribution to climate change. We would also ask that when conducting a cost benefit analysis of bioenergy that it is undertaken in a global context. There should also be recognition that biofuels are just one of a range of options available to tackle climate change. There are many other effective, inexpensive and less impactful solutions which could be used alone or together to tackle the problem (for example, enhancement of power plants, improving car engines, biomass residues etc.)

7. Biomass and biofuel can be obtained from several different feedstocks and should be analysed and compared individually. In terms of Greenhouse Gas abatement costs, biodiesel originating from rapeseed oil and bioethanol originating from sugar beats and wheat are more expensive alternatives (£/tonne) for power/fuel generation than many other options such as bioethanol from sugar cane, other biomass (reed, poplar, wood waste) and wind power. In addition, the cost of producing bioethanol from sugar-cane is roughly zero whilst the same matter produced from sugar beat and wheat costs £145/tonne. Thus, these differences have to be calculated and the best economically viable solution applied locally.

8. Another feedstock for biofuel is oilseed bearing trees eg Jatropha and further investigation into their cost effectiveness should be undertaken, particularly given the beneficial contribution such a potentially valuable raw material could contribute to the economies of the developing world where this crop is prevalent. Supply of jatropha would, unlike other biofuels not be competing with demands for it from the food industry. Having reviewed this feedstock and due to its drought resistance and ability to grow on marginal land, it offers the possibility of an economically, socially and environmentally sustainable contribution to energy provision.

9. Bioethanol in Brazil is produced at full cost-effective scale: Sugar-cane syrup is extracted for production of sugar or bioethanol (for blending with gasoline as biofuel). The residual liquid sewage can be used as fertiliser for the next crop and the solid remains from crushing is burned to generate power to run the entire facility with excess energy exported.

[1] The RWI study is a meta analysis of research data conducted by Manuel Frondel and Jörg Peters RWI—Essen and funded by the International Margarine Association of the Countries of Europe (IMACE). The study reviews the environmental, economic and land use aspects of rapeseed-based biodiesel.

[2] D1 Oils.

10. The same kind of approach can be found in lignocellulosic facilities. They are able to retro-feed their residues and offset the energy intake.

11. The cost effectiveness of biomass and biofuel needs to be looked at in conjunction with the range of other measures that can take place to reduce CO_2 emissions. Studies have demonstrated that in some situations it is more cost effective to enhance (modernise) old conventional power plants than to use biofuels, with the same or better results in CO_2 abatement. The impact of new car engines consuming less fuel/km, and biofuel/engine improvement are very interesting developments and their cost effectiveness again needs further investigation.

