



House of Commons  
Environment, Food and Rural  
Affairs Committee

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**Climate change: the  
role of bioenergy:  
Government Response  
to the Committee's  
Eighth Report of  
Session 2005–06**

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**First Special Report of Session 2006–  
07**

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## Environment, Food and Rural Affairs Committee

The Environment, Food and Rural Affairs Committee is appointed by the House of Commons to examine the expenditure, administration, and policy of the Department for Environment, Food and Rural Affairs and its associated bodies.

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Mr David Drew (Labour, Stroud)  
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Patrick Hall (Labour, Bedford)  
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### Powers

The Committee is one of the departmental select committees, the powers of which are set out in House of Commons Standing Orders, principally in SO No. 152. These are available on the Internet via [www.parliament.uk](http://www.parliament.uk).

### Publications

The reports and evidence of the Committee are published by The Stationery Office by Order of the House. All publications of the Committee (including press notices) are on the Internet at

[www.parliament.uk/efracom](http://www.parliament.uk/efracom)

### Committee staff

The current staff of the Committee are Chris Stanton (Clerk), Jenny McCullough (Second Clerk), Jonathan Little and Dr Antonia James (Committee Specialists), Marek Kubala (Inquiry Manager), Andy Boyd and Alison Mara (Committee Assistants) and Mandy Sullivan (Secretary).

### Contacts

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## First Special Report

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1. The Environment, Food and Rural Affairs Committee reported to the House on Climate change: the role of bioenergy in its Eighth Report of Session 2005–06, published on 18 September 2006 as HC 965-I. The Government's response to the Report was received on 21 November 2006.

2. We are disappointed that in its response to our Report the Government has not engaged with our call for it to be more ambitious in its policy on bioenergy. This continued lack of ambition is particularly apparent in its response to recommendation 29 of our Report. We remain unconvinced that the Government will meet its commitment to make the Government estate carbon neutral by 2012 when the only step towards this has been the completion of the first phase of a mapping exercise of part of Defra's estate to assess its suitability for the use of biomass heat.

3. We repeat our conclusion that the Government needs to do much more to bring together the various aspects of its bioenergy strategy in a single cohesive policy. We expect the Government to make this work a key focus of its forthcoming Energy White Paper. In addition, we believe that the White Paper should be focussed on climate change and not on energy alone.

4. We note the establishment of the Office of Climate Change in the context of the urgent need for more effective co-ordination of climate change work across Government. The new Office should make an early review of the Government's progress on bioenergy a priority. We look forward to taking evidence from the Head of the Office of Climate Change once this major appointment has been made.

## Government response

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### Introduction

We welcome the EFRA Committee report which is a useful contribution to the policy discourse. Generating carbon savings in an effort to mitigate further climate change is a top priority for the Government. The UK will continue to be at the forefront in setting the global agenda for tackling climate change and this is reflected in Defra's mission of "One Planet Living" that is steering many of our work programmes. As we made clear in the Energy Review earlier this year, increasing the use of renewable energy resources, such as bioenergy, is an important way of addressing this priority. The challenge is to make significant carbon savings in the most efficient way possible. In responding to the report from the Biomass Task Force and in the Energy Review we undertook to publish a UK Biomass Strategy and this will set out our conclusions on how bioenergy production, both in the heat and power and the transport sectors, can be optimised.

The Committee has rightly drawn attention to other important aspects of bioenergy development including the implications for agriculture, land use and biodiversity. The Government has set out a vision for the Common Agricultural Policy (CAP); that is, that agricultural policy should move to a position where there are no direct payments or market price support to EU producers and where tariffs are no higher than those for manufactured goods (around 4%). Support to farmers to achieve environmental objectives should be carefully designed and targeted. Bioenergy policy should be consistent with these long-term goals.

While appreciating that biomass can contribute to diversity of supply, policy must draw a clear distinction between the production and consumption of bioenergy. Consumption of bioenergy in place of fossil fuels leads to carbon savings; however, as with other agricultural products, we recognise that efficiency considerations should determine where and how renewable energy feedstocks are produced. There is therefore no presumption that all feedstocks should necessarily be produced domestically, although often they will, so giving rise to commercial opportunities for UK producers. It is also the case that environmental sustainability of production is one of our key priorities for bioenergy development and it is encouraging that this is an important theme in the EU Biomass Action Plan and the EU Biofuels Strategy.

As the Committee notes, this subject cuts across the responsibilities of several Government Departments. The Government is fully aware of the need for a cohesive approach and the Departments concerned are working together closely on this agenda, for example in developing the Renewable Transport Fuel Obligation (RTFO) and the Biomass Strategy and the UK's approach to developments in the EU and beyond.

It is within this wider context that our responses to the EFRA Committee are framed. The Government's position on the detailed recommendations is set out below.

## The EFRA Committee Report

### *Units, measurements and terminology*

1. In conducting this inquiry we encountered a wide range of different units, measurements and terms which are all used in calculations of energy and emissions. We recognise that different kinds of data are needed for different purposes, but the Government should ensure that its use of units and terminology is consistent across departments so that those outside the science community can form a clearer view of the relative merits of different forms of energy in the context of climate change. (Paragraph 12)

We recognise the need for greater consistency of units and terminology, wherever possible and appropriate, in Government sponsored publications and will endeavour to ensure comparisons or values are expressed in uniform terms.

2. The Government has estimated the contribution that bioenergy could make to the UK's energy mix by sector as percentages of the total, and using different dates for each sector. This does not facilitate useful comparison and suggests a lack of consistency in approach across Government departments. We recommend that the Government recast its estimates, settling on one target date and indicating what the relative percentages, in million tonnes of oil equivalent (Mtoe), actually represent. (Paragraph 14)

It is difficult to set a single target or target date for the different renewable energy sectors because the targets reflect a mixture of EU and domestic objectives. They are set to encourage the expansion of the individual renewable energy industries, which are at different stages of development. However, we recognise that this lack of uniformity can be confusing and may make drawing comparisons more difficult. We are looking to assess and report on the overall contribution that bioenergy can potentially provide within the UK Biomass Strategy across a range of target dates.

