



Environment and Rural Development Committee

5th Meeting, 2005

Wednesday 9 February 2005

The Committee will meet at 10.00 am in Committee Room 6

1. Inquiry into climate change: The Committee will take evidence from—

Panel 1

Dr Bob McIntosh, Director, Forestry Commission Scotland;

Professor Steve Albon, Head of Science, Macaulay Land Use Research Institute;

John Kinnaird, President, NFU Scotland

Panel 2

Stephen Midgley, Project Officer, the Scottish Coastal Forum;

Lloyd Austin, Chair, Scottish Environment LINK;

Panel 3

Roddy Yarr, Environment Manager, BAA Scotland;

Jeff Gazzard, GreenSkies Alliance;

Phil Flanders, Director for Scotland, the Road Haulage Association; and

Colin Howden, Campaigns Manager, TRANSform Scotland.

2. Subordinate legislation: The Committee will consider the following negative instrument—

The Potatoes Originating in Egypt (Scotland) Amendment Regulations 2005, (SSI 2005/39).

3. Inquiry into climate change: The Committee will consider arrangements for future evidence sessions for this inquiry.

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Clerk to the Committee
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The following papers are attached:

<p><u>Agenda Item 1</u></p> <p>Briefing paper from SPICe (<i>for members only</i>)</p> <p>Submission from the Forestry Commission Scotland</p> <p>Submission from Macaulay Land Use Research Institute</p> <p>Submission from NFU Scotland</p> <p>Submission from the Scottish Coastal Forum</p> <p>Submission from Scottish Environment LINK</p> <p>Submission from BAA Scotland</p> <p>Submission from GreenSkies Alliance</p> <p>Submission from the Road Haulage Association</p> <p>Submission from TRANSform Scotland</p>	<p>ERD/S2/05/5/1a</p> <p>ERD/S2/05/5/1b</p> <p>ERD/S2/05/5/1c</p> <p>ERD/S2/05/5/1d</p> <p>ERD/S2/05/5/1e</p> <p>ERD/S2/05/5/1f</p> <p>ERD/S2/05/5/1g</p> <p>ERD/S2/05/5/1h</p> <p>ERD/S2/05/5/1i</p> <p>ERD/S2/05/5/1j</p>
<p><u>Agenda Item 2</u></p> <p>The Potatoes Originating in Egypt (Scotland) Amendment Regulations 2005, (SSI 2005/39).</p>	<p>ERD/S2/05/5/2a</p>

SUBMISSION FROM FORESTRY COMMISSION SCOTLAND

Background

1. Forestry Commission Scotland (FCS) serves as the Executive's forestry department, advising Ministers on the development and delivery of forestry policy, carrying out regulatory and grant-aiding functions and managing through its Agency, Forest Enterprise Scotland, the national forest estate owned by Scottish Ministers. FCS is part of the GB Forestry Commission, a cross-border public body, operating in Scotland, England and Wales. The FC has been closely involved in climate change issues, particularly through its Research Agency.

2. Forestry and climate change interact in two different ways:

Climate change alters the environment in which trees grow and may give rise to changes in growth rate, susceptibility to frost, disease, etc.

Forests and related forestry practices can play a role in mitigating the impact of climate change through carbon sequestration and by fuel and product substitution.

Effect of Climate on Change on Forests and Forestry Practices

3. While it is likely that climate change will alter the environment in which trees grow, the speed and magnitude of the changes is difficult to predict. From a purely forestry point of view, climate change may have both beneficial and detrimental effects. The main impacts are considered below.

Growth Rate

4. The increase in greenhouse gas (GHG) emissions which are thought to be at least partly responsible for climate change has led to increasing concentrations of carbon dioxide in the atmosphere and an increase in nitrogen deposition. Coupled with the rise in average temperature, these factors are believed to have contributed to a general increase in the growth rate of forests across Europe. Given that carbon dioxide and temperature levels are set to rise further, it may be expected that the growth rates of Scotland's forests will continue to rise and this can generally be considered to be a positive result.

Windblow

5. The UK has a severe wind climate and in upland areas of Scotland the degree of windiness is a limiting factor which affects the elevation at which trees can be established, the ability to thin stands without incurring windblow, and the length of rotation that can be achieved before windblow becomes a limiting factor. All areas of Scotland are subject to periodic catastrophic windblow events arising from exceptional storms.

6. Current predictions suggest a modest increase in mean wind speed with the possibility of an increase in gale frequency. There may be indirect effects on windblow risk too through increased waterlogging of soils in winter, but the

predictions are tentative and the general conclusion is that no major adaptation to current management practice is recommended.

Pests and Diseases

7. Climate change is likely to alter the balance between insect pests, their natural enemies and their hosts and prediction of the likely outcomes is therefore difficult. A warmer climate may allow some exotic pests and diseases to become established in the UK and a combination of higher temperatures and lack of summer rainfall may render trees in such areas more susceptible to attacks by insect pests or fungal diseases. Against this, there may also be increased activity by beneficial insect predators and fungal competitors. Overall then, there are likely to be both positive and negative effects and predicting the overall impact is full of uncertainty.

Summary

8. Current predictions of the effect of climate change on forest ecosystems indicates the potential for both positive and negative impacts. Research is continuing to try to model and better understand the effects of climate change and formulation of forestry policy and practice will continue to be informed by the results of this work. Forestry Commission Scotland is part of a Scottish Executive funded project to examine the business risks (for several public bodies) associated with climate change.

The Potential for Forestry to Impact on the Rate of Climate Change

9. The establishment and management of forests, and the way in which forest products are utilised, can impact on climate change, mostly through affecting the carbon balance. There are three main ways in which forestry and related activities can have a positive effect:

- a. by substituting wood for fossil fuels in the production of heat and electricity (bio-energy).
- b. by substituting wood for more carbon intensive construction materials (sustainable construction);
- c. by locking up carbon in growing forests (carbon sequestration);

Carbon Sequestration

10. Growing trees fix carbon dioxide as carbon in carbohydrates within plant organic matter. (The dry weight of wood comprises 50% carbon.) Carbon accumulation in forests increases as the forest passes through its establishment and mid rotation phases, then levels off as the 'old growth' phase is reached. It has been estimated that carbon removals attributed to forest and forest products is currently of the order of 3 MtC/year for the UK and 2 MtC/year for Scotland.

11. The interaction between forests and carbon is a complicated one. While growing trees do lock up carbon, there is also the potential for carbon to be

released by the impact of afforestation on high carbon soils, by certain management practices such as thinning and by forest fires. Nevertheless, the overall effect is positive and forests act as a carbon sink.

12. The Kyoto Protocol sets targets for reductions in GHG emissions and specifies the mechanisms that may be used to achieve them. These include reductions in the consumption of fossil fuels and options for carbon sequestration through forestry activities since 1990, but the emphasis is very much on reducing emissions. The carbon off-set allowed for forests planted since 1990 is expected to be around 0.65 MtC/year for the UK and 0.4 MtC/year for Scotland (although the actual uptake in Scotland is around 2 MtC/year) in the first Commitment Period and an additional 0.4 MtC/year may become available for the UK at a later stage.

13. The principle of carbon off-set is enshrined in the Kyoto Protocol which also permits trading of emission savings by businesses and countries. However, carbon sequestration is currently not included in either the UK or EU Emission Trading Schemes and there is therefore currently no official scheme which enables forest owners to capitalise on the carbon sequestration benefits of forestry. There are, however, a number of voluntary schemes whereby entrepreneurs sell the idea of off-setting carbon dioxide emissions by planting trees. For example, businesses can pay to have enough trees planted to fix a quantity of carbon equivalent to that emitted by the activities of the business.

Sustainable Construction

14. In many cases, the use of wood in construction will save more GHG emissions than the use of other construction materials which consume significant quantities of energy in their production. The benefits are greater in the case of solid wood than in the case of manufactured products such as chipboard and medium density fibreboard (MDF) and the benefits are greatest where the wood is used on a long term basis so that the maximum amount of carbon is 'locked up' for the maximum amount of time.

15. The development of life-cycle analysis (LCA) has provided a means of assessing the long term impacts of different building materials on energy consumption and the carbon balance, but this can be a complicated calculation and there are no mechanisms to ensure awareness of the relative carbon benefits of the different materials and no mechanisms to encourage the use of low carbon products over cheaper alternatives.

Bio Energy

16. Scotland has a rapidly expanding biomass resource, with output from Scotland's forests set to increase by over 60% over the next 15 years. At the same time, Scotland has ambitious targets for production of renewable energy. The potential exists to combine these two issues by increasing the quantity of wood used as a fuel in heat and electricity generation.

17. Wood as a fuel is close to being carbon neutral. That is to say the emissions from biomass combustion are offset by biomass growth and depletion of

the carbon store in fossil fuels is avoided. Burning wood instead of coal, oil or gas is therefore highly beneficial in terms of carbon emissions.

18. Scotland, and the UK as a whole, currently produces only a tiny part of its energy needs from wood when compared to many European countries where wood fired district heating schemes and combined heat and power (CHP) plants are more common. Interest in utilisation of wood as a fuel in Scotland is growing and ranges from proposals for large scale electricity generating plants through medium sized CHP plants to relatively small scale local use for heating hotels, leisure centres, etc. The development of local uses has the added benefit of minimising the need for expensive and energy intensive transport of the material.

19. Further development of wood as a fuel is currently limited by:

a lack of any tradition of using wood in this way and therefore a lack of knowledge of the technology;

the relatively low cost of fossil fuels systems relative to biomass;

the non-availability of Renewable Obligation Certificates (ROCs) for plants producing heat only (as opposed to generating electricity).

20. In October 2003 Ministers set up the Forum for Renewable Energy Development which, in turn, established in January 2004, a Biomass Energy Group to consider how biomass, including wood, could make a meaningful contribution to Scotland's renewable energy mix. The report of the Biomass Energy Group is expected very soon and will make recommendations, and suggest actions, which will help the biomass industry to develop.

CONCLUSIONS

21. Forestry can make an important contribution to a reduction in carbon dioxide levels through carbon sequestration, through product substitution in construction and through substitution of wood for fossil fuels in energy production.

22. It has been estimated that if forest cover in the UK was expanded to 25% (which is the current aspiration for Scotland), and this was coupled with a drive to achieve substitution of wood for construction materials and fossil fuels, then the net result could be 8 MtC/year avoided emissions over most of the second half of this century - approximately 10% of the total emission reduction required to meet current targets by 2050.

23. While climate change has not been the main driver of forest policy, the Scottish Forestry Strategy already seeks an increase in forest cover and the use of wood in construction and energy production for a variety of other reasons and the climate change benefits that will be delivered provide additional support for the current direction of forestry policy in Scotland.

24. Pending any agreed changes at the UK or EU scale to the value (notional or real) attached to carbon sequestration, the most effective course of action

would seem to be to continue to encourage, where appropriate, the use of wood as part of a wider sustainable construction agenda and to continue to create an environment where the use of wood in energy production is encouraged and enabled. FCS and Scottish Enterprise are working together, through the Scottish Forest Industries Cluster to take forward the latter two issues.

Forestry Commission Scotland
January 2005

SUBMISSION FROM THE MACAULAY LAND USE RESEARCH INSTITUTE

The Macaulay Land Use Research Institute is a multidisciplinary research centre with soil, plant and animal scientists, geographers, socio-economists and IT specialists all working together under the same roof and towards a common Mission. This enables us to take a more holistic approach to research on land use than is possible in more discipline-based research organisations, and is unique in the UK. Our research is aimed at meeting the needs of land managers and those formulating and implementing land use policy in the UK and Europe. For example, we provide independent information for government policy advisers, government agencies, NGOs, and a wide range of other stakeholders and end-user.

Background – carbon sources and sinks

While the burning of fossil fuels by industry and transport needs to be limited, because it is a major reason for the increasing levels of atmospheric carbon dioxide (CO₂), changes in land use can also influence the carbon cycle. For example, reducing cultivation, particularly in arable production systems by moving to minimum till can reduce disturbance of the soil and thereby reduce carbon release. Changing land use to increase forest and woodland cover (afforestation), where the long generation time of trees effectively stores carbon (sequestration) on a time scale of many decades or centuries, can also contribute to mitigating carbon emissions.

Forestry and carbon sequestration

In a UK context, Scotland has the greatest proportion of forested land (17%) and therefore contributes the greatest share to carbon sequestration. Current estimates suggest that 9% of total carbon emissions from all sectors in Scotland are sequestered by our woodlands. The aspiration of the Scottish Forestry Strategy to increase woodland cover to 25% would contribute significantly to meeting the Kyoto commitment to increase carbon sequestration and should rightly be seen as an important part of the Scottish Climate Change Programme. Any grant-aided scheme to promote forestry might give some consideration to which current land uses are higher priorities to change to forestry, and also the forest type/tree species. However, contribution of species to biodiversity should not be viewed in isolation, but has to be balanced with other aspects of environmental sustainability such as enhancement of biodiversity.

Protecting soil carbon stores

While forests in Scotland are particularly important in sequestering carbon it is important to acknowledge that protecting the nation's soils as a major carbon store is crucial. Indeed the total carbon stored in soils in Scotland is estimated to be more than 100 times the carbon in vegetation. On both a UK and European-wide scale the total organic matter content of the top 30 cm of soils over large tracts of Scotland is exceedingly high (>35%). For example, the deep peat found blanketing much of the Highlands, Southern Uplands, Western and Northern Isles have up to 10 times the organic content of agricultural soils in the eastern lowlands. With current climate change scenarios predicting wetter winters and more storm events, it is important to ensure that changing land use does not lead to increasing soil erosion and therefore carbon flux.

Future Land Use Change

The 2003 Common Agricultural Policy (CAP) reform is expected to lead to a reduced cattle and sheep stocking density in some parts of Scotland. This would lead to a continued reduction in methane emissions, another important green house gas (GHG). In addition, if current grazed pastures are abandoned, in some areas it may be an opportunity to plant woodlands. As described above this would increase carbon sequestration, as well as potentially enhance biodiversity.