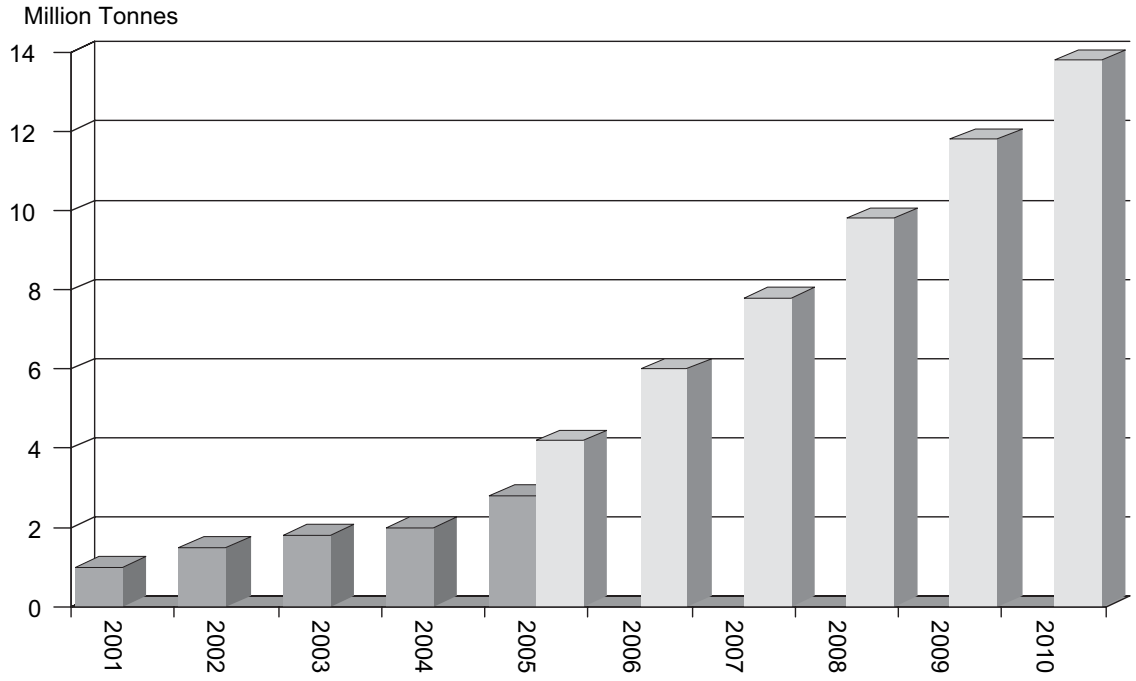
12. Second generation biofuels under development are also promising alternatives and may eliminate some of the disadvantages that biofuel crops produce. In addition, new technologies such as wave and wind power generation should be investigated further for their cost/environmental effectiveness.

13. Overall, there should be further research undertaken to customise solutions which will lead to the most cost-effective and environmentally beneficial outcome.

Trade in Biofuel, Technical Barriers and Looking Ahead

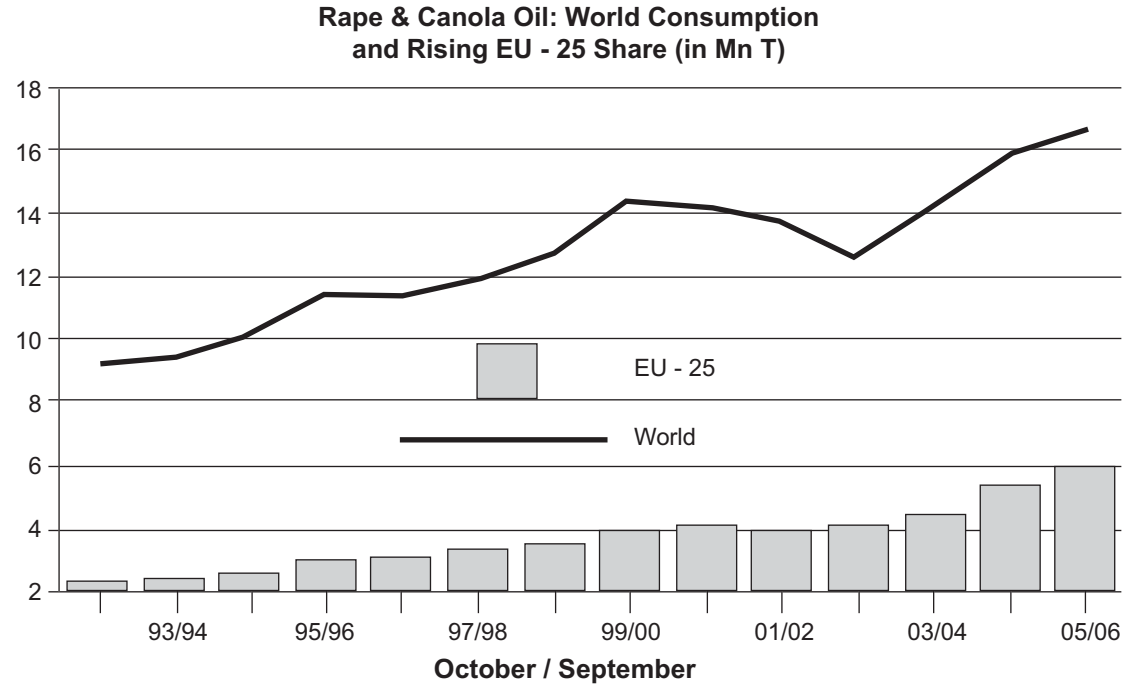
14. Due to the incentives and higher prices on offer to farmers, it is expected that land use will change from food to non food crops. Raw material availability for food purposes is likely to decrease and prices of major agricultural commodities would increase to the point of drastically affecting prices to consumers.

