RESPONDING TO THE CONSULTATION

Forestry Commission Scotland
draft Climate Change Action Plan

Respondent Information Form

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1. Are you responding: (please place a cross in one box only)

a) as an individual [ ] please go to Q2a/b and then Q4

b) on behalf of a group/organisation [X] please go to Q3 and then Q4

Individuals

2a Do you agree to your response being made available to the public?
(at Forestry Commission Scotland, 231 Corstorphine Road and their website)

[X] YES (go to 2b below)

[ ] NO, not at all (*We will treat your response as confidential)*

2b Where confidentiality is not requested, we will make your response available to the public on the following basis (please cross **one** of the following boxes)

[X] YES, make my response, name and address all available

[ ] YES, make my response available, but not my name or address

[ ] YES, make my response and name available but not my address

On behalf of Groups or Organisations

3. The name and address of your organisation <u>will be</u> made available to the public (at Forestry Commission Scotland, 231 Corstorphine Road and their website)**. Are you also content for your <u>response</u> to be made available?**

X	YES
	NO *(We will treat your response as confidential)*

Sharing Responses/Future Engagement

4. Are you content for Forestry Commission Scotland, or others in the Scottish Government to contact you again in the future about your consultation response?

X	YES
	NO

Please note that Forestry Commission Scotland is subject to the provisions of the Freedom of Information (Scotland) Act 2002 and the Environmental Information (Scotland) Regulations 2004 and would, therefore, have to consider any request made to it under the Act or the Regulations for information relating to responses made to this document.

Macaulay Institute Response to the Consultation paper on:

Forestry Commission Scotland draft Climate Change Action Plan 2008- 2010

a) **General comments**

The Forestry Commission Scotland (FCS) draft Climate Change (CC) Action Plan builds on a sustainable development platform and on that of Scottish forestry strategy and climate change policy, and is both inclusive and multi-faceted. It is innovative, very topical and forward thinking, and has a broad set of objectives. The priorities for action are quite generally stated and well defined, and there are none that should be dropped.

The Macaulay Institute would like to offer the following general comments:

1. More thought could be given to the necessity of targeting the "win-win solutions" and of resolving competing objectives within the forestry and other land use sectors. It is important to avoid, where possible, forest policy measures which alleviate CC but at too high costs for people and/or for the environment and other ecosystem services (e.g. with biodiversity losses).

2. Carbon policy measures are integrated within the sector, and somewhat less so with the sectors of economy. However, a more complete incorporation of policy measures in the regional schemes of sustainable integrated rural development, where social, economic, environmental, visual, and climate-change related components of land use are considered jointly, needs more consideration. The effective measures should aim "win-win" situations in order to benefit rural development, people, and the environment at local and national levels, and internationally.

3. The lack of sufficient cross-over between the land-use sectors applies also to the application of policy measures on the ground, concerning, for example, the more effective integration of agriculture and farming activities through the creation and operation of agro-forestry systems; or for example, renewable (bio) energy and other areas of sustainable rural development. It is anticipated that Land Management Contracts provide the opportunity for a shared/integrated strategy and coordinated land-based CC projects/activities.

4. It is essential to stress the importance of translation of the CC Action Plan guidelines into sustainable rural development and sustainable forest management requirements. This necessitates the strengthening of the linkages between the respective policy documents at all levels, including international (forestry and climate change; forestry and agricultural etc.). This is because the prospective influences of CAP reform on CC mitigation and adaptation performances in the forestry sector will likely be essential.

5. A regional approach to defining the priorities for action could lead to a better targeting of resources and financial incentives. For example, the establishment of SRC and short rotation forestry is not a universal priority for Scotland, but is an important priority at a regional/local level. More thought also needs to be given to how progress on the priorities for action might be monitored and reported more effectively.

6. The vision of a more proactive stakeholder involvement in the policy-making and decision-taking should be strengthened. The Action Plan needs to have a stronger indication of how it will constructively engage with other stakeholders and partnerships, including priority actions, e.g. through Regional Forestry Forums or Structure Plans.

7. Scientific knowledge of CC adaptation and mitigation activities should be combined with conventional local wisdom to offer a deeper understanding of how to enlarge capabilities for delivering of the CC Action Plan objectives to forestry and rural practices, on the ground. This could include incorporation of local knowledge and of that of rural communities, and of forest owners/users, into forest policy design. This will likely enlarge the support for forestry measures to mitigate and adapt to the changing climate.