Joined-up Policy

One consequence of climate change could be that it affects the economic viability of a particular activity and as a consequence results in changes to land use. This in turn could have a deleterious impact on attempts to adapt to, or mitigate the underlying causes of climate change. Changes in other sectors (e.g. energy) to mitigate climate change effects may also have direct impacts on how land management can contribute. For example, renewable energy targets have led to a growth in the number of applications for wind farms. Care needs to be taken to ensure that site selection and the erection of wind turbines takes into account the potential contributions to carbon flux. However, while there is a national target for the production of renewable energy there is no national strategy prioritising where wind farms or biomass-fuelled combined heat and power stations might be located either regionally, or within regions, in landscapes, which takes account of all the issues, including both climate change and biodiversity. The Scottish Parliament has the vision of how the objectives of adapting to, and mitigating, climate change can be undertaken as part of a sustainable development agenda. It has the potential to ensure the joined up government needed to have an integrated, holistic approach to expedite progress towards the aspiration targets to deal with climate change

SUBMISSION FROM NFU SCOTLAND

Summary

1. In summary, the views of NFUS on the topic are:
 - Agriculture has significant potential to contribute to an improved Scottish climate change programme. More attention needs to be paid to practical steps that can be taken to support agriculture's positive contribution.
 - In particular, the renewable energy part of the programme is too narrowly focussed on electricity generation. It should be much broader. Production of road fuels from energy crops, i.e. renewable resources, should be a priority.
 - Building on the pilot projects in South West Scotland, there should be nationwide support for production and use of biogas. This can be generated by digestion of slurry on farms, prior to use as fertiliser and soil conditioner.
 - To extend the range and efficiency of biogas use, more development aid should be granted to fuel cell research. A fuel cell is like an internal engine, using a constant flow of fuel to work and producing electricity without any moving parts. Fuel cells are very efficient.
 - Scottish producers should be the preferred suppliers of food and fuel, thereby reducing food-miles and fuel-miles – and their negative environmental impacts.
 - The use of farmland as temporary flood storage reservoirs merits attention through preparation of new flood mitigation legislation.

Introduction

2. There are two strands of policy on climate change. The first, and most prominent, is to ensure that government in Scotland fulfils its responsibilities within the international agreements entered into by the European Union (EU). These concern amelioration of the contribution that is made to the greenhouse gases that are alleged to be the cause of climate change. The second strand is consideration of how to cope with the effects of the climate change already underway. Partly, this also arises from EU obligations, for example the flood prevention component of the Water Framework Directive (WFD).
3. **Combating climate change:** as noted in the Scottish Executive's consultative document, emissions of greenhouse gases by agriculture in Scotland dropped by nearly 13 per cent between 1990 and 2002. The critical emission source is livestock and the gas is methane. However, the report gives no direct credit to the sector (or to forestry) for reducing greenhouse gases. Carbon gases are converted to complex hydrocarbons and to oxygen by plant absorption. Depending on use, some of the carbon content can be retained or can be consumed as a substitute for products made from fossil fuels.

4. The methane output referred to is part of the sustainable cycle of plant production, eaten and digested by animals and resulting in production of food, environmental management by grazing and by-products (excreta and body tissue). The by-products can be used to produce both fertiliser and fuels that substitute for man-made chemicals and for fossil fuels. (See more on this topic from paragraph 10.)
5. Were agricultural output to drop further, there would be a greater dependency on distant sources of food, giving rise to more food-miles and the attendant effects of transport on the environment. If such distant sources were reduced by more home production, food-miles and fuel-miles would be reduced.
6. **Living with climate change:** existing farming activity would be able to continue within the range of projected changes to Scotland's climate. Scotland's temperate oceanic climate is highly variable in any event. Also, in addition to geological and landform considerations, micro-climates within Scotland are important determinants of what agricultural activity is feasible. Approximately 90 per cent of the agricultural land area is used as permanent pasture, i.e. is used exclusively for livestock production. Also, a substantial proportion of the remainder is used directly for livestock production from time to time or for production of animal feed. The current species of livestock reared in Scotland can be expected to continue in use. To date, diversification of livestock species, e.g. farmed deer, has not been driven by climate change considerations.
7. This means that projections of generally wetter, warmer and windier weather do not represent a hazard to production, although particular places may have to adapt - for example through change of crops or by conversion of arable land to grassland.
8. A particular aspect of coping with wetter weather is the amelioration of flooding by using farmland for temporary retention of surface water – both to prevent flooding elsewhere and to mitigate the intrusion and costs of flood defences in built-up areas. This important topic is addressed below, from paragraph 24.

The Scottish Climate Change Programme

9. There is an understandable focus in public policy towards the energy component of the climate change programme. Energy production and its use are ready targets. However, there are two big weaknesses in the Scottish Executive approach. Firstly, energy concerns should be about more than electricity production and the ambitious targets set for renewable sources for its generation. Secondly, it doesn't address the feasibility of substituting for distant sources of supply.

Roadfuels

10. The fastest growing energy use is for transport. Yet very little has been done to bring forward the prospects for biodiesel and nothing has been done for bioethanol. The development of both these forms of 'green' road fuel would deliver significant environmental benefits, provide a potentially valuable source of diversified income for farmers and provide jobs and investment opportunities in Scotland.

11. Some NFUS members grow oilseed rape – for conversion into fuel in other countries. They, and others, could grow more if there was some realistic prospect of a local market. We see a very real danger that the Energy Act provisions (for introduction of mandatory renewable components in roadfuels) could result in biofuels for the UK market being sourced from other countries. The environmental benefits would be diluted by the fuel miles required to unnecessarily import a product to Scotland that could be produced domestically.
12. The other line of supply is from conversion of the fatty component of animal carcase waste. Biodiesel production from the food industry waste stream depends on a throughput of casualty animals from livestock farming as well from the left-overs of the food chain (cooking oil etc.). Also, the direct use of agricultural and food chain waste for energy production appears promising. Meat and Bone Meal (MBM) has calorific value that could be recovered by incineration for electricity and heat generation. This would help mitigate the impact on the livestock sector of charges for the disposal of these by-products. Therefore, a paradox of Scottish agriculture's concentration on livestock production is that it yields substitutes for fossil fuels. (See also comments on biogas below.)
13. Bioethanol has unrealised potential. It is both a substitute for petrol and a feedstock for production of petrol additives that improve engine efficiency. Bioethanol may, in theory, be manufactured from a wide range of plant material. Several technologies may be used to convert plant material to a fermentable, and thereafter distillable, material. They range from conversion of woody material, using enzymes, to simple mechanical processing of sugar beet to pulp. In between are familiar starch to sugars to alcohol processes. Scotland has a long experience of this technology. However, would expect strong competition from Brazil and mainland Europe if we went into this business.
14. Scotland's climate and latitude (more daylight hours in the growing season) are well suited to growing energy crops such as oilseed rape. However, the feasibility of growing energy crops for road fuels in Scotland will be dependent on development of processing facilities and on their operators' willingness to pay a sufficient and sustainable price for materials, ex farm. These will require the following factors to be addressed.
 - (a) The feasibility of supplying biodiesel/ethanol in the UK used to be thought of in terms of the tax treatment of the end product. However, it will be vitally affected by the UK Government's response to the EU recommendation to have a rising proportion of road fuel from such sources. Mandatory biofuels would create a certain demand. However, such a policy would not guarantee home production.
 - (b) A necessary precondition for farmers' commitment to energy crops would be installation of processing facilities, by third parties and/or by farmer-controlled businesses. The availability of capital grants, to at least the level available elsewhere in the EU, would be a significant step toward establishing Scotland's biofuel industry.

Heating

15. As regards household and commercial demand for energy, a significant proportion is for space and process heating. It is wasteful to go through the sequence of source to heat to electricity to heat. Woody biomass resources in Scotland are substantial yet we don't use it for local district heating or for public buildings, as examples where the Executive could have a direct influence. Having shown the way, we suggest that commercial use would follow.
16. It is worth noting, in this context, that the old distinctions between farmed land and forested land are being whittled away. In recent years, most new afforestation in Scotland has been on farms and the recent changes to the CAP support regime are expected to encourage further planting.

Biogas

17. NFUS welcomes the Scottish Executive's support for pilot projects in South West Scotland to test the feasibility of producing useable gas on farms. The process involves digestion on cattle slurry under controlled conditions. This had been advocated by NFUS for some time, primarily with a view to Scottish farms becoming more self-sufficient in energy. However, the Executive had been more motivated by the potential of the process for reducing the scale of micro-organisms spread on farmland and which might be transported under wet weather conditions to designated bathing waters. The microbial content of slurry is much reduced in the digestion process.
18. The pilot projects have not yet reached the evaluation stage. However, initial indications are favourable. For large farms, or for smaller farms acting co-operatively, the unit cost of biogas production may be sufficiently close to the benefits generated, that intervention at public expense could be justified. At such an early stage of development, any view of the potential scale of this form of energy generation on farms must be speculative. Also, full realisation of the benefits will depend on further development of gas-using technology. Existing technologies for heat and power generation are relatively wasteful. Energy efficiency would be improved by use of fuel cell technology.

Fuel Cell Research

19. NFUS supports the principle of further development of fuel cells that may use biogas as input. We have been in discussions with the Chief Executive of the Scottish Hydrogen & Fuel Cell Association (SHFCA) and understand that SHFCA members including St. Andrews University and Organic Power Scotland have expertise in this area of technology.
20. Proposals have been put forward for further development work, using new facilities on a dairy farm in Kinross-shire. It has been reported that the promoters have been able to secure a commitment of £20,000 from Scottish Enterprise towards a feasibility study. While this is a great help, it leaves the proposed project short of funds by a significant margin.

21. It has been recognised that biogas (mainly methane) produced from the anaerobic digestion of organic matter is a valuable and prolific potential feedstock for use in Solid Oxide Fuel Cells (SOFC) being developed at St. Andrews University. Scottish agriculture generates between 12 - 14 million tonnes per annum of animal slurries and manures, making it the greatest potential source of this renewable gas. This innovative proposal brings together the technologies of advanced anaerobic digestion and fuel cells to present a unique business case for on-farm treatment of slurries, providing a source of renewable energy which may be used on-farm or sold through the major energy providers. This will provide an additional source of income to the farming industry, whilst retaining the nutrient value inherent in the slurries for their subsequent application to land. The project would take the work carried out at St Andrews University from laboratory to commercial realisation, with ground breaking world-wide potential.
22. This proposal presents an opportunity for business development, both at an individual farm level and for the application of fuel cell technology. This could put Scotland at the forefront of such developments. Additionally, it provides an opportunity for the farming industry to demonstrate the feasibility of producing renewable energy while retaining the soil conditioning and fertiliser utility of livestock by-products.

A further public benefit would be the aforementioned reduction in faecal indicator organisms that can be expected from anaerobic digestion. This reduces the risks to bathing waters from the impact of storm conditions in livestock areas.
23. This is a total approach to an agricultural opportunity, providing further potential for renewable energy production. It brings together two unique technologies, to add value to livestock by-products.

Mitigation of Flooding in Towns and Cities

24. The existing legislation for flood prevention works dates back to 1961. This was long before climate change became an issue. The flood prevention works that it authorises predate the kind of substantial schemes that are now being proposed. Using big areas of farmland as reservoirs for storing floodwater will have long-term consequences for the farm businesses that are affected. Also, it can limit the kind of agriculture that can be undertaken. Therefore, there needs to be consideration of the public interest in how the land is used and on which sites should be chosen. We suggest that the subject be revisited. We further suggest that secondary legislation to the Water and Environmental Services Act, which provides the primary legislation to implement the Water Framework Directive, would be a suitable vehicle.
25. From the agricultural perspective, it appears that there are two lines of decision making required. The first is to decide on the principle of taking avoiding action (avoiding flood prevention works elsewhere) by having schemes to flood farmland. The second is decide, if affirmed, what farmland to use.

26. Use of a farmland site for temporary inundation can have substantial production consequences. Recurring use will usually result in permanent damage to drainage systems and will limit production choices. Creation of permanent wetland areas within such schemes is a likely outcome which could provide nature conservation opportunities – but less production. Provided that the production and capital losses to the farm businesses affected are fully compensated, NFUS would have no objection in principle to such a course of action. However, the public benefits of such a choice have to be carefully weighed up, especially where prime agricultural land is concerned and most emphatically where it is in a part of the countryside where prime land is in short supply.
27. Because the residual farmland would no longer retain its quality, the choice of agricultural sites should reflect preferences that take into account the wider socio-economic conditions of the locality. That includes the relative contribution of different sites to sustainability of production over the wider area. These sustainability considerations should include the positive contributions that farmers can make to other aspects of the climate change programme. We believe that forthcoming proposals for flood prevention at Elgin will highlight these choices.

SUBMISSION FROM THE SCOTTISH COASTAL FORUM

Questions to be answered:

Is the Scottish Climate Change Programme contributing effectively to the UK's International obligations and delivery of climate change objectives.

How can the process of policy development ensure that policy across all portfolio's is climate change proofed.

What policy priorities should be pursued (across different sectors and geographical areas) to enable Scotland to meet the appropriate targets for reducing its contribution to future climate change.

CLIMATE CHANGE, THE COASTAL ZONE and the SCOTTISH COASTAL FORUM.

The evidence provided here by the Scottish Coastal Forum is intended to be a general summary of the issues that members have discussed in relation to ICZM and climate change in Scotland. The individual organisations within SCF will no doubt comment individually if necessary.

Sustainable development is the over-riding theme of Integrated Coastal Zone Management (ICZM) and as such implementation of ICZM will benefit the environment. Indirectly it aims to ensure that ecosystem processes along the coastline function effectively, whilst still allowing growth of communities and economies. This will then ensure the coastal and inshore water environment is better able to adapt to changes or fluctuations potentially caused by climate change and thus biodiversity will remain high. More specifically the coastline around Scotland will be better able to adapt to any climate changes, for example the use of managed realignment would help maintain coastal processes and potentially reduce the requirement for coastal flood defences.