15. The graph below illustrates that based on the target of 5.75 per cent biofuel by 2010, a 2.25 million MT/Year growth in EU-25 biodiesel production for the next five years would be required. Therefore basing this demand on rapeseed oil would have a profound impact on the rapeseed market.

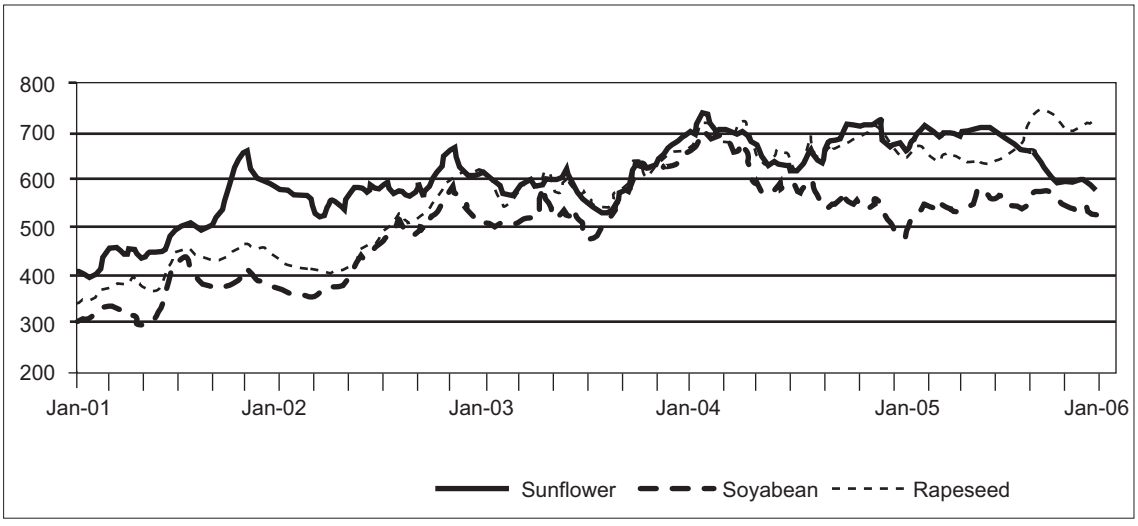


Source: EBB, European Biodiesel Board

16. The graph below illustrates that Rapeseed and Canola oil consumption is increasing both at EU and world level. Therefore, an increase in demand at UK/EU level can not necessarily be achieved by supply at a global level.