## Potential carbon savings from bioenergy

### *Biomass for heat and electricity*

3. Current Government policy focuses on renewable electricity generation at the expense of the prospects for the development of renewable heat. We note that in its response to the Biomass Task Force Report the Government has undertaken to increase the use of biomass heat and electricity. We recommend that the Government build on this commitment by setting out clear and quantifiable targets for biomass heat in its forthcoming Biomass Strategy. We further recommend that the Strategy redress the balance between biofuels, renewable electricity and renewable heat, to reflect the greater potential carbon savings offered by biomass heat. (Paragraph 35)

We noted, in the Energy Review, that in the absence of an equivalent mechanism to the Renewables Obligation for renewable heat, there was the potential for a distortion of the market for biomass on a revenue basis. In responding to the Biomass Task Force report we agreed that renewable heat provides important opportunities and is a particularly efficient

way of cutting carbon emissions, provided that development is planned appropriately with a secure market for the heat generated. We therefore committed, in both the Government's Response to the Biomass Task Force Report and in the Energy Review, to consider options for providing longer-term support for renewable heat, including biomass. A project is being commissioned to assess the case for longer-term support and, if appropriate, the potential mechanism(s) for delivering such support. At this stage we are not ruling out any potential mechanisms or approaches, including targets. This review does not affect the decisions already taken to support development including the five-year capital grant scheme for biomass heat and CHP projects as announced in March 2006 in the Climate Change Programme Review. The Government is also currently consulting on a number of changes to the Renewables Obligation.

**4. Reflecting on the conclusions of the Biomass Task Force, and acknowledging that the Government has already published its response to the Task Force report, we are disappointed that the Government has failed to take the opportunity offered by the Energy Review properly to address the issue of biomass heat, and has only committed to producing the Biomass Strategy “over the coming year”. Given the urgent need for concrete measures to support biomass heat, we should not have to wait until 2007 for the Biomass Strategy, and recommend that the Government make clear in its response exactly when it anticipates publishing this strategy, and further suggest that it does so at the earliest possible opportunity. (Paragraph 36)**

In preparing the Government's Response to the Biomass Task Force Report, it was judged that a full twelve months would be needed to undertake this work, including the commissioning of underpinning research. We have considered this timetable carefully in light of the EFRA Committee's recommendation but believe that consideration of the complex issues and in-depth discussions with key stakeholders are required, such that the quality of the final strategy would be seriously compromised should we bring forward the publication date significantly. We are giving this work high priority and will also take account of its links to the Energy White Paper which is due to be published in early 2007.

The Committee will wish to note that we are about to commission a project, due to start early in November 2006, to examine the case for, and mechanisms available to deliver, longer-term support for renewable heat. This should report early in 2007. In the meantime the biomass heat sector continues to be supported via the Bioenergy Capital Grants Scheme—for which a further round of applications were considered in July 2006—the Low Carbon Buildings Programme and the Defra-funded biomass heat capital grant scheme, which it is expected will be open to applications early in 2007. Capital support was considered by the Biomass Task Force to be the most appropriate measure to support this sector in the short to medium term.

## **Marine biomass**

**5. We agree with the Biosciences Federation and Royal Society of Chemistry that the potential of marine biomass as a source of energy should not be overlooked. We recommend that the Government conduct a scoping study to investigate the potential for and anticipated carbon savings from the use of marine bioenergy, and to establish the likely up to date costs associated with developing this technology. We emphasise, however, that any research in this field must be carried out in addition to—and not**

**instead of—research and development into land-based bioenergy production. (Paragraph 42)**

We welcome the attention drawn to the potential of marine biomass. We agree that a scoping study to investigate the potential use of marine bioenergy is an appropriate way forward. The issues to be addressed are wide ranging and complex, including whether the marine biomass could be harvested from wild or cultivated algal resources, what positive and negative impacts this would have on the wider marine environment including fish stocks, the scope for production, and economic viability. It would probably be appropriate to categorise this study as “Horizon Scanning” and will be resourced separately to the ongoing work programme on land-based bioenergy.

Marine biomass is an important potential theme in the new EU R&D framework programme (FP7).

## Potential carbon savings from biofuels

**6. No analysis of the relative benefits of different forms of energy is complete without consideration of the cost, in both financial and sustainability terms, of reducing emissions. The difficulties of making reliable calculations—owing to the volatility in oil prices, and consequently biofuel prices, as well as cost differences in feedstocks and processing methods—are well understood. We seek confirmation from the Government that the Stern Review on the Economics of Climate Change will provide clarity in this area. (Paragraph 50)**

The Stern Review is the most comprehensive study ever carried out on the economics of climate change. It was published on 30th October, and is available at: [www.hm-treasury.gov.uk/independent\\_reviews/stern\\_review\\_economics\\_climate\\_change/stern\\_review\\_report.cfm](http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm).

## Second generation biofuels

### *Barriers to production*

**7. Defra does not say when in the future it expects second generation biofuels to become cost-effective, or what contribution the Government intends to make in terms of research and development in this field. While we accept that the Government may be reluctant to pick technology ‘winners’ and ‘losers’ at this stage, it is vital that the Government examine the barriers to further progress on second generation biofuels, and—as a matter of urgency—establish the level of investment and policy support required to accelerate development of this technology. (Paragraph 63)**

The Government is committed to promoting biofuels in the context of our climate change objectives, and we are particularly keen to encourage the development of fuels offering the greatest level of greenhouse gas (GHG) savings, including second generation fuels.

The Government has funded R & D into second generation biofuels and will continue to do so, including a new Defra-funded National Non Food Crops Centre study on Biomass to Liquids. This will look specifically at the feasibility of introducing this technology in the

UK. Revenue expenditure on R & D will also continue to benefit from general tax credits of 125% for large companies and 150% for small and medium sized enterprises.

The Government's central policy mechanism to deliver a significant biofuels market in the UK into the long term is the RTFO that we announced last year. The RTFO has been designed specifically to enable and incentivise the sort of long term, high capital investment required for the best biofuel production facilities. Although the Obligation will be framed in terms of volume in the early years, we have made it clear from the outset that the policy is about reducing emissions of greenhouse gases and that we intend to move, over time, towards a system under which we offer different levels of credits to different biofuels on the basis of the carbon savings that they offer.

As set out in the Energy Review, we will be consulting next year on future enhancements to the RTFO beyond 2010/11. We will work closely with stakeholders to develop proposals that would directly incentivise fuels giving a higher level of carbon saving as soon as that becomes feasible. We will also assess the extent to which these proposals would stimulate R&D and investment into advanced technologies in this area.