It is the belief of the Scottish Coastal Forum, that effective policy development requires improved communication between the bodies that deal with sustainable development and climate change in particular. The Scottish Coastal Forum have a potential role in facilitating and coordinating cross-sectoral issues within the coastal zone. Climate change is one such issue that affects and is influenced by a variety of sectors in the coastal zone and the implementation of an integrated management system will assist in the creation and implementation of coordinated policies dealing with climate change.

There are a number of sectors in the coastal zone that have relevance to the Climate Change programme and these are discussed below.

Energy

Both the UK and Scottish Governments have made explicit commitment to renewable energy as a vital part of the climate change programme and to achieve the required targets there is an obvious commitment to implement energy production facilities in the coastal environment, the most obvious being offshore wind-farms. Wave and tidal (predominantly stream) technology has increased potential to become commercially viable in the near future. The Scottish Coastal Forum supports the close evaluation and assessment of the potential for the development of wind wave and tidal energy in Scotland as a means of electricity production and job creation. Its development must be on an integrated and strategic basis, underpinned by a planning system that allows all uses of the coastal and inshore environment to be considered in a coordinated manner

and any developments around the coast of Scotland are balanced and done on a sustainable basis.

Waste

Some waste could be recycled for beneficial purposes, e.g. submerged coastal protected reefs and marine biological nursery areas and there are examples from around the world (New Zealand one example). Other forms of waste do have the potential to impact on the coastline, such as when landfill sites are located in areas close to the shoreline, but this only relates to the reduction of greenhouse gases through the reduction of available salt-marsh and mudflats and the potential they have for carbon sequestration.

Transport

Transport development must be integrated through all forms of transport and this includes water transport. Water borne freight transport *can* be more efficient than road transport and with this efficiency comes a reduction on exhaust fumes and thus greenhouse gases, but careful investigations into transport efficiency needs to be undertaken to ensure that the correct decisions are made. Local produce for local markets should be the underlying principle to reduce the need for long distance freight. Another example of the benefits of integration within the coastal zone is provided within the central belt. Difficulties with transport congestion which could be reduced through integrated water based transport system within regional transport plans. The development of ferry services on the water would allow more options for efficient transport across the region and reduce congestion, a major source of greenhouse gases. Innovative use of inland waterways and canals should also be considered and the SCF would like to see more research into the efficient use of these transport networks to reduce the volume traffic on the roads and production of greenhouse gases.

Climate Change Research

Flooding and coastal erosion are major issues in the coastal zone. Increased storminess and relative sea-level rise could increase the coastal flooding and erosion in a number of areas in Scotland. The primary responsibility for coastal defences remains with the landowner. Local Authorities can implement some measures to protect large centres of population and some have developed shoreline management plans to put in place long-term management solutions to coastal erosion and sediment movement. SCF believe the Scottish Executive could promote further research to provide coastal management guidelines, related to both coastal cells and the SMPs in existence, which promotes adaptation to climate change in Scotland. In order to ensure they are based on coastal cells and management is undertaken on this perspective the SCF recommend that the local coastal partnerships where possible are lead organisations as they are cross-boundary organisations and can remain impartial.

Recent research has begun on the use of nearshore coastal environments to sequester CO₂. coastal systems need to be added to carbon cycle models because this sector has a high rate of carbon sequestration that has not been accounted for in terrestrial and oceanic carbon models. (Thom et al 2001)

In developing regional scenario's for climate change the SCF recommend the use of ICZM strategies across Scotland as these have been developed in a number of regions and they highlight the need for a dynamic management system able to cope with the potential sea level rise and climate change.

Conclusion

In answer to the questions posed:

1. The climate change programme is in early days and it will be difficult to assess its overall success. Monitoring of ICZM is also in its early stages of development along with understanding the ecosystem approach and more work is required to link the implementation of ICZM with adapting to climate change?

It is agreed within the SCF that the climate change programme needs to look at the other greenhouse gases along with carbon dioxide and also to differentiate between those changes that are wholly natural e.g. post ice-age amelioration and those of unambiguous anthropic origin.

2. The development of a cross-sectoral group who would be involved with any policy developments could review and assess whether the policy is climate change proofed. The use of SEA Directive in monitoring the effects of any regulation or programme will be of obvious benefit. The Scottish Coastal Forum and other such cross-sectoral organisations are in a unique position to review and tackle issues based upon the ecosystem approach, crossing political boundaries

3. The policy priorities should be to focus on the ecosystem approach in managing resources. ICZM is based upon sustainable development principles, which includes the ecosystem approach and aims to manage the use of economic, social and environmental resources based upon this principle. It looks at the processes that define the 'coastal zone' and aims to manage these processes in a balanced manner.

Summary of Principles

- Need for a strategic approach to marine renewables, transport and flood alleviation - ICZM is a useful tool to help achieve this.
- Better understanding and identification of the environmental sensitivities to allow fully strategic approach.
- Clear targets and objectives across policy sectors to encourage greater progress in reducing carbon.

SUBMISSION FROM SCOTTISH ENVIRONMENT LINK

Scottish Environment LINK member bodies (listed below) believe that Scotland needs urgent action on climate change and highlight the following 10-points:

1. Climate Change is happening already, it will get worse and **urgent action** is needed now to prevent the worst consequences.
2. Scotland needs Scottish greenhouse gas **reduction targets** and **a realistic programme** to achieve them.
3. Scotland's rural, urban, coastal and marine areas are going to continue to be **seriously affected** by climate change. We must accept this, mitigating effects where possible and coming up with strategies which help us adapt where not.
4. As part of a **Scottish Energy Strategy**, the Scottish Executive should take an **active role** in promoting a diverse base of renewable energy schemes.
5. **Transport emissions** are significant and growing; an effective integrated transport policy is required to curb these emissions.
6. Alongside increasing production from clean energy sources, Scotland needs to **reduce consumption** and must implement **energy efficiency targets** for domestic, commercial and industrial buildings.
7. Scotland must **safeguard its carbon reservoirs**, particularly peatlands.
8. Individuals can **make a difference**, but people need to understand the consequences of the choices they make about where they live, how they travel, what they buy etc.
9. Scotland must play its part in **international climate negotiations**.
10. Only with **sustainable development** addressing the environment, social issues and the economy together, can we really tackle climate change.

LINK member bodies are keen to contribute to taking these actions in Scotland.

CLIMATE CHANGE

Climate change is the most serious environmental problem facing the globe. In Scotland it will mean more unpredictable weather, more storms and rising seas, leading to floods, drought, failed harvests, the spread of disease and whole species being wiped out.

The UK signed up to climate targets at the Earth Summit in Rio in 1992 and further targets at Kyoto in 1997. The Scottish Executive has pledged that we will 'play our part' and 'make an equitable contribution' to meeting these targets but the Scottish Climate Change Programme did not set any specific targets for Scotland and specifies little actual action.

In Scotland we are already falling behind in tackling climate change. Recent Government figures reveal that Scotland's emissions of CO₂ fell 5.6% between 1990 and 2002, while overall UK reduction was 15%.

Taking action on climate change will have extra benefits - as well as avoiding the worst damage from the changing weather and addressing problems already being faced in farming and fisheries, Scotland will create jobs, and reduce air pollution and related health problems.

In more detail:

Climate Change is happening already, it will get worse and urgent action is needed now to prevent the worst consequences.

From the weather disasters around the world to breeding times of birds, there is no question that things are changing, with 7 of the 10 hottest years since 1961 occurring in the last decade. The more we do today to reduce emissions the less damage will happen in the future and the cheaper it will be to cope with change.

Scotland needs Scottish greenhouse gas targets and a realistic programme to achieve them.

Clear national and sectoral targets are needed so that everyone - business people, farmers, the public, councils - know what is expected of them and how they can do their bit to meet international targets. In the light of recent performance we think that Scotland should aim for a 20% reduction in CO₂ emissions on 1990 levels by 2010. We further support the Royal Commission on Environmental Pollution's call for a cut of 60% by 2050.

Scotland's rural, urban, marine and coastal areas are going to be affected by climate change. We must accept this, mitigating effects where possible and coming up with strategies which help us adapt where not.

From coping with flooding to realigning the coast and from changing farming to retraining doctors, we need to prepare today for the changes which will happen in the coming decades. Where possible, measures must be implemented that mitigate for adverse effects, such as the loss of important species, habitats and archaeological sites. We need to turn problems into opportunities where we can but also recognise that there will be real costs to pay.

The Scottish Executive should take a more active role in promoting a wide range of renewable energy schemes.

Renewable energy sources, like energy from the wind, waves, sun and specially grown 'energy crops,' are essential if we are to use less fossil fuels and phase out nuclear power. Investment in renewables is investment in clean energy, jobs in Scotland and new manufacturing industries. We think a challenging but achievable target for Scotland would be 25% of Scottish electricity to come from renewables by 2010 and 50% by 2025. There should be significantly improved planning and funding within the framework of a national energy strategy. Incinerating municipal waste does not produce renewable energy and should not be included as a renewable.

Transport emissions are significant and growing; an effective integrated transport policy is required to curb these emissions.

Transport, mainly road transport, was responsible for 14% of climate change emissions in 2002, and is the fastest growing sector of emissions. Road traffic is the second fastest growing source of greenhouse gas emissions with aviation the fastest. UK policy aims to cut transport emissions by 17% by 2010, half that reduction coming from measures like charges to come into cities and parking charges at work. Current action is not sufficient to produce the reductions needed. All transport policies and projects should be assessed against their climate change impact.

Scotland needs energy efficiency targets for domestic, commercial and industrial buildings.

Every year thousands of Scots die from conditions related to cold, damp housing. Solving this national disgrace should be an urgent priority and doing it right will also reduce the 22% of CO2 emissions which come from people's homes. Between 1990 and 2002 CO2 emissions from the Commercial sector rose by 35%, mainly because of increasing energy use within buildings.

Scotland must safeguard its carbon reservoirs, particularly peatlands.

Scotland's soils lock up a huge amount of carbon, far more than all the trees and shrubs in the UK put together, so it is vital to make sure these carbon 'sinks' are protected through appropriate agricultural policies, an end to large-scale peat extraction and an urgent programme of peatland restoration. These policies would also conserve biodiversity and archaeological value of peat bogs.

Individuals can make a difference, but people need to understand the consequences of the choices they make about where they live, how they travel, what they buy etc.

We can all help to reduce climate change emissions at work, at home, in school etc by making the right choices. The Government should help people to do this through good planning advice, integrated transport and public information campaigns.

Scotland must play its part in international climate negotiations.

Scotland is part of the UK delegation to UN meetings on climate change. It is vital that Scottish interests are properly represented and that Scotland makes a full contribution to meeting UK targets. Scotland should help to ensure that international rules force most savings to be made 'at home', and that nuclear power and destructive forestry projects are not supported.

Sustainable development means considering the environment, social issues and the economy together. Only by doing this can we really tackle climate change.

Climate change needs to be a major consideration in all areas of Government decision making and processes. Education for sustainable development is a key part of changing the way we look at problems and make decisions. The mitigation and adaptation response to climate change should also be sustainable.

Scottish Environment LINK member bodies have called on the Scottish Executive to develop, implement and resource a detailed Scottish Strategy on Climate Change which addresses these points and brings together social, environmental and economic interests to reduce emissions and improve quality of life.

Notes

Scottish Environment LINK is the liaison body for Scotland's voluntary sector environmental organisations. LINK was established in 1987 to provide a forum and network for the voluntary environmental sector to assist in co-operation and communication with government bodies and other bodies with a role in Scotland's environment. There are currently 36 member bodies in LINK, representing around half a million people.

This statement is supported by the following LINK bodies :

ruralScotland
Association of Regional and Island
Archaeologists
Badenoch and Strathspey Conservation Group
Biological Recording in Scotland Campaign

Butterfly Conservation
BTCV Scotland
Cairngorms Campaign
Council for Scottish Archaeology
Friends of the Earth Scotland
Friends of Loch Lomond
Hebridean Whale and Dolphin Trust
John Muir Trust
Marine Conservation Society
North East Mountain Trust

Plantlife Scotland
Ramblers' Association Scotland
Reforestation Scotland
Royal Society for the Protection of Birds
Scotland
Saltire Society
Scottish Council for National Parks
Scottish Native Woods
Scottish Wild Land Group
Scottish Wildlife Trust
Sustrans Scotland

February 2005

SUBMISSION FROM BAA

BAA Scotland forms part of BAA plc which is the world's leading airports operator. In the UK, BAA owns, develops and operates seven airports: Heathrow, Gatwick, Stansted, Southampton, Edinburgh, Glasgow and Aberdeen. Overseas we either manage contracts at, or have interests in, airports in the USA, Australia, Italy, and Oman.

BAA has already presented evidence to the House of Commons, Food and Rural Affairs Select Committee inquiry into climate change as well as the Environmental Audit Committee inquiry into the international challenge of climate change. BAA's submissions focused primarily on aviation and climate change, which is where BAA's expertise and efforts can add most value to the debate on policy development.

As a result of the information previously presented to these inquiries, this BAA Scotland submission essentially summarises the main points.

1 Executive Summary

- 1.1 BAA believes in the long-term responsible and sustainable growth of aviation. BAA has two sets of interests in climate change policy: in addition to being a major player within the aviation industry, we also have substantial energy interests, as one of the UK's top 20 consumers of industrial energy.
- 1.2 BAA supports the UK Government's leadership position on climate change and recognises the importance of effective international action to address this issue. We support the delivery of targets adopted by Governments within the framework of the Kyoto Protocol, and favour the mainstreaming of all aviation within EU public policy on climate change, noting that at present only climate change emissions by airports and domestic air transport are included within the Kyoto targets; international air transport emissions are not currently included.
- 1.3 BAA supports the UK Government's Air Transport White Paper commitments both to responsible expansion and to addressing aviation's climate change impact through linking intra-EU flights with the EU Emissions Trading Scheme by 2008, a declared priority for the UK Government's 2005 EU presidency.
- 1.4 While aviation's current climate impact is significant (11% of the UK's total climate impact), it is nevertheless still smaller than the climate impact arising from other sectors of the economy, such as power generation (29% of UK's total climate impact in 2000). However, BAA supports the precautionary approach to climate change policy, and accepts the responsibility of aviation – like all industries – to address its climate change impacts.
- 1.5 BAA believes that industrial climate change impacts are most effectively dealt with by harnessing market mechanisms and corporate self-interest, where possible, since these are powerful drivers and are likely to produce faster, better results than blunt regulation. BAA rejects policy approaches for aviation which are aimed simply at reducing demand by raising the cost of flying through taxes and charges, the revenue from which simply flows to Government and is not hypothecated to addressing the impacts. We believe the right approach, as in all industries, is to target the impacts of the activity, rather than the activity itself. We recognise that the consequence of a regime of smart, well-targeted instruments for aviation may be higher costs and reduced demand.