8. Some mention could be made of strategic partnerships, within Scotland, the UK, and internationally, that FCS would need to develop, enhance, or maintain, in order to implement the Action Plan.

9. A further idea could be added which reflects the aspiration for Scotland to provide international leadership in the field of CC forest policy initiatives.

b) **Detailed comments**

The role of forestry, page 4:
Activities enhancing carbon sequestration (CS) through forestry alone contribute modestly to the emission reduction. Nevertheless, forestry projects have relevance for carbon budget, and their inclusion in climate policy activities is logical and viable. Importantly, major forest based policy measures might delay the rate of climate change and allow time for adaptation, learning and technological innovation. The role of forests in relation to climatic and atmospheric changes is apparent in the carbon cycle. Forests are also involved in the natural cycles of water and greenhouse gases and play environmental role through their reflectance characteristics (albedo). On the other hand, internal and external drivers, including the changing climate, are affecting forest ecosystems and their carbon cycle.

Thus, an overall assessment is needed to develop a better understanding of the exact role of Scottish forests in climatic and atmospheric changes. Through the analysis of biogeochemical processes involved and by assessing the opportunities for forest-related action it becomes possible to discuss policies and measures at their different spatial levels that are likely to substantiate the role of forests as carbon sinks. Important is also to confirm and, where appropriate, to improve, to simplify or extend the manner in which the role of forests in CC is taken into account.

Sustainable forest management, page 5:
In terms of the environment, forests are viewed as a basis for production, as a sink for pollution, as a watershed protection, and as habitat for wildlife etc. Beyond these considerations of environmental sustainability, forestry is a considerable economic activity with strong social dimension involving institutions and a wide range of other issues.

Therefore, efficient and feasible climate policies need to be well embedded in existing sustainable development policy areas (whereas wider sustainability objectives and delivery mechanisms will also evolve in time), and if effective and economic instruments and flexible mechanisms are implemented, a considerable scope exists for multi–functional forestry development, where carbon sequestration,

provision of ecosystem services, production of sustainable energy and timber production – are at least partially combined. Climate policies and measures can then be integrated even better within spatial planning, and into rural and regional development schemes.

The Macaulay Institute contributed to the research on possible opportunities for future forest development and on forestry role in tourism; and the most recent study allowed us to explain the diversity of public attitudes to woodland integration in Scottish landscapes. This research concluded that, although some people in this country are preoccupied with native woodlands regeneration, whilst others are more concerned with socio-economic aspects of forestry development, e.g. with new employment opportunities, there is likely an agreement across sectors of the population on the necessity of multi-functional forestry, with proper integration of woodlands in Scottish landscapes.

Thus, identification and targeting of potential multiple benefits from climate change policy projects involving forestry will likely increase public support of policy measures and will enlarge their cost-effectiveness. Tree-planting for multiple purposes rather than solely for CS and storage will apparently prevent potential conflicts relating to trade-offs between biodiversity and CS, or between landscape amenity values (or the values for tourism/recreation) and those of CS. Although it may result in lower rates of CS, multifunctional forestry in Scotland is expected to be more attractive to people because in the majority of cases it will provide additional social benefits and promote sustainable rural development.

Conserving forest carbon stock, page 7:
Forestry decisions have a long planning horizon, and its measures to conserve forest carbon stocks require a long-term perspective. Therefore, the optimum carbon stock and offset policies should link long-term carbon storage in woodlands with long-term use of sustainably harvested wood as a substitute for fossil fuel, or as a construction material, and in wood products.

Consideration should be given to the fact that practices that sequester the most carbon are not necessarily the practices that have the greatest impact on reducing net emissions of CO_2 to the atmosphere. Carbon sequestration and storage activities can lead to changes in fossil-fuel use and can cause changes in land use and land cover that further impact the atmospheric CO_2 pool. Alternative land uses have differential impacts in contributing to carbon emissions, and sink enhancement measures through forestry can be understood as an instrument for the formulation of climate change mitigation goals and as an indicator for the selection of optimal abatement policies.

Carbon sequestration through woodland creation, page 9:
It is important to develop our understanding further of whether the forestry sector can offer ecologically sustainable, socially acceptable and low-cost opportunities for CS to compare with other climate policy initiatives.