The Energy Review also announced that a Low Carbon Transport Innovation Strategy would be developed to spur vital innovation in low carbon transport technologies. The Strategy will include all generations of biofuel technology.

We have examined and will continue to examine the barriers to progress, and to assess policy options to maximise GHG savings from renewable fuels. For example, a DTI Global Watch mission on next generation biofuel technologies took place earlier this year. The report, which was published in the summer, concluded that the very high capital cost of advanced production facilities is the primary reason for the low level of deployment. It recommended that policy for encouraging biofuels should be on a GHG reduction basis to provide incentive for investment in second generation technologies.<sup>1</sup>

The Government also announced in the 2006 Budget that it had applied for State Aid approval for introducing an Enhanced Capital Allowance Scheme to support the cleanest biofuels production plant, including those using designated advanced processes. Discussions are continuing to be taken forward with the Commission and interested parties, and the Government hopes to introduce a scheme in 2007.

We expect the EU R&D framework programme (FP7) to give significant emphasis to second generation biofuels.

## Second generation biofuels for aviation

### *Synthetic kerosene*

**8. Although we recognise the valid safety concerns raised by witnesses regarding second generation aviation fuels, we note that synthetic kerosene is already being used in aircraft departing from Johannesburg. We are puzzled as to why the Government does not appear to be pursuing the option of second generation Fischer-Tropsch kerosene—**

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<sup>1</sup> The report is available in full on the DTI Global Watch website ([www.globalwatchservice.com/missions/](http://www.globalwatchservice.com/missions/)).

**as used in South Africa—to deal with the rapidly growing climate impact of aviation. If a biomass-derived process for producing synthetic kerosene can be made economically viable, the UK Government must support its development. We recommend that the Government take immediate steps to investigate the economic viability of using biomass as the feedstock for synthetic kerosene. (Paragraph 72)**

The UK project “The Potential for Renewable Energy Sources in Aviation” produced by Imperial College Centre for Energy, Policy and Technology in 2003 for DTI, studied the options for potential renewable fuels for civil aviation. The study examined a whole range of alternative fuels and energy sources including Fischer-Tropsch (FT) kerosene.

The report acknowledged that the physical properties of FT kerosene made it potentially suitable for use in aircraft, but concluded that the cost of producing biomass-derived FT hydrocarbons was likely to rule out their commercial development for the foreseeable future. Whilst this was a useful examination of the subject, it should be noted that biofuel technology has developed since that report was produced.

South Africa has certified FT kerosene for aviation but it should be noted that this is derived from coal (South Africa has huge reserves of coal and the energy costs for its production might not make it a commercial proposition elsewhere). The fuel, produced by SASOL, is a 50/50 blend of synthetic and conventional kerosene. We are aware that Brazil has developed a bioethanol-fuelled single seater aeroplane for agricultural use, e.g. for spraying but this is an alcohol type gasoline and therefore is not similar to aviation kerosene.

Given that biomass is a limited resource, the Government needs to consider the cost effectiveness of its use in different applications. At present, it is easier and more cost effective to integrate biofuel use in road transport and heat and power generation, than for use in aircraft. However, the Government is actively keeping the area of alternative aviation fuels under review and it was identified as an area for co-operation, particularly with the US, after the G8 Gleneagles commitment to extend research aviation science and technology. Discussions with the US have focused on building upon their initial work within their PARTNER research network.

It is most likely that, as with the early South African experience, second generation biofuels would feature only as part of a kerosene blend but significant work remains before this could be demonstrated as viable in cost, energy and environmental terms and thus become a system-wide reality. The energy required for the production of second generation biofuels (from biomass) should be improved, but the efficiency of the process on a large scale is as yet uncertain. Other second generation fuels such as ethanols, whilst suitable for motor vehicles are not compatible with aircraft jet engines at this time and have a lower energy density than the Fischer Tropsch kerosenes.

UK scientists and technologists have been involved in a series of EU workshops to share and improve understanding of the wide range of alternative fuels issues: fuel formulation, technological implications, infrastructure and availability, safety, environmental impacts and cost effectiveness. The fuel companies are also committing considerable resource to this work and the pace of activity is accelerating dramatically. Apart from consideration of

biofuels, attention is also being given to kerosene sulphur levels (linked to aviation induced cirrus cloudiness) and to the potential pros and cons of fuel additives.

The subject of alternative fuels is expected to be a prime study area for a new UK knowledge transfer initiative led by Manchester Metropolitan University. Project OMEGA will engage UK academic institutions to assess problems and develop solutions in response to the aviation sustainability challenge, as announced by Trade and Industry Secretary Alistair Darling in May with £5 million from the UK Government. OMEGA will bring together world-class academic institutions to assess known and newly-emerging environmental challenges that the air transport and aeronautical industries must overcome during the next 50 years. It is highly likely that there will be a study supported by OMEGA into aspects of alternative fuels, especially biomass kerosene, linking with key stakeholders.

## Biogas

### *Biogas for transport*

**9. We recognise the carbon saving potential of biogas as a transport fuel, but acknowledge that the necessary adjustments to transport infrastructure represent an obstacle to biogas uptake. We note the Government's acknowledgement of the need to assess the feasibility of using biogas as an alternative to diesel and welcome the Government's Surrey-based pilot project to examine the use of landfill gas as a transport fuel. We recommend that a feasibility study be undertaken in time for the results to contribute to the Government's Biomass Strategy, expected in the coming year. (Paragraph 77)**

The Government acknowledges the potential role for biogas to contribute to the renewable fuel mix for use in road transport. Natural gas, including biogas, benefits from a significant duty discount compared with main road fuels, and this is guaranteed until 2008–09. The Government is currently considering whether and if so how biogas might be incorporated within the Renewable Transport Fuel Obligation. We will consult early in 2007 on the details of the RTFO, including on the question of which fuels should count towards the Obligation.

## Anaerobic digestion

**10. We recognise the potential of anaerobic digestion significantly to increase the use of waste as a source of renewable energy. We reiterate the point made by the Biomass Task Force that care must be taken in selecting the most efficient anaerobic digestion technologies. We note that the Government has committed to reviewing its current approach to anaerobic digestion by April 2007. This is too late. Defra's current review of the Waste Strategy—which is due to be published later this year—provides a more suitable opportunity to fulfil this commitment and we recommend that the Government use the review to bring forward all of its work in this area. (Paragraph 84)**

The Government acknowledges the potential of anaerobic digestion (AD) to generate renewable energy from a range of organic material, whilst also contributing to our objectives on waste management and methane mitigation from agriculture. AD is already supported under the Renewables Obligation. Defra is giving active consideration to its role

in relation to a range of our objectives, including its potential contribution to waste management as part of the current Waste Strategy Review. The complementary review, announced in the response to the Biomass Task Force, will be completed as soon as possible.