- 1.6 The UK aviation industry, most notably BAA and BA, has led the EU debate on aviation's climate change impacts and obligations, and BAA believes that industry co-operation should be built on by policy-makers and Governments. BAA believes that the debate is moving in the right direction in the EU and is pleased by the public position supporting action on climate change taken by ACI Europe, its EU trade association, in January 2005. However, there is weak global political will to tackle this issue, so BAA believes that the Government should focus on the wider international arena through the G8 concurrently with addressing aviation within the UK and EU.
- 1.7 BAA believes EU-level action can provide an effective interim policy response, as a first step towards the development of more co-ordinated global frameworks. We believe that the EU is an appropriate level for action, since unilateral action by individual EU Member States would raise market distortion and competitiveness issues.
- 1.8 BAA will be participating in the EU Emissions Trading Scheme from January 2005, since domestic airport emissions arising from substantial power use (energy infrastructure in excess of 20 megawatts) are included in the Scheme.
- 1.9 We believe that partial integration of intra-EU flights with an environmentally-credible EU Emissions Trading Scheme (where airlines can buy EU emissions allowances from the open EU market, but not sell to that market) is deliverable by 2008, and that full integration (where both buying and selling are allowed) is achievable by 2013.
- 1.10 We note the IPCC assessment that aviation's total climate impact is some 2.7 times that due to CO₂ alone, due mainly to the climate-warming effects of NO_x and water vapour emissions (contrails) in the atmosphere and to cirrus cloud enhancement effects. We accept that aviation should address its total climate change impacts. However, we urge a smart, targeted approach to this, which may require a mix of measures, to avoid unintended consequences of a measure adopted to tackle one impact (CO₂) leading to increases in another (NO_x), where there is a known technological trade-off..
- 1.11 For the 2008-2012 phase, the allocation methodology linking aviation with EU emissions trading should therefore be on the basis of both aircraft CO₂ and NO_x emissions. It is not yet possible to effectively differentiate aircraft operations in terms of the en-route climate impacts of aviation contrails and cirrus cloud enhancement, or yet to resolve these impacts. We believe that the long-term future of aviation and the potential to reduce aviation's climate change impacts will therefore be best served by a programme of international research, funded by the aviation industry, to find climate solutions within the sector.
- 1.12 This is consistent with BAA's belief that all industries should meet the external costs of their activities – but only once. Therefore, once smart, effective policy instruments (such as the EU Emissions Trading Scheme), which are targeted at reducing aviation's specific impacts, enter into force and cover aviation's external costs over time, the existing blunt instruments, such as the UK Air Passenger Duty (APD), should be phased out, as they are currently intended to capture some or all of aviation's external costs. This approach could also work to address the climate impact of long-haul flights. For example, reduced rates of APD could be applied to airlines agreeing, on a voluntary basis, to link their long-haul flights with the EU emissions trading scheme to deliver specific climate change targets.

2 BAA and the climate change debate

- 2.1 BAA is the world's leading airports operator. We believe in the long-term responsible and sustainable growth of aviation. Our position in the industry – planning airport infrastructure developments over 30-year time horizons – requires us to take a long-term view.
- 2.2 BAA has two sets of interests in EU climate change policy. In addition to being a major player within the aviation industry, we also have substantial energy interests, as one of the UK's top 20 consumers of industrial energy.
- 2.3 BAA supports the UK Government's leadership position on climate change and recognises the importance of effective EU and international action to address this issue. We support the delivery of targets adopted by Governments within the framework of the Kyoto Protocol, and favour the mainstreaming of all aviation within public policy on climate change, noting that at present only climate change emissions by airports and domestic air transport are included within the Kyoto targets; international air transport emissions are not currently included. While aviation is perceived as receiving special treatment, we believe there remains a material risk that national governments, or the EU, may seek to apply blunt taxation to reduce demand, in an attempt to curb the growth of aviation's emissions, thereby putting at risk the substantial economic and social benefits that aviation brings.
- 2.4 BAA is committed to making a significant contribution to reducing greenhouse gas emissions arising from energy use at our seven UK airports, through a new CO₂ strategy announced in July 2003. Our aim is to reduce absolute CO₂ emissions from energy consumption by 15% by 2010, compared to 1990 levels. This objective is particularly challenging in the face of passenger numbers rising substantially over the same period. The strategy is set to save 110,000 tonnes of CO₂ every year. This objective represents a step change in targets from the company's previous commitment of a five per cent reduction on 1990 levels.
- 2.5 We believe that airports are on the public front line on all of aviation's negative impacts – principally climate change, local air quality, noise, and surface access congestion. While we do not fly the planes, we firmly believe that unless we take aviation's negative impacts seriously, and deliver performance improvements, airports will not be allowed to grow. BAA therefore accepts its responsibility to lead change within the industry, talking with our airline customers, our communities, and our other stakeholders.
- 2.6 During 2003, therefore, BAA led a process of engagement with Government, airlines, aerospace manufacturers and environmental NGOs to inform and develop our thinking on a smart approach to addressing aviation's climate impact, as an alternative to increasing blunt taxation. Building on this dialogue, we updated our public policy position on aviation and climate change in October 2003.¹

3 Aviation and climate change: a BAA perspective

Climate change in context: sustainable development and aviation

- 3.1 BAA believes the debate on aviation and climate change needs to be seen in the wider framework of UK, EU and international commitments to sustainable development. Like many companies, we work within the UK Government's policy approach, which entails meeting four objectives at the same time:

- maintenance of high and stable levels of economic growth and employment

- social progress which recognises the needs of everyone
- prudent use of natural resources
- effective protection of the environment.

3.2 BAA believes that responsible air transport and airport growth should take place only where it is in accordance with these sustainability objectives. BAA further accepts that there are certain known environmental limits, such as the earth's capacity to handle greenhouse gases, which demand a clear and specific response.

3.3 However, in keeping with the emphasis placed by a sustainable development framework on policy integration, BAA believes the debate on aviation needs to recognise both the realities of environmental limits and aviation's socio-economic benefits. Economically, aviation plays a crucial role in promoting the high-knowledge and high-value-added industries, such as electronics, pharmaceuticals, insurance, and finance.

3.4 Socially, air travel is a facilitator – for people to visit friends and family scattered around the world, to seek new cultural experiences, to learn, to visit parts of the world inaccessible to their parents or grandparents. Sustainable development rightly places emphasis on improving quality of life for all. In this context, the fact that aviation is now accessible to most people, at least in the more prosperous countries, is both significant and welcome.

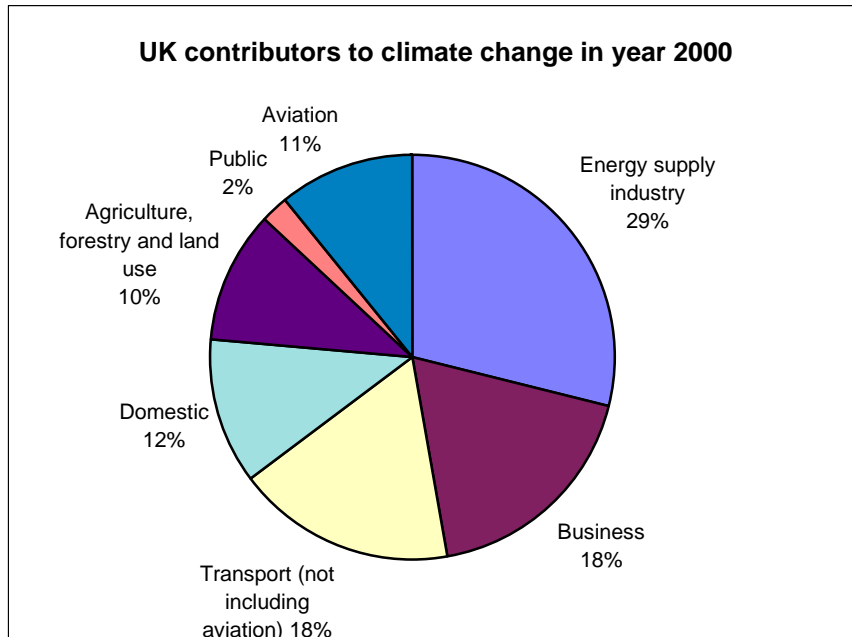
3.5 BAA regards the emphasis placed by a sustainable development framework on policy integration as fundamental, and we therefore reject approaches to tackling aviation's environmental impacts, including greenhouse gas emissions, which are aimed simply at reducing demand by raising the cost of flying through taxes and charges. However, we do recognise that the consequence of a regime of smart, well-targeted instruments may be higher costs and reduced demand. We believe this approach – of targeting the impacts of the activity rather than the activity itself – is the right approach.

Climate change and aviation: the overall challenge

3.6 BAA supports the UK Government's leadership position on climate change. We note the commitment of the UK and Swedish Governments to a target of 60% CO₂ emissions reductions against 1990 levels by 2050. Moreover, BAA notes the EU's publicly stated long-term climate change policy objective:

“a long-term objective of a maximum global temperature increase of 2° Celsius over pre-industrial levels... In the longer term this is likely to require a global reduction in emissions of greenhouse gases by 70% as compared to 1990, as identified by the Intergovernmental Panel on Climate Change (IPCC)”²

3.7 Globally, the IPCC analysis on aviation indicates that aviation is responsible for approximately 3.5% of total human radiative forcing, or climate change impact³. For the UK, in the year 2000, aviation's total climate impact amounted to about 11% of the UK's total climate impact. Thus, while aviation's current climate impact is significant, it is nevertheless still smaller than the climate impact arising from other sectors of the economy, such as power generation (29% of UK's total climate impact in 2000)⁴.



Based on data from:
Climate change: The UK Programme, Defra, February 2001 and
Aviation and Global Warming, DfT, January 2004

3.8 However, BAA recognises that aviation's climate impact is set to grow, and grow significantly, while a UK economy-wide total reduces in line with the requirements of the earth's global environmental capacity, and that in line with the precautionary principle, aviation must accept its responsibility to address the climate effects of this growth. In addition, as recognised by Governments at the Johannesburg Sustainable Development Summit, the priority to meet key human development needs such as clean water, food, and sanitation (in both developed and developing countries) will rightly use up a significant proportion of the earth's environmental capacity.

3.9 BAA believes there is a powerful economic and social case for aviation to take up some of the remaining capacity, given the absence of short-term technological solutions within the aviation sector, compared with the availability of solutions in other sectors of society. Importantly, this would only be permissible by users of aviation paying for emissions reductions (clean development) in other economic sectors – in developed countries, in transition economies, or in developing countries.⁵

Solutions to aviation's climate change impacts

3.10 BAA believes that effectively addressing climate change requires action at all levels – local, regional, national, EU and international. While climate change is a global problem and unified global action is the ideal, BAA recognises that regional political and trade blocs such as the EU have a key role in shaping public policy on climate change, and BAA is pleased that the EU is engaging seriously and constructively on the issue of aviation and climate change. In particular, EU-level action can provide an effective interim policy response prior to the development of more co-ordinated global frameworks.

3.11 BAA supports the EU Emissions Trading Scheme, and points out that domestic airport emissions arising from substantial power use (energy infrastructure in excess of 20 megawatts) are already included in the first phase of the EU Emissions Trading Scheme from January 2005. To meet our obligations under the EU Emissions Trading Scheme, BAA has therefore registered three sites: the two Gatwick terminal buildings and the Heathrow central boiler house, which supplies Terminals 1, 2 and 3. In addition, we would like to register a fourth site (Terminal 5) for entry into the scheme

during 2005/6. The EU Emissions Trading Scheme does not apply to our other sites, as the energy plants are below the threshold of 20 megawatts.

3.12 BAA very strongly supports the UK Government's objective to try to extend the EU Emissions Trading Scheme, by linking intra-EU flights within the scheme by 2008, and we welcome the Government's intention to make this a priority for the UK's EU presidency in 2005. We believe that this will help to bring aviation within the club of climate-responsible industries. We believe that all intra-EU flights should be linked with the EU Emissions Trading Scheme, irrespective of the nationality of the airline (including EU and non-EU airlines). The full legal allocation of international aviation's climate change impact to country governments should therefore be urgently addressed, so there is clarity over which countries are responsible for which aviation emissions.

3.13 BAA believes that partial integration of intra-EU flights with EU emissions trading (where airlines can buy EU emissions allowances from the open EU market but not sell to that market) is deliverable by 2008, and that full integration (both buying and selling) is achievable by 2013.

3.14 BAA believes that an environmentally-credible emissions trading scheme should embrace a number of key principles, and these should guide EU public policy on addressing aviation's climate change impacts. These principles include deliverability, environmental effectiveness, economic efficiency and equity.

3.15 BAA believes that linking intra-EU flights with EU emissions trading must be seen as a first step towards including all aviation within a global system of open emissions trading. Parallel pressure should therefore be brought by EU member states on the US, Russia, and other non-EU regions across the whole climate change agenda, including on aviation. BAA welcomes the UK Government's declared intention to use its Presidency of the G8 to press for further international progress on the climate change agenda, and hopes that this will lead to non-EU nations taking a more constructive, international approach to resolving the issue of aviation's climate change impacts.