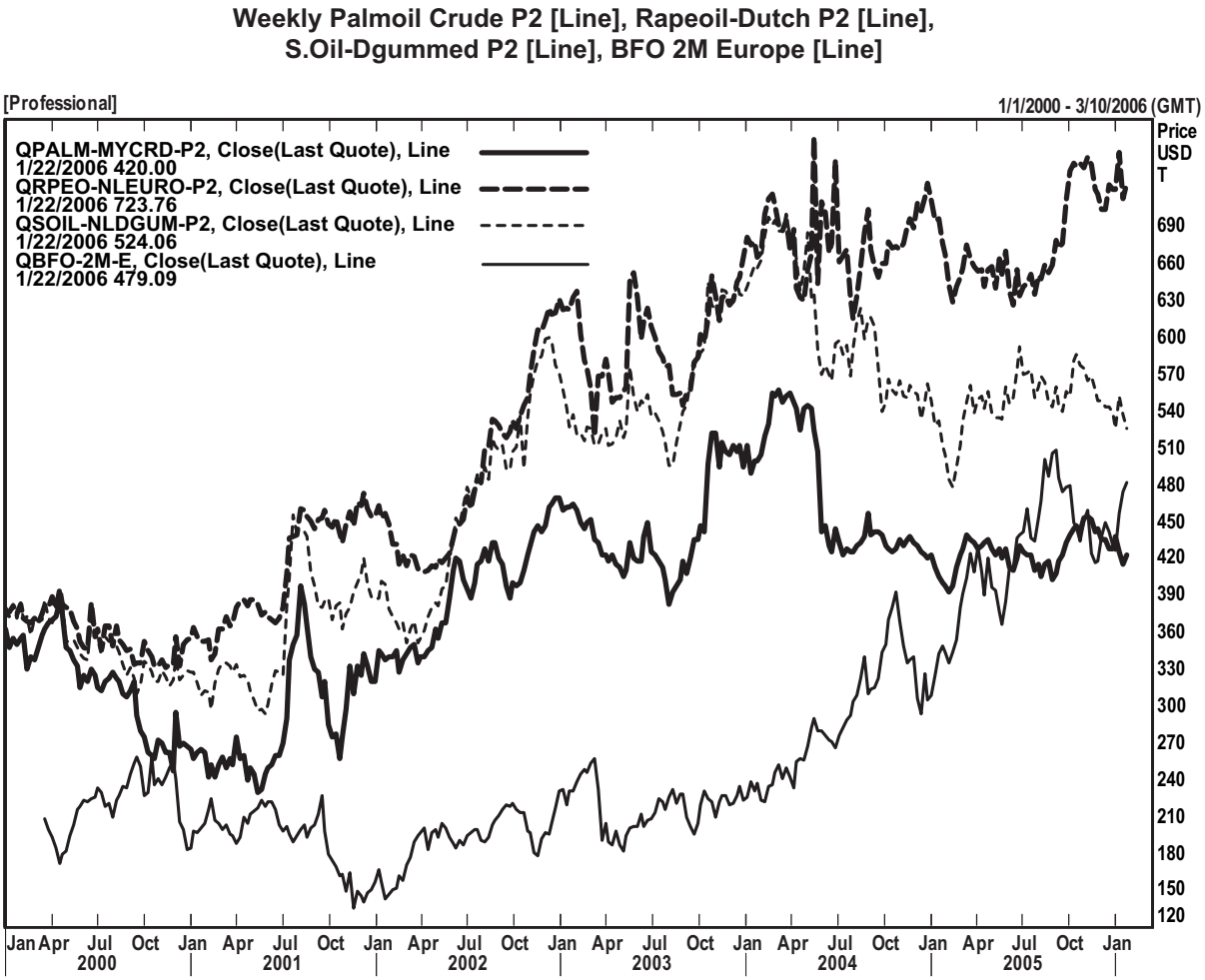


17. In the graph below the impact of the increase in demand for biodiesel has already started to take hold. The price of rapeseed (red) has started to increase dramatically over the last few years and when compared to sunflower in blue and soybean in green rapeseed has continued to rise where they have fallen.



Source: Reuters

18. The graph below further illustrates the price increases that have already taken hold. The price of rapeseed is outlined in orange (top line), mineral oil as red (bottom line) and Sunflower as yellow and palm oil as green.



19. Disruption of the food chain would be serious, as world food production has to date only been able to keep up with demand.

20. We would therefore encourage the European Commission to recommend that the European Committee for standardisation amend the current iodine rules to make more oils eligible for biofuels production—such as sunflower oil. This would also help reduce the pressure on current domestic biofuels, namely rapeseed oil, as well as palm oil.

19 June 2006

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