## Land use

### *Food security*

**11. We conclude that second generation biofuel production is less likely to have the same impact on world commodity markets as first generation biofuel production, which competes with the food industry for corn and oil feedstocks, further pointing to the desirability of investing in the necessary technologies. (Paragraph 102)**

We agree with the Committee's conclusion. The steps being taken to encourage the development and deployment of second generation biofuels are set out in the response to recommendation 7.

### Energy from waste

**12. It was made clear to us that organic waste material—much of which currently goes to landfill—represents an untapped source of energy. We support the work of the Biomass Task Force and its leader Sir Ben Gill in highlighting the energy potential of waste, and trust that this line of thinking will be fully integrated into the Government's forthcoming new strategy for waste. We see the generation of heat and electricity as an important part of any effective waste strategy. The contribution of waste to energy production could be substantial. However, this should be made alongside, and not instead of, efforts in other areas. (Paragraph 108)**

The Government is committed to reducing significantly the volume of biodegradable waste disposed of to landfill by 2020. We fully recognise the value of this waste, both in terms of the materials it contains and its energy potential, which was highlighted in the Climate Change Programme Review and the Energy Review. Energy from the biodegradable fraction of waste may be supported through the Renewables Obligation and exempt from the Climate Change Levy. The consultation document on the current Waste Strategy Review proposed significant increases in recycling and composting, as well as anticipating an increase in energy recovery. The revised Waste Strategy is due to be published in early 2007.

### General conclusions on land use

**13. Questions over land use are at the heart of bioenergy policy. We are concerned by the implications of the Government's claim that "by 2050 the UK could produce as much as one third of its transport energy needs" from renewable sources. We recommend that the Government make clear in its response to our report the evidence—and assumptions made in relation to land use—to support this claim. Biofuels for transport currently offer an important way to reduce carbon emissions from the growing transport sector, but increased production may have an adverse effect on food production and biodiversity. If the Government goes ahead with the increase in**

**the Renewable Transport Fuel Obligation beyond 5%, as proposed in the Energy Review, there may be serious UK land use implications. Exploiting the 'dualfunctionality' of crops to provide both food and bioenergy may go some way to mitigating this. (Paragraph 113)**

The conclusion that the UK could produce as much as one third of its transport fuel by 2050 was arrived at in a report entitled *Liquid Biofuels and Renewable Hydrogen to 2050*, commissioned by the Department for Transport and produced by E4Tech in 2004. The report assumed that ethanol from fermentation and hydrolysis processes would replace petrol, and that vegetable oil based biodiesel and synthetic diesel from a lignocellulosic biomass-based Fischer-Tropsch process would replace fossil diesel. It assumes an ambitious estimate that 4 million hectares of agricultural land could be diverted to biofuel production (based on estimates by ETSU (1998) and Eyre et al (2002)). In addition biofuels from non-crop sources could produce up to 10% of total road fuel.

We are aware that land use may be an increasing issue, not only in the UK, but in other Member States and beyond. As the Committee suggest, exploiting the multiple functionality of crops and other biomass sources may reduce the pressure. This could be by using part of the crops for food and part for bioenergy or part for fuelling the process plant and part for feedstock, while also producing by-products. We will consider the importance of, and the impact of bio-energy developments on land use, biodiversity and commodity markets when determining the future support levels of biofuels and bioenergy, drawing upon the developing research base.

**14. Biomass crops used for heat and electricity can have a positive impact on biodiversity, and offer greater carbon savings per hectare, but in the case of short rotation coppice, are costly to establish and yield no output for four years. They therefore require considerable investor confidence. Whilst we recognise that the complex matrix of advantages and disadvantages relating to the various uses of arable land precludes any simple choice between sources, the Government must act now to help reconcile and rationalise these apparent inconsistencies in order to maximise carbon savings. (Paragraph 114)**

We have taken careful note of the Committee's comments on the choices which are available on different sources of bioenergy. As indicated above, we aim in the Biomass Strategy to set out conclusions on cost-effectiveness and other factors which influence the optimum direction of development. In the specific case of energy crops, the evidence suggests that farmers are prepared to choose to invest in production if a secure market for the output is available. While market forces play a key role in determining the pattern of industry development, we recognise that Government incentives and strategies can also be used to direct development in an appropriate and cost-effective direction.

## **Government policy on bioenergy**

**15. Government policy does not leave room for newer, more efficient technologies to develop and become commercially viable because it does not link incentives to carbon savings. We recommend that the Government begin to remedy this initially in implementing the Renewable Transport Fuel Obligation. (Paragraph 115)**

The Government agrees with the principle that policies designed to address climate change should link incentives to carbon savings where it is feasible and appropriate to do so.

For the RTFO, the Government has been clear from the outset that the primary objective of the policy is to reduce greenhouse gas (GHG) emissions from the transport sector. In this context, the RTFO feasibility study considered the prospects for directly incentivising fuels giving the highest level of GHG savings. The study concluded that integrating GHG fully into the RTFO was fundamental to ensure the potential of the mechanism to achieve its objectives. However, it also found that the additional complexity, legal uncertainty and short term implications of incentivising GHG savings directly suggested that a staged approach toward integration was advisable. It recommended a reporting requirement in the first instance, developing into a hardened carbon incentive over time. The Government will be consulting on this basis with draft regulations early in the New Year. However, the Government is keen to move toward direct incentivisation as soon as it becomes feasible to do so.

## Biomass support schemes

**16. We are pleased that Defra is keeping the prospect of a Renewable Heat Obligation under review: this option should not be ruled out altogether without further consideration. We recommend that Defra undertake a full analysis of such an Obligation, but emphasise that such an analysis should not be the cause of any delay to other Government measures in support of biomass heat. (Paragraph 125)**

We have commissioned work—following discussions with the industry and other stakeholders—to analyse the business case for longer-term support for renewable heat and the potential support options. The project specification for this work specifically mentioned the need to consider a Renewable Heat Obligation among a number of other suggested options. The outcome of this work will be reflected in the UK Biomass Strategy.