3.16 *The Future of Air Transport* White Paper highlighted:

"The Intergovernmental Panel on Climate Change report Aviation and the Global Atmosphere included a central estimate that the impact of aviation emissions was 2.7 times the impact of CO₂ alone" [due mainly to the climate-warming effects of NO_x and water vapour emissions (contrails) in the atmosphere and cirrus cloud enhancement effects]... "A decision would be needed on how the extra impact of aviation should be taken into account when designing the sector's participation in the trading regime"⁶.

3.17 To the maximum extent practicable, BAA would like to see the allocation methodology take a smart, targeted approach and not adopt an allocation methodology based simply on multiplying CO₂ emissions by a radiative forcing factor of 2.7. We believe that a CO₂ x 2.7 approach could send perverse incentives to the aviation industry to reduce CO₂ at the expense of other non-CO₂ climate impacts. For instance, there is a known trade-off between CO₂ and NO_x, and it would be perverse to encourage an increase in NO_x in order to achieve reductions in CO₂. In addition to this being a problem from a climate change perspective, it could also compromise progress towards the delivery of EU public policy objectives on NO_x and local air

quality.

3.18 BAA has therefore suggested that, for the 2008-2012 phase, aviation could be linked with EU emissions trading on the basis of both aircraft CO₂ and NO_x emissions. Provided airlines were prevented from selling Aviation Allowance Units into the open EU trading market, the targeting of both CO₂ and NO_x would not compromise the EU Emissions Trading Scheme's compatibility with the Kyoto Protocol. It should be noted that this is true even though NO_x is not yet legally designated as a greenhouse gas within the Kyoto Protocol basket.

3.19 From 2013, BAA would also like to see aviation's contrail and cirrus impacts directly, separately, and fully integrated into EU emissions trading. The legal designation of aviation's non-CO₂ impacts should be prioritised as a step towards enabling the direct, separate, and full integration of aviation's CO₂ and non-CO₂ impacts within emissions trading. However, while it is possible to differentiate aircraft in terms of CO₂ and NO_x emissions performance, further scientific research is necessary in order to move towards differentiating aircraft operations in terms of contrails and cirrus effects. Without advances in scientific understanding, contrail and cirrus impacts could only be incorporated within EU emissions trading on the basis of an averaged "per kilometre" impact. BAA would therefore welcome international research, funded by the aviation industry, to develop a predictive system capable of assessing, to a reasonable degree of accuracy, the CO₂, NO_x, contrail and cirrus impact of any given flight.

3.20 We strongly oppose alternative policy instruments of blunt taxes and charges, where the revenue raised flows into the public purse for general government expenditure and is not exclusively and entirely hypothecated to purchasing emissions reductions in other parts of the economy. Such instruments offer limited positive environmental benefit, impact negatively on competitiveness, and essentially act to tax away demand and the positive benefits that aviation brings.

Conclusions

3.21 Aviation has a small, but significant and growing impact on climate change, and this must be addressed.

3.22 Aviation should be brought within the mainstream of industry and climate change policy within the UK and the EU, as quickly as practicable. The most effective way of achieving this is for intra-EU flights to be linked with the EU Emissions Trading Scheme from 2008.

3.23 EU policy to address aviation's climate change impacts is a welcome and necessary first step to global solutions, but the UK Government and the EU must rigorously pursue this agenda internationally through the G8 and other bodies.

¹ "Aviation and climate change: A BAA perspective", October 2003. The position can be downloaded by clicking on "Aviation and climate change seminar" within: http://www.baa.co.uk/main/corporate/sustainable_development_frame.html

² Article 2, the 6th EU Community Environment Action Programme, adopted in co-decision in 2002

³ Based on 1992 data. IPCC (1999) *Aviation and the global atmosphere*. Cambridge University Press.

⁴ 2000 figures, based on: *Climate change: The UK Programme*, Defra, February 2001 and *Aviation and Global Warming*, DfT, January 2004

⁵ The Kyoto Protocol (KP) provides for three 'flexibility mechanisms', to assist Annex B countries (those taking on legally binding emissions reduction targets) to deliver against their targets. These

flexibility mechanisms are: Joint Implementation (article 6 of the KP), the Clean Development Mechanism (article 12 of the KP), and Emissions Trading (article 17 of the KP). It is recognised that the JI and CDM mechanisms will help facilitate clean development in transition economies and developing countries.

⁶ Paragraph 8, Annex B, *The Future of Air Transport*, Department for Transport, 16 December 2003

SUBMISSION FROM GREENSKIES ALLIANCE

Air transport and climate change

The Aviation Environment Federation leads the Europe-wide GreenSkiesAlliance of environment NGO's and community groups, of which TransformScotland is a member. We believe that a comprehensive menu of options is required to develop an effective strategy to control and reduce air transport's environmental impacts, including the sector's growing climate change contribution, and that an emphasis on regulatory control will always be required. Voluntary measures can often be introduced quickly and can encourage companies to go beyond any legal requirements, but ultimately it is not in their shareholders interest to voluntarily impose measures that will restrict their business.

Sadly, we are of the view that this sector is already environmentally unsustainable. This is because the forecast rate of growth, estimated at 3-4% per annum, is simply outstripping the rate of technological and operational improvements, currently in the 1-2% range per annum. The overall negative environmental impacts of the air transport sector are therefore steadily increasing.

Experience also suggests that many voluntary, and even some statutory, agreements only remain in force while the industry is able to comply with them. As soon as an agreement starts to hinder the day-to-day operation of an airport or airline, or requires any significant growth-restricting action, many agreements are amended, renegotiated or ignored.

Economic instruments, or market based options, are important for several reasons: in addition to being used as a demand management tool, they may be applied to internalise the external environmental and social costs of aviation; create an incentive to operate clean and quiet aircraft; help other modes of transport such as high speed and inter-city rail to compete more effectively; and to stimulate R&D projects. As noted in the Arthur D Little report produced during the recent U.K. Department for Transport White Paper consultation process, although new technologies are a possibility, they may require economic or regulatory measures to create the necessary "market" that makes it commercially viable for manufacturers to go from the design stage to production. Without these measures acting as a driver, there is no incentive for airlines to go beyond minimum environmental standards – a cynic might say undoubtedly so, as Transport Ministries, Civil Aviation Authorities, regulatory bodies such as UN ICAO and airlines and airports regularly collude to prevent the industry "suffer" what in their collective view might be "unnecessary" cost burdens.

However, since it is often difficult to predict how the market will react to the introduction of environmental levies, there is no guarantee that economic instruments will deliver a given target. For this reason, the Government will always need to provide regulatory safeguards to protect residents and the global environment from unacceptable levels of noise, air pollution climate change impacts and so on.

Hence, regulation should establish limits, while other measures should be used to encourage best practice. Without local or global limits, the industry will probably continue to become more efficient through some supply-side improvements but its cumulative environmental impacts will continue to grow.

We are pleased to note however that companies such as BAA plc and British Airways acknowledge the tax and rationing basis of market based options such as an emissions trading scheme. They view air transport as so important, however, that other sectors should provide aviation with the wherewithal to carry on "business as usual".

We are not big fans of emissions trading schemes as currently envisaged for this sector for the reasons outlined below.

Climate change studies, and commentaries on the effects of air transport emissions on the global atmosphere, stem from the seminal 1999 UNIPCC Special Report, "Aviation and the Global Atmosphere". There is no doubt that the entire range of emissions and consequent greenhouse effects from flight operations are a major and growing source of climate change. We would make three observations at this point:

The climate change contribution from aircraft emissions is more than CO₂ alone and all impacts should be considered when developing control strategies

The present enthusiasm from industry and policymakers for emissions trading solutions is speculative and misplaced

The industry is unfortunately still engaged in wilful attempts to "deny, minimise and delay" the science of climate change

Most regulators seem to have realised that these global climate impacts from air transport are a significant problem. Again, the recent air transport policy development process in the U.K. has produced forecasts showing the likely range of both internal and international CO₂ emission increases but unfortunately omitted a base case for comparisons to be made. We are glad that following our prompting, the U.K. Department for Transport did commission its consultants, Halcrow, to identify and publish this baseline.

The table on the following page puts all the UK aviation CO₂ emission forecasts in the context of current national reduction targets for this gas.

Between 1990 and 2030, UK CO₂ aviation emissions are forecast to increase by up to 60.1 million tonnes. This nearly offsets (83%) the total reduction in CO₂ emissions required to meet the Government's commitment, treaty plus voluntary contributions, under the Kyoto Protocol.

This level of emissions growth is unsustainable. Any workable emissions trading scheme would have to identify savings elsewhere in our economy, or further afield, at least in the region of the 60mtc UK "aviation excess", which would be allocated to and then purchased at an appropriate cost within any trading scheme. And an "open" scheme would pit aviation against other industrial sectors that may also want to buy growth through this mechanism. Environmental taxation in whatever form should, in our view, aim to achieve a significant reduction in air transport's forecast contribution to climate change, not be a means of paying a low price to ensure "business as usual".

The UK CO₂ & Aviation CO₂ Emissions Scenario

Total UK CO ₂ emissions in 1990 (source: Netcen)	603 million tonnes (mt)
Reduction required to meet Kyoto target by 2012 (5.2% below 1990 levels)	31.4 mt
Reduction required to meet UK voluntary target under "Kyoto Plus" by 2012 (12% below 1990 levels)	72.4 mt

UK Aviation

(a) 1990

Total UK aviation CO₂ emissions in 1990
from bunker fuels (source: Netcen) 14.8 mt

Estimated total UK aviation CO₂ emissions
including domestic in 1990 (approx. 4%) 15.4 mt

(b) 2000

Total UK aviation CO₂ emissions
including domestic in 2000 33.4 mt
(source: Halcrow. Netcen is 31.8 mt)

(c) 2030

Total UK aviation CO₂ emissions
including domestic in 2030 66.99 mt – low traffic growth
(source: Halcrow) 76.5 mt – high traffic growth

We reproduce below an extract from the House of Commons Environmental Audit Committee Aviation: Sustainability and the Government Response, Seventh Report of Session 2003–04, which puts these emissions further into context:

Aviation and the 60% target

In our previous report on aviation, we were concerned at the lack of readily available and commonly agreed statistics on aviation emissions and their impact on future carbon reduction targets. We therefore set these out in a table which we reproduce here for reference, and highlighted the fact that by 2050 aviation emissions would amount to 66% of total UK domestic emissions.

	Millions of tonnes carbon (MtC)			
	1990	2000	2030	2050
1. Aviation (excluding RF)	4.6	8.8	17.7	17.4
2. Aviation (including RF @ 2.5 times) [line 1 x 2.5]	11.5	22.0	44.3	43.5
3. UK domestic emissions	164.8	147.0	98.7	65.8
4. Total UK emissions, including aviation but not RF [line 1+ line 3]	169.4	155.8	116.4	83.2
5. Total UK emissions, including aviation plus RF [line 2 + line 3]	176.3	169.0	143.0	109.3
6. Aviation (including RF) as a percentage of UK domestic [line 2 ÷ line 3]	7%	15%	45%	66%
7. Aviation (including RF) as a percentage of total UK [line 2 ÷ line 5]	7%	13%	31%	40%

When we say “*at least*” in the previous paragraph on page 2 above, this is because of the complications involved in establishing an emissions trading scheme for this, and indeed any other, sector:

- Any scheme would have to be on an agreed “cap & trade” basis i.e. an absolute base level of emissions is set and then the excess traded from verifiable sources **but**
- The emissions “bank” can only come from reductions over and above Kyoto and any subsequent international or voluntary targets to avoid double counting – it is

extremely difficult to avoid what is termed “hot air” (non-existent savings) creeping into schemes which essentially are variants on a “robbing Peter to pay Paul” scenario

- As yet there is no agreement on how to allocate international emissions from air transport
- The radiative forcing effect of aviation emissions is more than CO₂ alone due to other emissions such as NO₂ and condensation trails leading to cirrus cloud formation - the current accepted multiplier is 2.7 times
- Aviation emissions are **not** exempt from the Kyoto agreement: the sector’s regulatory body ICAO, through its CAEP entity, and the UNFCCC SBSTA (technical) and COP (negotiating) bodies have been charged with developing an appropriate allocation system for international emissions and potentially an emissions trading scheme as part of a range of market-based options to control and reduce emissions from the sector – progress is painfully slow
- Our research into the claims made for existing emission trading schemes have left us very, very sceptical about their real effectiveness

And on this last point, the Inquiry might like to know our views on the DEFRA-managed UK Emissions Trading scheme, which began in March 2002.

The UK’s flag carrier, British Airways, became the first airline in the world to take part in an emissions trading scheme with the aim of stabilising CO₂ emissions. In doing so, it will qualify for Government grants worth more than £6.5 million. The airline has promised to reduce CO₂ emissions from its domestic flights and premises by 125,000 tonnes (out of a total of approx. **17 million tonnes** that the company produces each year right now!). BA has reduced its global CO₂ emissions by over 500,000 tonnes in the past 2 years. But this has been achieved largely through cutting loss-making flights and downsizing its workforce to reduce operating costs.

BA claims to be making savings by moving to newer more fuel-efficient aircraft. The airline is also shifting parts of its older, smaller regional fleet to be operated by other airlines.

So the mix of CO₂ emissions BA is currently “trading” comes from some small energy efficiency gains but mainly from reduced economic activity due to route cuts; transferring some emissions to other airlines outside the scheme by giving them some of its internal UK routes and planes; and loss of market share to low-cost carriers who are currently outside the scheme as well.

Even if BA fails to reach its reduction targets, and assuming a market price of £5/tCO₂e (a high estimate) it would need to buy emission credits worth about £1.9 million over the scheme’s five years. But this figure is dwarfed by the £6.67 million incentive BA will receive from the Government. It is plainly wrong that companies should be receiving payouts of this magnitude largely for “virtual” savings. And set against the future growth in UK air transport CO₂ emissions, of which BA will have its fair - and massively increased – share, the short term nature of such schemes are exposed plainly and simply as climate fraud. This is a most perverse reversal of the “polluter pays” principle!