To provide estimates indicating whether forests offer a low-cost opportunity for CS, which exactly forests (their species composition, age structure and management regimes etc.) and where in Scotland, the costs for the creation and sustainable use of woodland per hectare of the land are estimated and then, being based on the simulated amount of the sequestered C (in physical terms) and on the estimated costs, the present value (PV) of costs per tonne of C is computed and compared for each policy scenario. Research conducted at the Macaulay Institute suggests that such estimates provide useful benchmarks for prospective cross-comparison of

different CS forestry scenarios and for their comparison with other climate change policy alternatives. Initial results of the economic assessment of opportunities to mitigate climate change through forestry suggest that forest based policy measures are likely competitive with other means of removing C from the atmosphere and that choosing right species and management regimes (e.g. rotation ages, use of wood after trees are cut, replanting schemes etc.) is important for saving economic costs. The economics of CS in forestry in Scotland, however, is an area that merits further attention.

Interdisciplinary research on the role of forestry projects, including the use of bio-energy for climate change mitigation is highly topical in this country, where there is a scope for further development of woodlands in rural landscapes. Should woodland development proceed with the creation of forest plantations (is so, where? which species and management regimes should be used?), and what are the opportunities for a multifunctional future of forestry in Scotland and across its regions?

Establishment of energy crops, page 10:
The conversion of land to woodland largely focuses on remote rural areas (e.g. uplands). Such programmes are embodied in regional policies, and some of the available options provide multiple benefits. The enhancing of CS on marginal land, in combination with an increased use of bio-energy will likely represent a sound opportunity for remote regions, when the major links between different policy areas are captured and an attention is given to the provision of long-term initiatives in support of CS activities, including bio-energy production and consumption.

The rising importance of renewable energy initiatives can be explained by the fact that the effects for avoidance of C release through the replacement of wood for fossil fuels are repeatable. Therefore, social benefits of renewable energy projects in the long run are expected to be higher than under the strategy of carbon fixation (e.g. carbon storage in trees). Woodland creation for energy crops can also be seen as a sustainable way of restoring the productivity of abandoned land and create new options for land development. Moreover, a systematic promotion of renewable energy industries, services and technologies offers opportunities for innovation, development of energy markets, with locally and regionally oriented value chains and provides new employment opportunities.

It is important therefore to define a particular agenda for bio-energy forest policy scenario by addressing economic, social and environmental factors (e.g. biodiversity and landscape values), and to define where to place biomass production in the general context of (multifunctional) land use, where reform of CAP and contemporary agricultural change will likely be influential.

Depending on the scale of SRC and short rotation forestry development, high carbon savings can be achieved in the long run, but this would require proper incentives and links between the CAP and Climate Change Action Plan, particularly concerning changes on set-aside and marginal lands. Existing incentives in forestry need to be scanned to their influence on climate change and measures enhancing forest sinks, and particularly of establishment energy crops need to be based on principles of sustainable development. It is important to identify bio-energy projects which are coherent, effective, efficient, acceptable by the public, and consistent with other aspects of sustainable forest management and regional development.

Research to identify and explain what CS forest policy measures are most acceptable or desirable for Scottish people has been initiated at the Macaulay Institute. It will provide understanding of existing perspectives on the role and place of forestry projects (including short rotation forestry and energy crops) in CC

mitigation, and will offer insights into the connection between Scottish CC policy and FC CC Action plan and Scottish integrated sustainable rural development strategy.

Regularising the woodland carbon offsetting sector, page 11:
Our analysis suggests that over and above other climate change mitigation policy measures, the enhancement of carbon "sinks" and "reservoirs" in forestry is meaningful, and in regularising the woodland carbon offsetting sector, it is important to measure carbon uptake and release, as well as to develop economic and market conditions for creating and trading terrestrial carbon credits.

The cap-and-trade system that includes carbon offsets from forestry faces numerous challenges caused by temporary and “ephemeral” nature of terrestrial carbon sinks, and by the problems of leakages, double-counting and too high transaction costs associated with measuring, assessing and monitoring of carbon etc. The inclusion of carbon offset credits in a trading system requires the finding of solutions of the problems pertaining to the creation and trading of terrestrial carbon credits.