As we have indicated previously, this should not delay the introduction of the measures announced in the Climate Change Programme Review or the Government's Response to the Biomass Task Force Report, i.e. the development of a capital grants scheme for biomass boilers and biomass CHP systems (which should be operational before the end of 2006/07, subject to State Aids approval) and launching a second round of the Bio-Energy Infrastructure Scheme (which should take place before the end of 2006/07).

## Barriers to biomass heat

**17. Biomass heat has great potential to generate significant carbon savings. But we do not believe that the Government has properly positioned itself to exploit this potential. The Government must also quantify what it means by the “optimum use” of biomass. Despite the Government's acknowledgement that the contribution from biomass “can be very significant”, we note that the Renewable Transport Fuel Obligation is predicted to save 16 times more carbon than the new subsidy for biomass heat. The Government should publish the evidence base—including the basis for its calculation of the carbon savings anticipated to be made from the RTFO—for its current policies. We recommend that financial and policy support for biomass-derived heat be increased to a level that ensures associated carbon savings are at least on a par with those anticipated**

**from the Renewable Transport Fuel Obligation. We further recommend that the Government take the opportunity provided by its long-term Biomass Strategy to make these changes. (Paragraph 134)**

We agree with the Committee's recommendation that the UK Biomass Strategy is the correct forum for presenting the detail of current and future strategy on biomass. Within the Strategy we will be identifying the key policy objectives that bioenergy should help to address and, at the same time, we will consider whether the appropriate mix of policy, financial and technical frameworks are in place to ensure the "optimum" use of biomass, i.e. the best use of biomass to deliver the hierarchy of policy objectives in a sustainable manner.

With respect to the evidence base for the Road Transport Fuel Obligation, the assumptions underlying the Government's calculation of carbon savings anticipated to be made from the RTFO are included in the partial regulatory impact assessment available on the Department for Transport's website at:

[http://www.dft.gov.uk/stellent/groups/dft\\_roads/documents/page/dft\\_roads\\_610330-06.hcsp#TopOfPage](http://www.dft.gov.uk/stellent/groups/dft_roads/documents/page/dft_roads_610330-06.hcsp#TopOfPage)

These assumptions are based on a range of publicly available studies looking at the greenhouse gas savings of biofuels, including the JRC Eurocar Concauwe and Sheffield Hallam studies. As the feasibility report acknowledges, the actual savings biofuels offer are highly dependent upon precisely how the fuel is produced, and there can be a significant variance in the net GHG savings associated with biofuels depending upon the feedstocks and technologies used in their production. To ensure that the Government is able to measure the effectiveness of the RTFO, companies will be required to report on the level of GHG savings that they achieve.

While, as the Committee notes, the anticipated carbon savings from the introduction of the RTFO exceed those predicted to arise from the 5 year capital grant scheme for biomass boilers and biomass CHP, the capital grant scheme was only ever envisaged by the Biomass Task Force as being a short-term measure. It is one of a suite of actions to encourage biomass heat which are being driven forward as part of the implementation of the Government's Response to the Biomass Task Force Report. This suite of actions includes the work currently being undertaken on potential future longer-term support mechanisms. The successful delivery of these actions would significantly increase the overall use of biomass heat in the UK and the resulting carbon savings. In relation to the RTFO's predicted carbon savings [at the 5% by volume level by 2010], the potential exists for biomass heat to deliver even larger carbon savings—the Carbon Trust, for example, identified possible carbon savings of 5.6 million tonnes of carbon per annum from domestically sourced biomass<sup>2</sup>. We continue to work hard to realise this potential.

## Renewable Transport Fuel Obligation (RTFO)

**18. We note that the 2010 Renewable Transport Fuel Obligation target of 5% biofuel inclusion by volume falls far short of the indicative target of 5.75% by energy as set**

2 *Biomass Sector Review*—Carbon Trust, PAA & B&V, October 2005  
<http://www.carbontrust.co.uk/publications/publicationdetail?productid=CTC512>

**down by the EU Biofuels Directive. We support the recent announcement made in the Energy Review that the Government is considering increasing the level of the Obligation. However, the Government must take action to ensure its three “critical factors” are met. The Government must also outline specific—rather than hypothetical—targets beyond 2010 as soon as possible, in order to encourage the level of investment necessary for the Obligation to be a success. In addition, the Government should set out the assumptions and evidence base that underpin the Energy Review’s conclusion that doubling the level of the Obligation will prevent the emission of a further million tonnes of carbon a year. (Paragraph 141)**

As set out in the Energy Review, the Government has committed to consult in early 2007 on the long-term direction of the RTFO, including on how we might develop the RTFO targets beyond 2010/11.

As acknowledged in the Government’s RTFO feasibility report, the actual ‘lifecycle’ carbon savings that biofuels provide can vary widely so any estimates of carbon savings must be treated with caution. Our current analysis suggests that a 5% biofuel commitment would produce carbon savings equivalent to taking 1 million cars off the road. It cannot be assumed, however, that moving to a 10% commitment will deliver twice the carbon savings. Moving beyond 5% will require three critical factors to be met, and the Government is taking action in these areas:

- We are working with the Low Carbon Vehicle Partnership to develop robust sustainability and carbon assurance schemes for biofuels. We will be requiring companies to report on these issues as part of the obligation to ensure that we can monitor the effect of the policy.
- We have encouraged the European Commission to look at revising the current technical limit of 5% biofuel blends appropriate for ordinary vehicles. The Commission’s EU Biofuels Strategy<sup>3</sup> recognizes that action is needed to resolve this problem, and the Commission have now tasked the European standard making body responsible, CEN, to consider revising this limit to 10%.
- The RTFO has been designed to help lower the costs of biofuels over time and thus help ensure as far as possible that costs are acceptable to the consumer. However, the actual costs of biofuels beyond 2010 will be dependent on a number of external market factors over which the Government has little control, including the price of oil. Government will monitor the cost of the mechanism following its introduction in 2008, and that will inform the direction of future policy. The costs of biofuels and the availability of resources will also be considered in the context of the UK Biomass Strategy.

Ultimately, the reporting requirement in the RTFO will ensure that the Government is able to make a more refined assessment of the level of carbon savings achieved once the obligation comes into effect.