[The previous paragraphs are based on the article “*Hot air blows gaping hole in emissions trading scheme*” from The Ends Report, March 2002. www.endsreport.com]

This Inquiry might also like to know that the recent EC commissioned research project, “*TRADEOFF - Aircraft emissions: Contributions of various climate compounds to changes in composition and radiative forcing – tradeoffs to reduce atmospheric impact*” found that the latest look at the potential cirrus cloud impacts directly related to aviation emissions in

the atmosphere raised the radiative forcing multiplier significantly, as the comparison below shows:

2000 TRADEOFF best estimate: ~4.4
2000 TRADEOFF low: 3.3
2000 TRADEOFF high: 5.5

2050*TRADEOFF best estimate: ~4.7
2050* TRADEOFF low: 3.6
2050* TRADEOFF high: 5.7

1992 IPCC best estimate: 2.7
1992 IPCC low: 1.9
1992 IPCC high: 4.0

2050* IPCC best estimate: 2.6
2050* IPCC low: 1.9
2050* IPCC high: 5.3

* UN IPCC Fa1 scenario. Sources: UN IPCC Special Report & EC TRADEOFF study.

We would ask this Inquiry to make sure this latest important research is submitted to Scottish Ministries and officials as appropriate. There is a significant difference between 2.7 and 4.4-4.7!

We are very concerned too that the likely future costs of climate change are understated. To this end, we conducted some research and found that UNEP and the financial services industry are jointly also very concerned and are of the opinion that climate change risks are inadequately priced. We enclose below the UNEP Financial Initiatives press release detailing these concerns:

Financial Sector, Governments and Business Must Act on Climate Change or Face the Consequences

Too few financial companies including banks, pension funds and insurance companies are taking the risks and opportunities posed by climate change seriously, members of the United Nations Environment Programme's (UNEP) Finance Initiatives are warning.

Zurich/Nairobi, 8 October 2002 - Losses as a result of natural disasters appear to be doubling every decade and have reached one trillion US dollars in the past 15 years. Annual losses, in the next ten years, will reach close to \$150 billion if current trends continue. The massive economic losses stemming from the devastating summertime flooding in central Europe are in line with the kinds of increasingly severe weather events anticipated by scientists as a result of human-induced climate change. This year has also seen a failure of the Monsoon in Asia, dramatic forest fires in the United States and the onset of another El Nino event in the Pacific. Members of the UNEP Finance Initiatives, a unique partnership between UNEP and 295 banks, insurance and investment companies, argue that climate change-driven, natural disasters, have the potential to wreak havoc across the world's stock markets and financial centres.

"The increasing frequency of severe climatic events, threatening the social stability or coupled with significant social costs, has the potential to stress insurers, re-insurers and banks to the point of impaired viability or even insolvency," the report, Climate Change and the Financial Services Industry, says. The property market, where loans for houses and buildings are made over relatively large periods, could be particularly vulnerable as a

result of extreme weather events. Homeowners and companies with property holdings may find that their insurance cover is cancelled at short notice, leaving them highly exposed.

Government action to arrest the problem will inevitably mean a reduction in emissions of the main sources of greenhouse gases linked with global warming. This will require cut backs and the more efficient use of fossil fuels such as coal and oil.

Asset managers, such as pension funds which are slow to appreciate the climate change threat, may see the value of energy or power company holdings decline as investors become more aware of the liabilities linked with carbon intensive industries, the report further concludes.

Yet opportunities are emerging that should allow the financial services industry to reduce or hedge against the risks and even help curb emissions of the greenhouse gases linked with the de-stabilisation of the Earth's climate and weather systems. The report says that the annual market in trading greenhouse gases, emerging as a result of international agreements to reduce emissions, could be worth as much as US \$ two trillion by 2012. The market for clean energy could stand at \$1.9 trillion by 2020, according to some estimates.

Meanwhile the financial services industry, with over \$26 trillion in assets under management, could if mobilized "wield significant influence over future economic development...and therefore the future global greenhouse gas emissions" for the benefit of itself and society as a whole.

However a survey of mainstream financial institutions carried out for the report indicates that most are "unaware of the climate change issue" or have adopted a "wait and see policy". These attitudes are due to the prolonged wrangling over the Kyoto Protocol, the international treaty designed to deal with the threat of global warming, compounded by practical issues like the lack of solid information on emissions and delays in finalising the regulations of the new greenhouse gas markets.

As a result, only a small group of forward looking financial companies are addressing the issue many of whom are re-insurers whose businesses are already feeling the economic impact of rising, weather-related, insurance claims.

Klaus Toepfer, UNEP Executive Director, said today at the launch of the report: "This report is a wake up call for the global financial community. It highlights the real risks and economic perils they are facing as a result of human-influenced climate change. It also highlights how the industry can make a real difference through harnessing the new market instruments and mechanisms made possible by the Kyoto Protocol and by developing their own imaginative solutions."

"It also underscores how, given the financial muscle available to them, these institutions could move markets and minds to deliver a cleaner, healthier and less vulnerable world for the benefit of the world economy, for the benefit of people everywhere," he said.

The report and its studies, supported by a group of the world's biggest banks, insurers and re-insurers, were launched today at the Swiss Re Greenhouse Gas conference in Zurich, Switzerland. The findings will also be presented to governments at the next round of climate change negotiations set to commence in New Delhi, India, on 23 October until 1 November.

"In addition to the emitting industry needing to take a carbon constrained future into account", concluded John H. Fitzpatrick, CFO and member of the Executive Board of Swiss Re, "the financial services industry, of which we are a part, also has an obligation to contribute to the solution of these problems through its own investments and business expertise. After all, climate change and substantial emissions reductions - like any other strategic global business challenge - ultimately becomes a financial issue. The problems associated with environmental disasters quickly become measured in dollars and cents. Our industry needs to lead by developing financial solutions and risk mitigation techniques to assist our clients in achieving global emission reductions."

The report has drawn up a blueprint for action, designed to galvanize the financial services industry to address the climate change threat more directly. The blueprint is also aimed at assisting governments to create the right conditions for the industry to operate swiftly and effectively in delivering new climate-related businesses and markets.

Recommendations include urging insurers and re-insurers to better reflect the risks from climate-related perils in policies and to develop public/private partnerships in high-risk areas so that cover can be maintained.

Commercial banks should fully price risks from climate change into loan agreements and give incentives to schemes that encourage energy efficiency or cleaner fuels.

Asset managers, such as pension funds, should request the companies in which they invest better information on their carbon emissions and their exposure to greenhouse gases.

Accountants, actuaries, analysts, credit rating agencies and others providing professional services should help corporate clients to better understand the threats and opportunities of climate change. Greenhouse gas trading markets need standardized accounting methods to operate and is thus another area where professional people and their professional organizations can help.

Meanwhile governments are urged to adopt a long term, global plan, to keep greenhouse gases at safe levels. This is vital because the Kyoto Protocol runs out in 2012 whereas carbon dioxide, methane and the other greenhouse gases can persist in the atmosphere for many tens of decades. At home, governments should also take a variety of actions including a clear commitment on how greenhouse gas reduction targets will be met alongside economic incentives for investing in clean energy schemes and clean energy research and development.

Governments are also asked to work with stock market regulators to help boost understanding of the impacts of global warming on publicly listed companies and new offerings.

The report concludes by calling for a major drive to mobilise the financial sector on this issue and recommends that new financial techniques and methods are developed to help investors and project financiers factor in climate change into the valuation of their assets.

Notes to Editors: The UNEP Finance Initiatives is a partnership between UNEP and 295 financial institutions worldwide. The report, Climate Change and the Financial Services Industry, was prepared by Innovest Strategic Value Advisors of Richmond Hill, Toronto, Canada, under the direction of the UNEP FI Climate Change Working Group which comprises : Andlug Consulting; Citigroup; Corporacion Andina de Fomento; Dresdner Bank AG; Gerling Sustainable Development Project GmbH; Munich Reinsurance Company; Prudential; SAM Sustainable Asset Management; and Swiss Re.

It is available on-line in Pdf format from 8 October at www.unepfi.net.

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The point we are making here is that prevention costs need to be factored into all financial calculations or cost benefit models, not just damage costs. And as we have already said, CO₂ alone is not a sufficient basis for developing market based options – all greenhouse gas emissions from air transport need to be taken into account. For us, the best way to do this is to use the radiative forcing multiplier effect identified by IPCC of 2.7 although as we mention previously, new EC research shows that the cirrus cloud effect is now better understood and significant raises the radiative forcing multiplier.

And actions in the air transport sector need to be linked to energy sector activity and policy too. For example, the recent U.K. Energy White Paper “*Our energy future - creating a low carbon economy*” had this to say about aviation emissions.

“We need to reduce the emissions from aviation...”

5.22 Demand is rising in the aviation sector internationally at about 4% a year. We all benefit from the growth in business, services and our ability to travel. Intercontinental aviation emissions currently do not count in the national inventories of greenhouse gas emissions. There is no international agreement yet on ways of allocating such emissions. The UK’s international emissions currently amount to some 8MtC ((MtC including domestic). They are expected to rise to some 14-16 MtC by 2020.

5.23 We are committed to ensuring that the long-term development of aviation is sustainable and that it meets its external costs. We are discussing with stakeholders the most economic instruments for ensuring that the industry is encouraged to take account of, and where appropriate reduce, its contribution to global warming. We will set out our plans in an Air Transport White Paper. Potential instruments to address CO₂ emissions from international aviation being considered internationally include an en route emissions charge and participation in an open emissions permit trading system. For domestic flights British Airways has joined the U.K. emissions trading scheme. There may be opportunities for future participation in this scheme for other carriers who operate U.K. routes.”

Extract from: “Our energy future - creating a low carbon economy” UK DTI 2003.

All regulatory authorities involved in this area of policy development need to ensure that policy suggestions and discussions at ICAO and ECAC, the international bodies that regulate aviation are in line with their respective states or institutions current and future energy policies. We would welcome sight of any other similar policy documentation from the Scottish Executive regarding its greenhouse gas reduction strategies for air transport.

And whilst we are mentioning other policy areas, we assume that Scotland’s Transport, Environment Ministries and SEPA also talk and consult their respective taxation authorities, such as Treasury and Finance Ministries, both nationally and at Westminster,

on how best to control and reduce the growing climate change impacts of increased Scottish air transport?

The Amsterdam Treaty commits European Governments to internalise the external costs of transport modes and recent Commission policy proposals commit Europe to taking unilateral action if discussion at ICAO fails to produce meaningful results on how best to deal with aviation's climate change impacts. We really need a Europe-wide diplomatic and technical initiative on internalising external costs via aviation fuel taxation, an en-route emissions charge scheme and an ETS policy that should be spelled out with targets and a timetable.

To sum up:

- We need a policy on allocation from SBSTA
- Clear recognition must be given to IPCC's current accepted view and the most recent EC work on radiative forcing multipliers – MBO's must have an unambiguous relationship to the full range of greenhouse gases and other effects from aircraft exhaust emissions at altitude
- We need clear Kyoto derived/linked targets for both the EU's and ICAO's MBO work
- We need an urgent European position on the introduction of an en-route emissions charge and an aviation fuel tax should ICAO fail to deliver
- We believe that Europe should press ahead with an en-route emissions charge scheme anyway with a clear target-led reduction strategy. We recommend that an en route emissions charge is introduced immediately to address the impact of aviation greenhouse gas emissions on climate. An emissions trading scheme will only be supported if it is proven to be environmentally effective and continues to encourage the sector to make real reductions in its emissions. Part of the assessment of the environmental effectiveness of any potential scheme will be compliance with the following conditions, either in its design or in a supporting climate strategy*
- Aviation's regulatory authorities should show evidence of cross-cutting policy development with other bodies, such as Finance and Energy Ministries
- The prevention cost of measures to combat climate change should reflect worst case scenarios and consultation extended to financial institutions, such as re-insurance companies
- The scheme should adopt a stringent cap, and/or sectoral allocation, consistent with states responsibilities under the Kyoto Protocol or any other subsequent agreement under the UNFCCC
- That the trading scheme (or wider policy - see note below) is based on the total radiative forcing potential from all aviation emissions, not just CO₂
- That permits are auctioned as opposed to grandfathered (or, in the latter case, combined with an environmental charge to account fully for externalities - see note below)
- The system is transparent and all emissions reductions can be independently verified
- The potential to introduce JI or CDM credits into a scheme is capped (at a level not exceeding 20%).

* It is recognised that these conditions may not necessarily be an integral part of a trading scheme providing other measures are in place in parallel (a phased programme of introduction is not acceptable). For instance, permits may not be fully auctioned if an emissions charge (or other economic instrument with the objective of capturing externalities) is levied in conjunction with a charge. Similarly, a scheme may not necessarily include other greenhouse gases, or be based on total radiative forcing potential, if other instruments (economic or regulatory) deal with these issues more effectively and are in force.

Finally, we have recently tried to work out just what the effect on airline ticket prices of the sector joining the European ETS might be. If our major UK airline, British Airways, had to buy permits in the market place for **all** its intra-EU CO₂ emissions, the financial impact would look like this:

- British Airways has 38 mppa worldwide
- 22 mppa are intra-EU
- Total CO₂ worldwide - 15 million tonnes
- 20% CO₂ intra-EU - 3mt
- @ £10 tonne = £30 million
- £2.73 per passenger return trip

However, if we assume the base year to be 1990 (consistent with phase 1 of the current EU ETS for the sectors involved so far) then the grandfathered allowances for British Airways will be 95% of the 1990 figure and the impact on ticket prices looks like this:

- Total CO₂ for BA in 1990 was 10.98 million.
- 20% of emissions are intra-EU then permits required for approx. 900,000 tonnes of CO₂
- @ £10 a tonne = £9million.
- 22 million intra-EU passengers, this would only be £0.41 per single journey on tickets, £0.82 per return trip

Our carefully considered opinion is that £2.73 on an intra-EU return ticket would be unlikely to have any noticeable supply or demand side effects and therefore no impact whatsoever on the sector's growing climate change contribution, whilst the second calculation, perhaps the more likely scenario, results in an even lower cost increase per return trip of just 82 pence!

