Written Submission from The James Hutton Institute

The James Hutton Institute (www.hutton.ac.uk) welcomes the opportunity to comment on the Scottish Government's Draft Climate Change Plan: The draft third report on policies and proposals 2017-2032. Our submission draws on research funded by the Scottish Government Strategic Research Programme (2011-16) and co-funded research by the European Union. In this submission we focus on the topics of behavioural change and waste, for the Scottish Parliament Environment, Climate Change and Land Reform Committee and its consideration of the draft plan.

Related submissions are being made by the Scottish Government Centre for Knowledge Exchange and Impact, and the Moredun Research Institute.

Behavioural Change

The James Hutton Institute supports the proposed Individual, Societal and Material (ISM) approach of the Scottish Government. In particular, our research agrees with the observation in paragraph 15.2.5 about needing to understand the different contexts and the multiple factors within them that influence the way people act.

Regarding behavioural change as only a question of individuals making different choices ignores normative and infrastructure constraints on behaviours. Findings from our research, such as the EU co-funded GILDED project ('Governance, Infrastructure, Lifestyle Dynamics and Energy Demand'; http://gildedeu.hutton.ac.uk/), accord with the results reported in RPP3 of the Climate Conversations undertaken by the Scottish Government. Our findings highlight that public concern about climate change and energy use is better contextualised in wider concerns about human impacts on the environment biodiversity loss, declines in soil health, availability of fresh water, and that this can be a better basis on which to engage (see GILDED Policy Brief 1 http://gildedeu.hutton.ac.uk/policybriefs).

We also identified that people often feel powerless in the face of enormous challenges, but that willingness to do something about them is constrained by the 'first mover problem': people feel that acting alone will not make much difference, but are willing to make changes if others do. Generally, if people are required to make changes for the environment due to public policy, their willingness to accept them depends on whether the changes are perceived as 'fair'.

Behavioural change can be facilitated and inspired by bottom-up initiatives aimed at promoting more sustainable lifestyles, as shown by the EU co-funded project GLAMURS ('Green Lifestyles, Alternative Models and Upscaling Regional Sustainability'; http://glamurs.eu/). The James Hutton Institute's participation in this project focused on flexible working initiatives in the Aberdeenshire area. Findings included showing that flexible working has potential benefits to the environment in terms of reducing tailpipe emissions and to the individual in terms of time savings that exceed those of other interventions (such as road-building) by making more efficient use of existing infrastructure. This relates to the time and schedules factor identified in the ISM Model.

RPP3 notes 10 key behaviour areas targeted as immediate priorities for reducing our environmental impact. However, it may be advisable to add that these priorities are

likely to only be the start of what needs to be done over the coming decades, and therefore to prepare public expectations accordingly. We identify a requirement for research into the best ways to help people make sense of the large volume of information available (including data on energy, food and water consumption), and to empower them to make effective choices suited to their own context. The volume of such information is likely to increase through the growth of the Internet of Things and wearable technology, implied in the ISM model as one of the material factors.

The James Hutton Institute is willing to engage with the Scottish Government team in its testing of the ISM approach, noted in paragraph 5.1.8.

Waste, Resource Use and a Circular Economy

The James Hutton Institute (www.hutton.ac.uk) supports the policy and proposal of reducing waste and a transition towards a more circular economy. This is consistent with both United Nations Sustainable Development Goals and the European Union Circular Economy Strategy. Our research supports observations made about co-benefits identified for policies in one sector on another (e.g. agricultural land use).

The water sector is the largest consumer of energy in Scotland by a significant margin, and therefore potentially the 'biggest win' for improving efficiency and sustainability. The Institute, under the Scottish Government Strategic Research Programme (2011-16), has looked in detail at whole systems to optimise the balance of positive versus negative impacts. This has demonstrated the potential to increase sustainability and reduce or offset energy.

One example is a small rural scale waste water treatment plant (120 person equivalents) at Dinnet, Aberdeenshire. In collaboration with Scottish Water, our research diverted effluent to biomass production in willow-bed constructed wetlands. Results showed greater than anticipated biomass production with no measureable disbenefits to water quality. The willow bed utilises an expanded clay substrate to increase capacity to remove and sorb phosphate; as supported by our water quality data. The substrate can be crushed and the phosphate returned to agriculture, with the potential to offset fertiliser production energy. A life cycle analysis was undertaken, using the willow bed as a source of biomass combined with a simple phosphorus-recovery technology. This showed significant reductions in life cycle impacts compared to both the original waste water treatment plant and a common alternative (reed bed planted in gravel substrate); especially for human health and ecosystem impacts.

This site and the research findings have been used as a resource to explain opportunities for creating co-benefits from innovative approaches to treating waste water. We suggest that developing an inventory of such examples, perhaps linked to Scotland's Environment Web (www.environment.scotland.gov.uk/), could be used to illustrate innovation and good practice, and contribute to achieving the Scottish Government ambition of the establishment of the principles of a circular economy by 2035.