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3 [http://ec.europa.eu/energy/res/legislation/biofuels\\_consultation\\_en.htm](http://ec.europa.eu/energy/res/legislation/biofuels_consultation_en.htm)

## Carbon assurance schemes

**19. We welcome the news that the Government is developing a carbon and sustainability assurance scheme, but we were extremely disappointed to hear that there will not be a “carbon balance requirement” in the initial phase of the Renewable Transport Fuel Obligation. First generation biofuels are easier to produce and cheaper to buy than second generation biofuels, which require more investment but offer greater carbon savings. We have serious concerns that the RTFO—as it currently stands—could ‘lock in’ first generation biofuel technologies and so damage the prospects for development and use of more advanced fuels. ‘Well-to-wheel’ life-cycle analyses of potential carbon savings from all biofuels must be in place to inform policy before the Government pushes ahead with the RTFO. We support calls to link carbon savings with RTFO certification. No biofuel which causes more CO<sub>2</sub> emissions on a ‘well-to-wheel’ basis than its fossil fuel counterpart should be eligible either for the RTFO or the 20p duty derogation. (Paragraph 158)**

As set out in our response to recommendation 15 above, the Government is keen to move toward direct incentivisation of GHG savings under the RTFO as soon as it becomes feasible to do so. We are working to develop a methodology to enable companies to measure and report on the GHG savings of biofuels on a life-cycle basis from the outset of the RTFO. These reports will be publicly available and ensure that companies are thinking about GHG savings when sourcing their fuels and negotiating contracts. However, placing a direct additional economic value on levels of GHG saving from biofuels through the RTFO before standards have been developed and agreed, and before verification systems have proved sufficiently robust, would leave considerable scope for fraud, and risk discrediting the RTFO scheme as a whole.

Higher targets under the RTFO in the future, potentially including specific GHG saving targets or otherwise directly incentivising GHG saving, should provide good prospects for development and use of more advanced fuels as the obligation develops. Encouraging the development of the best biofuels will be a key consideration when we consult on future enhancements to the RTFO next year.

**20. We are also aware of the implications of first generation biofuels for sustainable development and the environment. We support the work of the Low Carbon Vehicle Partnership in its work to develop reporting systems for carbon savings and environmental standards and we recommend that the Partnership’s study be extended to assess the feasibility of linking these standards to RTFO certification. As far as imports for the purposes of bioenergy generation—either of the raw feedstock or of finished biofuels—are concerned, we further recommend that the Government take immediate steps to examine the legal and trade implications of accommodating international sustainability criteria within the RTFO. (Paragraph 159)**

The RTFO feasibility study examined the legal and trade implications of accommodating sustainability criteria within the RTFO. It concluded that a reporting mechanism could be made consistent with the existing legislative framework, but that proposals to include carbon or other sustainability assurance requirements were vulnerable to risk of legal challenge. However, the report also said that a full analysis would need to await the final design.

The Government would like to move toward including sustainability requirements for the RTFO if it can be done in a way consistent with WTO rules. We will conduct a further analysis once the final design of the carbon and sustainability criteria and reporting mechanisms for the RTFO have been established. We will also support the European Commission in exploring options for a European sustainability standard as part of their review of the EU Biofuels Directive.

## Enhanced Capital Allowance Scheme

**21. It is not yet clear what effect the Government anticipates the Enhanced Capital Allowance scheme will have on encouraging biofuel development. But we are keen to see evidence of its impact and to receive details of the analysis that led to this scheme being introduced. We recommend that the Government take all necessary steps to ensure that State Aids approval is received from the European Commission and that Defra monitor the effectiveness of the scheme and report on a regular basis. (Paragraph 163)**

**22. We were dismayed to be told by Treasury officials that Defra will run the Enhanced Capital Allowance Scheme, and by Defra that it is “principally a matter for the Treasury”. This kind of confusion at the heart of Government hardly sends encouraging signals to this potentially important industry. We recommend in the first instance that the Government make clear which Department will have the final word on qualification criteria for the Scheme. Both Defra and the Treasury told us that a series of discussions took place with industry when developing the proposed Enhanced Capital Allowance Scheme. We recommend that the Government, in its response, set out its estimate of the proportion of businesses within the industry that are expected to benefit from the scheme. (Paragraph 164)**

The Government has set out a partial Regulatory Impact Assessment, which is available on the HMRC website. HMT, Defra and HMRC have been working closely together on the ECA proposal. As the ECA is a taxation measure, HMT and HMRC have led on the State Aid approval. Defra will be responsible for the administration of the scheme if it goes forward. Defra will issue the qualifying criteria and equipment list, but this will be dependent on what is allowable under State Aid rules. Officials from the Departments are currently consulting with stakeholders again following clarification by the Commission on a number of issues, including the ‘aid intensity’ rules which mean that only a certain level of aid is allowable. As part of our consultation we are assessing the number of businesses which would be likely to receive enhanced allowances and for whom the ECA would be likely to be a material benefit. We will reflect the expected costs and benefits in our final RIA.

**23. We further recommend that Defra publish a comprehensive list of bioenergy-related derogations, allowances and other incentives, stating in each case which Government department has the lead in overseeing its operation and what its latest estimate is of the take-up of each scheme. (Paragraph 165)**

We agree that this would be a useful list and we undertake to publish such a document by the end of 2006, building on the list published by the Biomass Task Force at Appendix B of their report to Government.

## Cross-Government strategy

**24. We are disappointed that much of the evidence we received suggests a distinct lack of 'joined-up' Government concerning bioenergy. On a cross-cutting issue such as this it is essential that all relevant Government departments are—and are seen to be—pulling in the same direction. The evidence we received during our inquiry leads us to conclude that Defra appears to have 'all of the targets and none of the levers'. This is unacceptable. If the Government is to honour its commitment to reduce CO<sub>2</sub> by 20% below 1990 levels by 2010, much more effective co-operation between departments is critical. No one department appears to take ultimate responsibility for the issue of climate change, and we are disappointed to have to reiterate the recommendation made by our predecessor Committee and *again* call for a central co-ordinating post to be created at Cabinet level to deal with this important crosscutting issue. (Paragraph 168)**

The centrality of climate change objectives to the delivery of a broad range of Government policies was underlined in the exchanges of letters between the Prime Minister and the Secretaries of State appointed to the Departments concerned in May 2006. In September the Government established an Office of Climate Change (OCC) to work across Government to provide a shared resource for analysis and development of climate change policy and strategy. The OCC will support Ministers as they decide future UK strategy and policy on domestic and international climate change by: management and reporting of progress on existing commitments; developing a cross-government consensus on current progress and outstanding issues; identifying short and medium term goals for particular sectors, and consequent priorities for action; carrying out time-limited policy-focussed projects; and promoting understanding of climate change across government and supporting departments to adapt their policies.