This goes some way to explaining the current "enthusiasm" from the sector for entry into the European ETS!

We hope the Inquiry finds this submission useful. If any points need clarification please let us know. We would be pleased to discuss this paper with the Inquiry's Members at an oral evidence session if you feel that would aid your deliberations.

SUBMISSION FROM THE ROAD HAULAGE ASSOCIATION

Introduction to The Road Haulage Association

The Road Haulage Association is the trade and employers association for the hire-or-reward sector of the road haulage and distribution industry, working on behalf of its members since 1945. The association represents approximately 10,000 member companies based across the UK, with a total road strength of over 100,000 vehicles and approximately 250,000 employees.

As well as lobbying government and the authorities on behalf of the membership, a major part of the associations remit is to ensure that the road freight sector has the knowledge and ability to operate in a safe, efficient and environmentally aware manner.

To achieve these aims we work closely with truck manufacturers and the suppliers of ancillary products, both nationally and internationally.

The role of road haulage

Modern day lifestyles are heavily dependent on the ready availability of efficient freight transport. Without it retailers would not be able to offer the range of products that they do throughout the year at acceptable prices (i.e. items that previously would have been available only on a seasonal basis) and manufacturers costs would be higher, leading either to more expensive goods to the consumer or to the loss of business to competition from abroad. Those who would wish to reduce the movement of lorries on the roads must accept therefore that society in general would need to be prepared to accept some very significant changes to their lifestyles. That said the industry is constantly seeking ways to improve its efficiency and effectiveness and to reduce the impact that it has on the environment and on the community in general.

What is already being done by the Road Transport Industry?

As an industry I believe that we are already environmentally aware, with all major truck manufacturers and parts suppliers endeavouring to provide goods vehicle operators with ever lower emission producing vehicles. Furthermore, for the last twelve years, the United Kingdom's diesel engined commercial vehicles have been the only ones within Europe to be powered solely by Ultra Low Sulphur Diesel (ULSD). The Government's decision to introduce Ultra Low Sulphur Diesel (ULSD) much earlier than was required by the EU and in practice years earlier than the majority of other Member States has given us a head start in reducing the level of harmful particles being pumped into our environment.

The truck manufacturing companies are committed to investing heavily in research and development to find solutions to allow us to move into an even lower carbon economy. It is worth noting that, because of continuous engine emission improvements, thirty five of today's commercial vehicles emit the same mass of particulate matters as just one commercial vehicle being operated in 1990.

(source: MAN ERF)

All types of road transport between them emit a significant proportion of carbon emissions and air pollutants. It is essential, therefore, that we in the road freight transport sector continue to work closely with the Scottish Executive to drive down emissions and improve the present situation.

What is presently being done regarding the crucial issue of climate change?

Less than a year ago the Energy Saving Trust, working with the Department for Transport, hosted a one day workshop for government, customers and key vehicle suppliers in the road freight transport sector to discuss the potential future development and direction of three grant programmes: Power Shift, Clean Up Scotland and the New Vehicle Technology Fund.

Currently, Transport Energy Power Shift provides grants towards the purchase and costs of new electric, hybrid (i.e. diesel or petrol/electric) and gas powered vehicles, with the intention helping the emergence of a market for alternative, cleaner fuel vehicles within Scotland.

Clean Up Scotland provides grants towards the costs of purchasing and fitting emission reduction equipment, such as particulate traps, to existing, mainly diesel vehicles, plus the conversion of diesel vehicles to run on LPG or natural gas.

Results already look very positive for each of the grant programmes, with nearly 10,000 vehicles being funded through the Power Shift and Clean Up programmes so far. It is be acknowledged that most of these results relate to car based products, but this figure does also include a number trucks fitted with new technology to clean up or reduce the amount of emissions they produce.

Transport Energy grant programmes are funded, amongst others, by the Scottish Executive, and are an essential element of the existing strategy to reduce road vehicle emissions. The programmes aim to develop the market for clean, low carbon vehicles, provide advice and support to businesses and encourage Best Practice schemes, and investment in new technologies. Clean Up Scotland is operated by Transport Energy and the grant budget for the 2004 / 2005 financial year is £1.44 million.

Over the last two years, these programmes have achieved significant results in terms of both reducing carbon dioxide (CO²) emissions and driving the market forward for cleaner fuel vehicles.

And the New Vehicle Technology Fund provides grants to developers for the production of demonstration models of clean, low carbon vehicles and technologies.

Since its introduction in 2001 the New Vehicle Technology Fund has helped to support the development and demonstration of 22 new vehicles, including five Ultra Low Carbon Challenge projects.

In total, the Power Shift and Clean Up programmes have helped to save over 29,500 tonnes of CO² emissions entering the environment over the last two years.

Improvements in truck design continue, but they are not as evident as for cars. The emphasis on fuel efficiency has various contributions – diesel engine designers are producing impressive increments in fuel efficiency. This obviously helps lower the dependence on high volumes of fuel oil.

Since 2003 the Road Haulage Association has been a member of the Low Carbon Vehicle Partnership, from which the Commercial Vehicle Working Group advises on the issue of CO² emissions from Heavy Goods Vehicles.

In Scotland the association works closely with the Energy Savings Trust, with promotions via mail-shots to our members, as well as giving time for presentations at our Annual Conference and our Members Briefings.

We also have the Transport Energy Best Practice programme within the UK. This programme offers commercial fleet managers impartial information and practical advice on how to reduce costs and also cut vehicle emissions.

Results for this programme already show that changes in fleet management procedures and practices have helped to reduce CO² emissions by over 143,000 tonnes since the programmes inception.

We look forward to the introduction in April 2005 of the Safe And Fuel Efficient Driver training programme (SAFED) into Scotland. This scheme has already been implemented elsewhere in the UK and has been shown to dramatically reduce fuel consumption and subsequently lower the generation of harmful emissions entering the environment.

What can the Scottish Executive do to improve the situation?

We readily acknowledge that road transport contributes 22% of the UK's total CO² emissions and it is therefore vital that these programmes deliver even greater environmental savings in the future.

The Road Haulage Association is continually lobbying the UK Government for support and additional funding, research and development in this important area.

At the moment the Chancellor of the Exchequer at Whitehall implements a system of high fuel duty taxation rates in an attempt to influence the decisions

made by road users. However, the commercial sector has no alternative but to use the road network to effectively deliver goods. Indeed, presently over 69% of

goods are transported by road. And whilst the RHA supports efforts to encourage other forms of freight transport, it is widely accepted – including by Government – that road freight will remain the only viable choice for the vast majority of freight journeys for many years to come.

And, although the impacts of the use of fossil fuels are well understood, we live in a world where cost and competition remains a high priority. Road transport is under particular strain in respect of the environmental burden, as it lies at the intersection of sometimes conflicting interests between the commercial and competitiveness requirements of road freight and vehicle manufacturers and issues such as public health, traffic congestion and climate change. As a result, unless substantial incentives and / or subsidies are made available directly to goods vehicle operators, we need to accept that petrol and diesel will remain dominant in terms of road transport fuel for at least the next 30 to 40 years. In terms of performance, user-friendliness, safety and most importantly, price, petrol and diesel always has a clear advantage over the alternatives.

The UK road transport goods vehicle operator has improved dramatically, in terms of safety, efficiency and overall operational effectiveness over the last twenty years. This has been achieved largely without any financial help or long term assistance from government.

At the same time we have seen many operators leave the industry and few new entrants take their place. In March 2005 we will be faced with implementation of the Road

Transport Directive and by 2008 we will also be legally obliged to re-train our employees every five years (The Training Directive).

Both these pieces of legislation will have an impact on road transport and we expect to see a massive driver shortage and even more haulage companies being closed down.

Hopefully, the road transport companies that are left will be the most efficient and the most environmentally friendly.

To ensure that the future movement of goods is carried out by the best fleets, based within these shores, it is imperative that the Scottish Executive and the UK Government allow these businesses to operate on a "level playing field" with their European competitors.

Whatever penalties are imposed with regard to emissions and high rates of taxation, and whatever subsidies are made available to improve the environment, they must be uniformly imposed across all Member States if they are to allow this industry to survive in the long term, whilst committing itself to positive actions with regard to Climate Change.

SUBMISSION FROM TRANSFORM

1. Introduction

TRANSform Scotland is the national sustainable transport alliance, campaigning for a more sustainable and more socially-just transport system. Our membership includes local authorities, public transport companies, national environmental groups and local transport and environment interest groups, and individuals.

TRANSform Scotland considers that Scottish transport is too reliant on use of the private car and the heavy lorry, while government policy to increase the use of air travel seems to have forgotten the climate change impact of this most polluting form of transport. Trends continue to show rapid increases in use of these unsustainable modes, all of which are entirely dependent on the fossil fuel economy.

Rising car ownership and the falling real price of motoring have encouraged levels of car reliance that are reflected not only in increasingly sedentary lifestyles but also in widespread urban traffic congestion. Many journeys that are now made by car would once have been undertaken by bike or on foot or not contemplated at all. This has resulted in a range of transport problems, economic, social and environmental. This paper makes comments on the links between transport and climate change.

2. Trends in climate change emissions from transport

Firstly, transport is a major contributor to climate change. The transport sector accounts for 14% of Scotland’s greenhouse gas emissions and 23% of climate changing carbon dioxide emissions. Secondly, emissions from the transport sector are growing. Emissions from the transport sector have increased by 8% in Scotland since 1990.¹

The UK Government and the Scottish Executive have set out a range of commitments towards meeting greenhouse gas emissions reduction targets. The table below summarises the UK’s international and domestic commitments on reducing emissions of the gases which cause climate change:

Source	UK Target
UN Earth Summit 1992	Cut CO ₂ levels to below 1990 levels by 2000
Labour Party 1997	20% cut in CO ₂ by 2010 on 1990 levels
UN Kyoto Protocol 1997	12.5% cut in all 6 greenhouse gases by average of 2008-2012 on 1990 levels
Tony Blair February 2003	Adopting the Royal Commission on Environmental Pollution 60% cut by 2050.

The UK Government published *Climate Change: The UK Programme* in November 2000.² One section was also separately published as the *Scottish Climate Change Programme* (with the addition of a Ministerial Foreword). This Programme presents the Government’s plan to reduce climate change emissions from the different sectors of activity within the UK in order to meet our commitment under the 1997 UN Kyoto Protocol and the Labour Party General Election Manifesto pledge of 1997. The Programme deals with emissions from the following sectors: energy supply, business, transport, domestic, agriculture, forestry and land use, and the public sector. A recent analysis by the UK Sustainable Development Commission concluded that further radical measures were required if the UK is to meet the 20% target.³

Chapter 9 of Section 2, “Bringing it all together,” states that, in addition to the effect of the fuel duty escalator, action in the transport sector should produce 5.6MtC (32%) of the

predicted 17.75MtC reduction expected by 2010. It also states that further (unspecified) actions by devolved administrations are expected to lead to additional reductions in total emissions. These additional reductions are needed to meet the 20% CO₂ reduction target for the UK. Scottish Ministers have stated that Scotland will make an equitable contribution to meeting the UK Kyoto commitment.⁴

The Scottish section of the Programme states that “One of the main tools in recent years for cutting emissions from the transport sector has been the fuel duty escalator.” This measure has now been abandoned.

It also states “*the likely level of emission reductions from the measures outlined depends, among other things, on the extent to which local authorities take action at the local level, including the extent to which they utilise the proposed new powers on charging.*” Of Scotland’s urban local authorities, only the City of Edinburgh Council is pursuing congestion charging and its scheme will not commence until 2006 at the earliest.

3. Road transport

3.1 Road traffic growth

The Scottish Executive forecasts that, if no action is taken, that there will be a 27% increase in road traffic levels on Scottish roads between 2001 and 2021. Most of this growth will be focussed on urban areas.

It is our contention that there is a strong and clear correlation between the growth of road traffic levels and the growth of climate change emissions. Hence, the growth in road traffic levels must be tackled.

The 2004 Scottish Executive Transport White Paper contained one useful progress indicator: road traffic levels. We believe that this is a useful indicator as we believe it to be a good proxy for the environmental impact of road transport, and in particular climate change emissions. However, the target chosen – to stabilise total vehicle kilometres at 2001 levels by 2021 – is incompatible with the Scottish Executive’s commitments on climate change emission reduction. The UK Climate Change Strategy target is to reduce carbon dioxide emissions to 20% below 1990 levels by 2010; it also requires the UK transport sector to deliver 40% of all proposed climate change emission reduction. Therefore even if the Executive’s road traffic stabilisation target is met, we think it unlikely that the Scottish transport sector will be making an adequate contribution to the UK Climate Change Strategy.

The Executive lacks a comprehensive strategy to demonstrate how it will achieve even this target. The long timescale set, and the absence of interim targets, means that action is not being prioritised to take action to meet the target.

The 2021 road traffic stabilisation target is even more clearly incompatible in light of the need for further reduction in climate change emissions post-2010 (see RCEP: 2000).