Adapting to climate change, page 12:
It is important that adaptation and mitigation activities are linked together: more resilient forest ecosystems usually provide more of social benefits with respect to CC mitigation. The success of CC mitigation, in turn, enhances woodland capabilities to adapt better to the changing climate. Forest management can enhance the effectiveness of CS through appropriate interventions, whereas the adverse impacts of CC can be reduced through preventive measures, i.e. adaptation.

However, the distinction between management effects and other natural or human effects is case specific and a complicated issue. The knowledge built up in Scotland and beyond should therefore be used to facilitate more successful CC mitigation – CC adaptation interactions. More attention is also to be paid to the realisation of best practices and agreements to recommend the right balance between CC adaptation and mitigation measures in forestry.

Establish the practical potential for forestry in flood risk management, page 23:
In addition to the potential positive value of forestry in flood alleviation, it is important to note that there are likely to be situations where forestry management may exacerbate flooding. This is most likely to be associated with drainage following clear-felling and recent replanting. Consideration should be given to appropriate management of activities to minimise these adverse effects.

Increase wood use for renewable energy, page 24:
We support the idea highlighted in the CC Action Plan of increasing use of woody biomass for heat or for combined heat and power, as this is the most technologically and carbon efficient way of using wood for energy. However, we believe that together with the measures already included in the Plan, the use of residuals accumulated in the forestry sector should also be addressed.

Wood may be used as a source of energy in many ways and at different stages of processing. New technologies of bio-energy are being developed, using lignocellulosic resources (including wood); they may be in the context of bio-refineries in connection with paper mills. Various technologies and the possibilities of producing energy as heat, electricity or fuel from wood, forest industry residues, former by- or products at the end of their life cycle need to be assessed taking into account technological (energy) aspects as well as economic, environmental and social in order to supply forestry sector practitioners with sound information.

It is important that using wood for energy is by itself a carbon neutral process (if the energy required for harvesting and processing of wood is not considered). The net gain here is the amount of CO_2 that would have been released by burning fossil fuel, if not replacing it with wood. Unlike fossil fuels, wood is a source of renewable energy within a time scale that is perceptible to people. Moreover, under wise management, forest regrowth may offset the emissions produced by the combustion of the harvested wood. Technical and economic issues of how to take this complexity into account (accounting and monitoring) in order to enlarge the net benefits, is essential in decision-making.

We also suggest to mention that over-harvesting is to be avoided where possible and conflicts between different forest and land uses need to be prevented or resolved. The actual available resources need to be assessed according to location, habitat type, management and possible market outlets. Local markets are to be analysed and developed further, with the objective as to balance supply and demand whilst complying with ecological constraints and preserving sustainable development.

Increase the use of timber, page 26:
Carbon storage in wood products merits further attention as it provides multiple benefits by enlarging the supply of wood and adding to the total carbon sink, with the duration of the sink equivalent to the life of the goods. The replacing of high energy products with industrial wood substitutes and using of more wood in construction, engineering and in production of goods for households are repeatable activities (with timber rotations, and when forest is replanted and sustainably managed), and thus in the long run, they are largely seen as more sustainable means of carbon management for than e.g. carbon storage in trees.

Given the retention of carbon in wood products, the fact that wood requires relatively less energy for processing than its alternatives, an important issue is to quantify the comparative advantages of wood and to develop a system that integrates these advantages in climate change action schemes. In order to make an effective comparison between wood and major alternative materials, the Life Cycle Analysis should be developed further to include a range of markets for wood products and to take into account a series of criteria including, of course, carbon balance.

We suggest also mentioning that the range of concerned products is currently expanding from wood products alone towards 'green chemistry' and new composite materials capable of entering various industrial sectors, besides bio-energy (discussed above).

Reducing the forestry sector's carbon footprint, page 28:
The economic and technological components of the Action Plan could be strengthened further by giving even more thought to the efficiency (e.g. minimise energy losses etc) of timber production; modernization of transport technique and of road infrastructure (and linking it to the forestry industry), and to the development of innovative technologies of wood processing and recycling.

Further opportunities are to be developed for the forestry industry in terms of adding-value and addressing niche and local markets (sawmills that are capable of processing small diameter timber) where products are more competitive due to reduced transport costs (e.g. in the bio-energy sector), and where carbon footprints are lower.

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