**25. We acknowledge that bioenergy is not a 'silver bullet' that will in itself overcome the UK's climate change challenge, but we believe that it must play an important role in a range of measures—which must also include demand reduction and increased energy efficiency—to reduce the UK's climate impact. We will examine some of these other measures in our next inquiry into Climate change: the "citizen's agenda". (Paragraph 170)**

## Research and development

**26. We welcome the Environment Agency's offer to undertake a life-cycle study of alternative land-use study and recommend that Defra support and oversee this work. (Paragraph 176)**

Defra has invested in research to deliver a comprehensive software package to enable the environmental assessment of bioenergy production and use. This builds on the previous 'Environment Assessment Tool for Biomass Energy (BEAT)' life-cycle assessment based tool developed by the Environment Agency. The new tool will comprise a comprehensive LCA data base of bioenergy options and will enable impacts on a land use basis to be examined. The research will be complete by summer 2007.

**27. By cutting its investment in established research centres such as the Institute for Grassland and Environmental Research (IGER), the Government risks missing a**

valuable opportunity to be at the forefront of new renewable bioenergy technologies. The Government has said it wishes to focus its research and development effort on climate change and sustainable development but, as we have noted, land use is a critical element of climate change policy. Therefore, we are concerned that this restructuring of investment might be to the detriment of land-based research at a time when land-use issues, particularly in terms of non-food crops, are coming to the fore. We further note that Defra's own Chief Scientific Adviser shares these concerns and has said that an additional £20–30 million needs to be spent on research and development if the Government is to achieve its objectives. We recommend in the first instance that the Government publish a breakdown of its spending on bioenergy research and development, pending a full review of its resources for land-based research. (Paragraph 177)

To deliver its new agenda, Defra has to realign its R&D spending to give greater support to Ministers' environmental priorities, especially climate change and energy. Defra has publicised well, via the Science Forward Look<sup>4</sup> and the consultation on the Evidence and Innovation Strategy<sup>5</sup>, its intention to increase investment towards key environmental priorities and re-direct research programmes in agriculture. Defra has maintained its research investment in support of the non-food use of crops. It has not terminated early any existing programmes at IGER, and the Institute remains a very important research partner for Defra in the development and delivery of its policy objectives. This is reflected in the Department's continuing significant investment at IGER. Defra has developed good strategic partnerships with IGER over many years and in 2005/06 invested almost £6.4m at IGER.

Significant national funding currently also goes into this area through the DTI Technology Programme, and the Research Councils (particularly EPSRC/BBSR and projects such as the Supergen Bioenergy consortium). Research Council expenditure on bioenergy (including biomass and biofuels) is rising and accounted for over £2m in 2005–6. This includes two new large research consortia (funded at £3m and £2.2m each over 3–4 years) as well as projects supported under response mode and research undertaken in Council Institutes. BBSRC has recently consulted on its review of Bioenergy Research, which contains a range of recommendations for further activity. BBSRC is particularly keen to support capacity building in bioenergy in the UK research community and in promoting increased joint working between its institutes in this area.

The proposed Energy Technologies Institute and Environmental Transformation Fund will also increase funding into energy research, development, dissemination and deployment. Bioenergy also features within the key technology themes set out in the prospectus for the Energy Technologies Institute published on 14 September 2006, from which industrially relevant R&D programmes and projects will be selected.

Defra chairs the Government Bioenergy R&D Funders' Forum which keeps an overview of all UK public research dedicated to the production and use of bioenergy crops. The Forum will examine the government-wide portfolio of work and publish a breakdown of spending

4 *Evidence and innovation: Defra's needs from the sciences over the next 10 years*, July 2004  
<http://www.defra.gov.uk/science/publications/documents/ScienceForwardLook3rd.pdf>

5 *Evidence and Innovation Strategy 2005–08*—consultation document issued October 2005  
<http://www.defra.gov.uk/corporate/consult/ei-strategy/eis-consultdoc.pdf>

on bioenergy research and development. Insight into the Forum's work is available online at <http://aims.defra.gov.uk/>. The Forum is also producing a Research Priorities paper that will help with development and implementation of the UK Biomass Strategy, which is due to be published in 2007.

## International comparisons

### *Biomass*

**28. The Biomass Task Force argues that “the potential for biomass district heating systems needs to be better understood”, highlighting their use in Finland and Sweden in particular, and supporting the use of planning obligations to establish district heating systems, particularly in new housing developments. We agree and note that measures such as these are also relevant to policy on tackling fuel poverty. (Paragraph 183)**

We recognise the carbon and efficiency savings which district or community heating systems potentially offer and are taking steps to encourage their use via the planning system. Planning obligations already play a useful role in ensuring that, where renewable energy policies are included in local development frameworks, local authorities can ensure that new developments contribute to the implementation of these policies. In considering the scaling back of planning obligations alongside the possible introduction of a Planning-gain Supplement, the Government will ensure that any new arrangements support the role of the development industry in promoting the use of renewable energy. We are also including district heating systems (boiler and infrastructure) in our design for the biomass heat capital grant scheme which will provide support in the industrial, commercial and community sectors.

**29. We commend the Government's decision to adopt the Biomass Task Force's recommendation that it consider the use of biomass across the Government estate, and call upon the Government to publish a detailed plan, before the end of 2006, showing how biomass will be fully utilised across the Government estate, and what contribution this will make towards the achievement of the target to make Government carbon neutral by 2012. We also call upon the Chancellor to use the 2007 Comprehensive Spending Review to ensure that the Departmental Budgets contain sufficient resources to fulfil this commitment. (Paragraph 185)**

We recognise the importance of Government leading by example and are therefore examining our estate's suitability for using biomass heating. A mapping exercise of the suitability of the Defra estate (Phase 1, covering the 52 most promising sites) for biomass boilers has just concluded and the results are currently being analysed. Further Phases, during which the remaining Defra sites will be assessed, are planned for 2006/07. At the same time we are carrying out a 'Lessons Learned' exercise on the initial mapping work before formally rolling out the mapping exercise across the other main procuring Government Departments.