3.2 Scottish Executive transport expenditure priorities

3.2.1 Priority for spending on sustainable transport is long-overdue

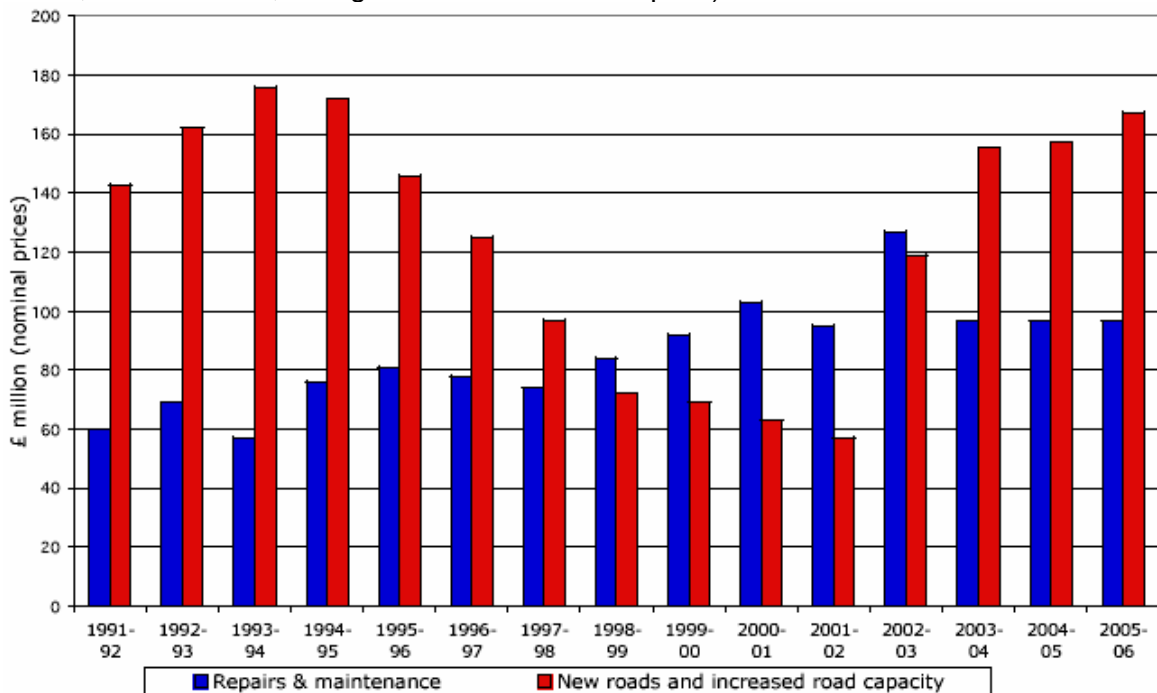
The Scottish Executive often asserts us that “70%” of transport expenditure will, by 2005-06, be on sustainable transport. This sounds impressive, but we believe it to be misleading, as we explain in Section 3.2.3 below.

It is certainly long-overdue for priority to be given to investment in sustainable transport (public transport, walking & cycling). However, we question why it will have taken the Labour/Lib Dem partnership seven years (i.e. since 1999), and the Labour government nationally the best part of a decade (i.e. since 1997), to prioritise spending on sustainable transport.

In the meantime, despite a series of positive-sounding policy statements, transport expenditure has continued to prioritise subsidy for the private car and the heavy lorry.

3.2.2 Spending on road-building is now at the same high level as it was under the last Scottish Office administration

Since 1999, the Scottish Executive has put in place a traffic-generating road-building programme due to cost more than £1 billion. Spending on new road-building is currently as high as it was in the final years of the last Scottish Office administration (see chart below; our estimates, background available on request).



The current roads spend does not however even include the largest and most expensive parts of the roads programme that the Scottish Executive intends. The largest element of this is the proposed M74 Northern Extension, estimated to cost £375-500 million, and up to £1 billion if procured by PFI. Since the 2002 spending review, the Executive has continued to make expensive new commitments, such as the Aberdeen western bypass, which is currently costed at £120 million (yet few people have confidence that this won't increase considerably given the size of the project).

Should the Executive decide to continue with these projects then the amounts devoted to road-building will undoubtedly leave the Labour/Lib Dem-led Scottish Executive with higher annual road-building spend than the Conservative-led Scottish Office – an administration widely criticised at the time by Labour and the Lib Dems for its excessive spend on traffic-generating road-building.

3.2.3 PFI road-building makes the Executive’s “70% on public transport” claim misleading

The vast costs of the Scottish Executive’s road-building programme are not properly reflected in its own published expenditure plans. The reason for this is that the Scottish Executive appears to favour building major road-building projects on a PFI basis. Such arrangements, which involve private investors providing the initial capital investment that the Scottish Executive then pays back in instalments over a long period of time (in some cases as long as 30 years) mean that the huge costs of road-building are being deferred.

Project	Status	Annual PFI cost
M74 through Dumfries and Galloway.	Road built and open.	Current PFI contract sees approx. £25 million per annum be paid to private consortium Autolink every year for 20 years.
M77 Fenwick-Malletsheugh and Glasgow Southern Orbital.	Under construction.	Total PFI cost estimated at £130 million, with payments to continue for at least 20 years after 2010.
M74 Northern Extension.	Still pending result of public local inquiry.	Conventional procurement estimated at £375-500 million. PFI procurement estimated at up to £1 billion – including annual payments of £25-34 million per annum for 30 years.
A96 Aberdeen western bypass.	Awaiting publication of road orders.	Total cost currently estimated at £120 million. Will this become a PFI project too – and if so what will it cost?

By choosing to finance such projects in this way, it means that the Executive does not highlight them in its short-term (three year) expenditure plans, and can make extravagant claims about public transport’s share of current investment. The Scottish Executive is effectively mortgaging Scotland’s future ability to invest in more sustainable transport.

The Scottish Executive’s transport expenditure plans also fail to take adequate account of the most sustainable modes of transport – walking and cycling. Most journeys are local in length (50% of *all* journeys are under two miles) and many are readily transferable to these modes. In the context of the negligible environmental impact and positive public health promoting aspects of these modes of transport, this is a serious omission from the Scottish Executive’s expenditure plans.

3.3 Transport costs and prices

3.3.1 Transport prices

Contrary to the frequent statements about the “hard-pressed motorist”, the simple fact is that over recent decades the real price of motoring has not increased. Motoring organisations often assert that car drivers pay more taxes than they receive back in government expenditure on roads and other facilities. This view however fails to consider the wider costs associated with motor vehicle use. As Professor David Begg said as long ago as 1991:

“This is an extremely superficial and myopic argument which fails to take any cognizance of the enormous environmental cost imposed by road transport on society in terms of air pollution, visual intrusion and noise. Moreover, it does not take into account the still unacceptably high accident rate on our roads and the resulting loss in economic output as well as human suffering.”⁵

It is an established fact that the real costs of motoring have been static for decades whilst public transport costs have risen sharply. In the twenty-five years from 1974, the price of public transport increased by 60-80% in real terms, higher than the increase in average disposable income. Meanwhile, the overall cost of motoring (all costs including purchase, insurance, maintenance and road tax as well as fuel and oil) remained constant in real terms.⁶ Motoring costs have been falling in real terms since 1999/2000, when the fuel duty escalator was scrapped⁷ making public transport increasingly expensive compared to car use.

Over this same period, the real cost of fuel and oil only - the perceived "marginal" cost for an individual journey once someone owns and runs a car - fell by 8%. The (then) Department of the Environment concluded that:

"This demonstrates that the real cost of motoring, particularly the marginal cost of petrol, is very much more affordable, in relation to the real increase in personal disposable income, than it was 20 years ago."⁸

It has also often also asserted that British/Scottish car users are "the most heavily taxed in Europe." The Colin Buchanan and Partners report *European Motoring Taxation Costs*⁹ concluded that "*In terms of total taxation ... the United Kingdom (together with the sub-areas of Scotland and the Scottish highlands and Islands) is ranked just below the middle of the countries included in the study.*" A more complete comparison of motor transport costs across Europe would have also to take into account the differing national levels of personal taxation.

3.3.2 The true costs of transport

Despite the narrow financial calculations of motoring organisations, it is clear that motorists do not meet the full cost of their motoring. Instead, motoring imposes a range of 'social costs' (or 'externalities'). Some of these costs are carried by the economy, for example the impact of congestion costs on economic efficiency; some on public expenditure, for example the costs of maintenance of infrastructure; some on society, for example air pollution, noise pollution and road accidents; and some on the global environment, for example climate change.

At a European level, the UIC/CER report *The Way to Sustainable Mobility* concluded that "Total external costs [of transport] (excluding congestion) for 1995 amounted to €530 billion, or 7.8% of the GDP of all European countries covered by the study."¹⁰ Road transport accounted for 92% of this total. When congestion was included in the calculations, the total external cost of transport was said to account for "almost 10% of European GDP".¹¹

Maddison et al. (1996), some of the UK's foremost environmental economists, suggested that the marginal external costs of transport in the UK "outweigh the taxes paid by road transport by a factor of three."¹² They estimated that, at 1993 prices, road taxes covered only 31-36% of marginal external cost. They calculated the aggregate marginal external costs of UK road transport as between £45.9 and £52.9 billion, made up of congestion costs £19.1 billion, air pollution £19.7 billion, noise pollution £2.6-3.1 billion, road damage £1.5 billion, accidents £2.9-9.4 billion and climate change £0.1 billion. While UK road taxes have certainly increased since 1993, it is fair to assume that over the same period that the marginal external costs will also have risen considerably.

Maddison et al. concluded by describing the conundrum posed by the failure to tackle the true costs of transport as follows:

“In the absence of a correct price signal for using the roads and the atmosphere, car drivers need not pay either for the congestion costs which they inflict upon other road users or the pollution which their journeys create. ... Any policy to tackle these problems must involve confronting motorists with the true costs of their journeys. Higher taxes would close the gap between private costs and social costs and curtail these socially wasteful journeys. ... If motorists had always paid the full cost of their journeys, urban geography and commuting patterns might be very different to those observed today.”¹³

The University of Leeds’ Institute for Transport Studies report, commissioned by the UK Department for Transport, *Surface Transport Costs & Charges*,¹⁴ in what was probably the most comprehensive report of its kind in the UK, reported that:

“For the British road sector as a whole, taxes and charges in 1998 covered between one third to a half of their relevant marginal social and environmental costs, depending on the range of the cost estimates examined. Congestion costs, making up some two-thirds of overall costs, are the most important cost category, followed by environmental costs, accident costs and infrastructure maintenance.”

The authors were subsequently quoted as saying that “far from being over-taxed, motorists pay only a third to a half of the costs they impose on society... [The report] claims the cost of congestion, pollution, infrastructure maintenance and accidents far outweigh the £32 billion fuel and car taxes collected each year”.¹⁵

The position of the UK Government has for at least the past decade been that the marginal external costs of transport should be covered by road users. The UK Sustainable Development Strategy of January 1994 clearly indicated that a sustainable transport policy should “*ensure transport costs reflect the wider costs of transport decisions for the economy and the environment which are not currently priced, and so make transport decisions more efficient.*”¹⁶

This position was confirmed by the UK and Scottish Transport White Papers launched in July 1998, and underpins the Scottish Executive’s proposals on road user charging:

*“It has been known for some time that, for some journeys, particularly peak hour in urban areas, the current costs of road transport do not reflect the true economic and environmental costs of motor vehicle use.”*¹⁷

It is not however just in the UK that there is a growing understanding that the external costs of transport must be reflected in the price paid by road users. The principle of “internalising external costs” has been accepted by a range of governments, inter-governmental organisations and industry groups as well as environment and public health bodies.¹⁸ But this should not be surprising as the “internalisation debate” is merely the application of the internationally-accepted ‘polluter pays principle’ in the field of transport. What is more, the principle of internalisation of external costs was accepted by the European Commission in its 1998 White Paper *Fair Payment for Infrastructure Use*¹⁹ - even if action at EU level has subsequently proven laggardly.

3.4 Demand management

3.4.1 Paying for transport “at point of use”

Organisations such as ourselves have for long argued that motorists are more likely to change their travel behaviour towards more environmentally-friendly modes of transport (e.g. public transport) if they face more of the costs of their journeys at point of use rather than ‘up front.’ Public transport is often perceived to be more expensive because all of the

costs of travel are paid when the ticket for the journey is purchased. With motoring, however, many of the costs involved are 'sunk' with the purchase of the vehicle, annual payments of vehicle excise duty, maintenance costs, etc.

Proposals for road user charging provide an opportunity for such principles to be brought about in practice in the context of road use, by presenting motorists with more of their costs at point of use, according to whether or not they are using scarce road space.

3.4.2 Road user charging

Road user charging is a traffic management strategy that applies the 'polluter pays principle' in transport – that those who create pollution (and congestion) will be charged for the damage they inflict on others. Road user charging is an economic instrument that seeks to 'internalise' the external impacts of traffic (e.g. harmful emissions, congestion, road casualties and noise) into the price mechanism.

Road user charging will typically seek to discourage unnecessary trips at times when road space is scarce (i.e. city centres at peak times) and thereby enable those who need or prefer to use their car under high demand conditions to reach their destinations within shorter and more predictable periods than when no such regime is in force. Road user charging treats road space as a resource that should be paid for according to the ebb and flow of demand. This principle is familiar from products and services such as electricity, telecommunications and cinema tickets. It is also already in existence within the transport sector: rail and air tickets tend to be more expensive at peak hours.

The case for road user charging (or "road pricing") has drawn such broad support because the opportunities for environmental protection, but also economic efficiency, are clear-cut. Indeed, it has often seemed apparent that the European Commission's promotion of road user charging is more closely associated with encouraging efficient use of transport infrastructure than with encouraging protection of the environment.

Expert academic advice appears to be solidly behind the need for the need for road traffic demand management measures, such as congestion charging, to be implemented. In July 2002, 28 professors signed up to an open letter ("The Professors' Letter") to UK Secretary of State for Transport Alistair Darling to restate the case for traffic restraint measures.²⁰ Perhaps the key paragraph from the letter is:

"Many politicians would like to be advised that a programme of selective road building, together with promised improvements to alternative methods of transport, will be sufficient to improve travel conditions, without the need for traffic restraint. The evidence is that if traffic growth continues at the rates of recent decades, such a package will not in practice achieve its intended effects."

In February 2002, the UK Department for Transport's Commission for Integrated Transport (CfIT) published its report *Paying for Road Use*.²¹ The report made the case for a national road user charging scheme using satellites and on-vehicle smartcards. It proposed a charging scheme that would be levied on congested roads at congested times, on the basis of 'marginal social cost pricing' (i.e. charges would be based on the costs road users impose on each other and their surrounding environment). The UK Department for Transport has subsequently published, in June 2004, the results of the 'Road Pricing Feasibility Study' and work in this area is ongoing.