Peatlands

The James Hutton Institute welcomes the commitment to peatland restoration, with the aim of reducing emissions from the mostly damaged Scottish peatland resource in the draft Climate Change Plan. In particular we note the emphasis on "Driving up" peatland restoration, and Policy outcome 1 on page 129 'To enhance the contribution of peatland to carbon storage, we will support an increase in the annual rate of peatland restoration, from 10k ha in 2017/18 to 20k ha per year thereafter.'

(i) Restoration targets

We recognise that these proposed annual targets are ambitious. It is expected that 50k ha of peatland will be restored over 30 years (1990 to 2020). To date the Peatland Action (PA) project has delivered 10.3k ha of peatland restoration, which adds to the 30.9k ha of restoration activities prior to the PA project (Chapman et al., 2012), although in some cases there were additional restoration activities on pre-existing sites. That leaves a further minimum of 10k ha of restoration to be achieved by 2020. It is then planned to restore 200k ha over 10 years (2020 to 2030).

In 2012, the Institute estimated it would be possible to restore 6.5k ha, which was the maximum area restored in any given year between 1990 and 2012. A three-fold increase to 20k ha would be feasible given the availability of contractors, materials and technological advances. However, this has not been achieved to date, even by the Peatland Action Programme, and there could be limitations in terms of skills, personnel or equipment (Chapman et al., 2013). Therefore, we welcome recognition of the need for awareness raising and developing capacity, skills and knowledge (Table 13-8) to deliver best practice in peatland restoration. We observe that the level of resources required for consolidation, monitoring and planning will increase as the area restored increases. It should also be noted that there will be a need to ensure restored areas do not revert and thus relinquish the progress made, and to verify that the benefits (e.g. Carbon sequestration and biodiversity) are accruing (see below under Monitoring).

The Institute is willing to contributing to initiatives for awareness raising, working with partners noted above, and enabled by the Scottish Government Strategic Research Programme, ClimateXChange, and the new Centre for Knowledge Exchange and Impact.

(ii) Monitoring

Established restoration sites under the Peatland Action Programme have undergone limited monitoring to date. What monitoring has been carried out has been rather ad hoc. Thus, past projects may not be collecting data that are suitable to determine if restoration is successful and hence whether the achieved emissions reductions are in line with projections. This was an evidence gap identified in the Peatland Action Programme (Artz and McBride, 2016), in which there was no specific budget or instrument for either short or long-term monitoring. So, there is an argument for including a commitment to monitoring efforts to ensure that peatland restoration actually produces the estimated emissions abatement, and value for money, possibly within policy instruments.

The 2nd commitment period (2013 to 2020) of the Kyoto Protocol (Doha amendment) enables peatland restoration to be included in formal accounting of GHGs. However, UK data on emissions from peatlands and emissions reductions after rewetting efforts are still limited (Artz et al., 2012). Recent work by the Institute for the UK Parliament Business, Energy and Industrial Strategy Committee shows that there are evidence gaps in terms of emission factors for peatlands under different land cover types (Artz et al., 2017). Currently, the Institute is carrying out research into the use of remotely sensed data (e.g. satellite, aircraft, drones) for such monitoring, but these are still in their infancy and means of monitoring of emissions are required beyond those potentially offered by remote sensing proxies.

Supported by the Scottish Government Strategic Research Programme, in 2016, a chronosequence of forest-to-peatland restoration sites in northern Scotland was established by the James Hutton Institute in collaboration with colleagues from SNH, RSPB, University of Highlands and Islands Environmental Research Institute (UHI-ERI), CEH and the University of Exeter. These sites use state-of-the-art instruments and methods to monitor GHG emissions throughout the restoration process (www.theflowcountry.org.uk/research/current-projects/). The data collected are being used to quantify Scottish restoration efforts in terms of carbon sequestration potential, and to validate and develop the novel remote sensing techniques noted above. The critical aspect of the ongoing ground-based measurement work is the production of long-term emission datasets (minimum of 5 years), which will lead to a better understanding of inter-annual variability of GHG dynamics of restoration efforts, and help compute uncertainties in annual budgets. Therefore, we welcome the commitment to monitoring in the draft Climate Change Plan.

No mention is made of the timescales for when peatland restoration could be claimed to be ‘complete’, and it is likely to take many decades for the full benefits to be accrued. However, the Institute has recently made contributed information on timescales for peatland restoration for incorporation into the TIMES model, referred to in the draft plan. So, such information can be expected to be built into the calculations on LULUCF.

References

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Compiled by D. Miller, R. Artz, M. Coull, T. Craig, S. Chapman, J. Ge, R. Hough, M. Khomik, G. Polhill and M. Stutter.

David Miller

Knowledge Exchange Coordinator

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