The Government's commitment<sup>6</sup> to make the Government office estate carbon neutral by 2012 and also its aspiration of reducing the estate's carbon emissions by 30% by 2020 will require a range of technologies for them to be met. We expect biomass heat to play a key role, but we are not yet in a position to predict the overall contribution it will make across the Government estate.

As part of its preparations for the 2007 Comprehensive Spending Review (CSR07), the Government is taking forward a fundamental assessment of its expenditure, with the aim of maximising value for money across all public spending. The possible introduction of biomass boilers on the Government estate will be assessed in this context.

## Biofuels

### *Alternative vehicle technologies*

**30. Vehicle manufacturers have the technology available for E85 and flex-fuel vehicles, and uptake in Sweden is already high. We recommend that the Government assess the model provided by Somerset County Council which has established a pilot scheme to encourage E85 uptake at local level. We further recommend that Defra work with HM Treasury to produce a cost-benefit analysis of proposals to introduce a range of incentives similar to those used successfully in Sweden. (Paragraph 192)**

Our primary mechanism to ensure the supply of renewable fuels into the UK market is the RTFO, and it will be left to the market to decide what is the most efficient way to deliver the fuels.

However, we recognise that additional actions can be taken to support the development of niche markets and gather evidence about future policy options. Through our infrastructure grant programme we have also provided grant funding for ten E85 bioethanol stations in Norfolk and Somerset, and we are currently considering applications for E85 facilities in other areas of the country. Departments will keep under active review the cost benefit of these and other measures to inform future policy in this area.

**31. As the availability of low carbon vehicles increases, the Government should develop a uniform system to help consumers make informed choices about the CO<sub>2</sub> savings which can be achieved from different types of vehicle. Such a scheme should employ the same approach as is currently used to make fuel consumption comparisons under differing kinds of driving conditions. (Paragraph 193)**

In July last year Department for Transport Ministers launched a colour-coded vehicle labelling scheme developed through the Low Carbon Vehicle Partnership. The labels are similar to those currently displayed on fridges and other white goods. They rank vehicles in bands from A to G, so that consumers will be able to see the environmental impact of vehicles when they are shopping for a new car. The labels display a variety of information to car buyers, such as how fuel efficient a particular vehicle is, how much motorists can expect to pay in fuel bills, and whether it qualifies for a reduction in Vehicle Excise Duty.

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6 <http://www.defra.gov.uk/news/2006/060612a.htm>

Over 80 major car brands, which represents over 98% of new vehicles sales, in the UK have signed up to the introduction of the scheme.

The Government announced this summer that it would introduce a new transport and climate change communications campaign to promote consumer information on buying greener vehicles and on eco-safe driving. The campaign will also target businesses by promoting the benefits of workplace travel planning. The car purchasing strand of the campaign will provide consumer information and advice on the CO<sub>2</sub> emissions of new cars and on different car types. The method by which supporting data will be ranked and presented is currently being developed.

## Fuel standards

**32. The Government must make clear its long-term targets for the Renewable Transport Fuel Obligation as soon as possible, in order to give car manufacturers and the petroleum industry sufficient lead time to develop vehicle engines and make the infrastructure adjustments necessary to support the use of fuels containing higher proportions of biofuels. We note that increasing the current limit of 5% will require the European Committee on Standardisation (CEN) to develop new fuel standards for higher inclusion levels of biofuels by volume. We recommend that the Government work with the CEN to ensure that new standards are set as a matter of urgency. (Paragraph 197)**

The Government has made it clear that it intends to move beyond the 2010 target of 5% renewable fuels if certain conditions are met. We will be consulting next year on enhancements to the RTFO beyond 2010/11, including the issue of future targets. This could include for example, whether simple volumetric targets remain appropriate, or whether the system should move to one based on GHG targets.

As indicated above, action is in hand to address the problems arising from the current European fuel standards.

## Overall conclusion

**33. Climate change is a long-term concern but action is needed today. Bioenergy is only one part of a many-faceted solution to the pressing problem of climate change, but we must make use of all the measures available to us. If the UK is to be a credible leader, setting the global agenda for tackling climate change, the Government must take every opportunity to reduce domestic carbon emissions. Bioenergy represents one of the most significant such opportunities available today. (Paragraph 198)**

We share the Committee's conclusion that climate change is a long term concern but action is needed today. The Government is committed to act to reduce domestic carbon emissions and the Prime Minister has made clear that climate change is a top priority for Government at home and internationally. We recognise that climate change is one of the biggest problems facing the UK and the world, and we need to ensure that the actions we are taking as a Government are co-ordinated and as effective as possible. The new Office of Climate Change will help us meet that challenge and will be a key resource to help us achieve the challenging targets we have set to reduce carbon dioxide emissions by 60% by

2050. Its first task is to begin an audit of existing work to develop a clear picture of where we currently stand on climate change and what outstanding issues need to be addressed most urgently, taking as our starting point the Climate Change Programme Review carried out earlier in the year. As indicated earlier in this response we welcome publication of the comprehensive review led by Sir Nicholas Stern which has confirmed that the Government is right to set climate change at the top of our domestic and international agenda.

As the Committee has recognised, efforts to reduce carbon and other GHG emissions require a wide combination of approaches and initiatives and calls for a collective effort to ensure we move toward a lower carbon future. Energy efficiency is, of course, an integral element of the UK's strong domestic programme to tackle climate change but other measures such as the new Planning Policy Statement on climate change will be important to start to lock in low carbon living. Finally, we strongly agree that sustainable bioenergy can make an important contribution to Government's renewable energy and climate change objectives and the UK Biomass Strategy will be a key vehicle to take this forward.

Department for Environment, Food and Rural Affairs

21 November 2006

## Formal minutes

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### Monday 4 December

Members present:

Mr Michael Jack, in the Chair

Mr David Drew  
James Duddridge  
David Lepper

Mrs Madeleine Moon  
Sir Peter Soulsby  
David Taylor

Draft Report [*Climate change: the role of bioenergy: Government response to the Committee's Eighth Report of Session 2005-06*], proposed by the Chairman, brought up and read.

*Ordered*, That the draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 4 read and agreed to.

*Resolved*, That the Report be the First Special Report of the Committee to the House.

*Ordered*, That the Government response to the Eighth Report from the Committee in the last Session to be appended to the Special Report.

*Ordered*, That the Chairman do make the Special Report to the House.

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[Adjourned till Wednesday 13 December at 2.30 pm]