Carbon Emissions Land Tax:
delivering large-scale natural carbon capture

JOHN MUIR TRUST

CLIMATE POLICY PROPOSAL

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KEY POINTS

- Scotland is rich in low productivity land that could be used to lock up vast amounts of carbon, whilst contributing to biodiversity and rural community regeneration.
- The potential is enormous. If all land managers maximised carbon sequestration of peatlands and woodlands across Scotland, we could reduce our national carbon emissions by up to 13 Mt CO_2e a year – equivalent to removing every single vehicle from our roads.
- We have incentive schemes for peatland restoration and woodland creation. By supplementing this with a **carbon emissions land tax** levied on major landowners, we could vastly scale up our efforts.
- A **carbon emissions land tax** would band landholdings over 1,000 ha according to their land uses and current estimated negative or positive emissions. With some testing and refinements, existing carbon soil science and data could determine tax bands.
- Revenues generated could fund further peatland and woodland restoration schemes.
- Expansion of native woodlands would have many additional public benefits: increased biodiversity, reduced flooding, better water quality, and recreational opportunities leading to improved mental and physical health.

INTRODUCTION

This proposal has been developed by the John Muir Trust as a contribution to the extensive discussions now underway around Scotland's response to the global climate emergency.

This paper, and its related FAQs, incorporates practical and technical advice received from tax experts, academics, policy makers and scientists. We are keen to continue working closely with interested parties to progress this proposal further and drive positive behavioural change and pro-environmental actions**.** If you are interested in finding out more, please get in touch.

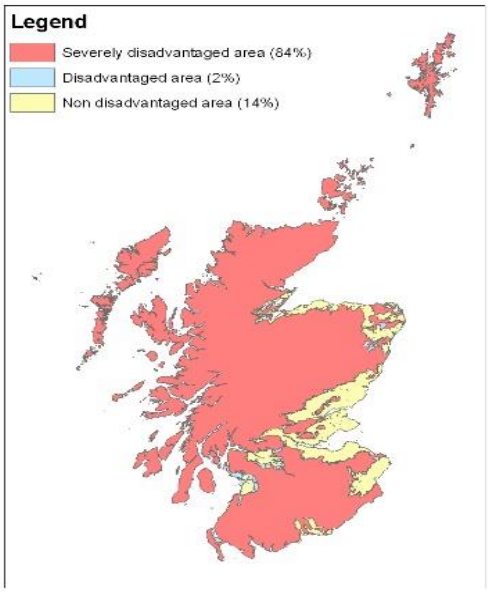
BACKGROUND

The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 sets a bold target to reduce our emissions of all greenhouse gases to net-zero by 2045 at the latest, with an interim target of a 75 per cent reduction by 2030. This will require a major shift in the use of our resources, not least in the way we manage our land. This proposal is not an alternative to phasing out our fossil fuel consumption; it is a recognition that we also need to repair centuries of harm by harnessing nature to remove and store damaging greenhouse gases.

Proportionate to our population we have an exceptionally large landmass. We have six and a half times as much land per head of population as our nearest neighbour England. The geographical Highlands, which accounts for more than half of Scotland's total landmass, is the most sparsely populated region in Europe apart from northern Scandinavia. Consequently, Scotland is in a stronger position than most to deliver major carbon reductions by transforming the way we manage our land.

Left to its own devices, land would be a natural carbon store. While we need farmland to produce food, much of Scotland's terrain consists of agriculturally less productive uplands and peatlands. For tens of thousands of years, these areas – apart from the highest, rockiest mountain tops – were home to vast pristine woodlands and peatlands which locked in immense quantities of carbon. The geographic extent of these areas is illustrated in the maps below.

RSPB map showing Scotland's proportion of 'UK uplands' (including low-lying coastal areas and peatlands



Scottish Government map of Scotland's agriculturally 'severely disadvantaged areas'

WHAT IS THE PROBLEM?

Over many millennia, and especially in recent centuries, human activity has stunted the immense potential for carbon sequestration from our land. Today our poorest quality agricultural land is punching well below its weight when it comes to delivering public benefits, including climate targets.

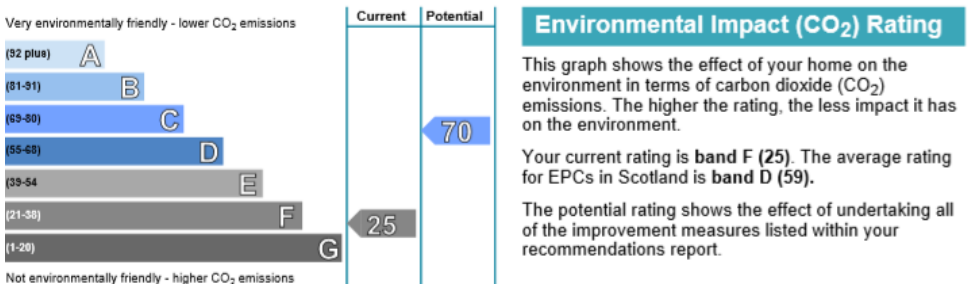
A recent report published by the Scottish Government shows that the land use, land use change and forestry (LULUCF) sector now emits more CO_2e than aviation and shipping in Scotland. Scotland's carbon sink is also shrinking, with the level of greenhouse gases soaked up by forestry and land use falling sharply.[i]

We are now in a climate emergency. The urgency of the crisis demands that we take serious action to maximise the carbon sequestration storage potential of Scotland's uplands. By taking bold action now, we can become a global leader in natural climate solutions.

WHAT CAN WE DO?

We propose phasing in a carbon tax for large-scale landowners in every part of Scotland starting with a pilot scheme on properties in excess of 10,000 ha before rolling it out to all landholdings in excess of 1,000 ha.

Based on hectarage, every landowner would be assessed for actual and potential carbon emissions and sequestration by relevant public agencies (SEPA, NatureScot), local authorities, and expert consultants, (along broadly similar lines to the scheme used to rate the environmental impact of domestic properties, as depicted in the graph below).



They would then be placed in a graduated carbon emissions land tax banding scheme administered by local authorities, building upon existing systems for collecting non-domestic rates for sports shooting (which currently varies from £2 to £5 per hectare depending on land type) and other land-based businesses. This is an efficient method of administration and will ensure that costs are kept low.

The scheme would focus solely on natural carbon removal and storage. We recognise the role of renewables in replacing fossil fuels, but electricity-generating schemes are covered by existing incentives and regulation.

Based on 2014 figures published by the Scottish Parliament Information Centre (SPICE) on private landholdings exceeding 1,000 hectares, we estimate that upwards of 39,000 sq.km of private land – half our total land area – would be assessed for natural carbon storage.[ii] Together with an additional 12,000 sq. km owned by government agencies and NGOs, around 60 per cent of Scotland's land would be liable for assessment. This assessment, based on existing methodologies (including, for example, tools currently in use in the farming sector), would be efficient, cost-effective and fair.

Until tax rates are set and carbon assessment of land is underway, it is impossible to forecast revenues with any precision. With more than 50,000 sq. km (five million ha) meeting the minimum hectare threshold, and most of that land falling far short of its carbon capture potential, a notional average tax of £3 per hectare could theoretically raise up to £15 million per year. The primary ambition of this taxation, however, is to drive positive behavioural change which taxes can do – as the implementation of the sugar tax has shown.

We propose that all tax revenues raised be paid into a dedicated carbon capture fund to provide additional funding streams to assist farmers, crofters, community land trusts and other small landholders make the transition to net zero land use. Those landowners eligible for the tax could move to lower tax bands by changing land use to maximise carbon sequestration.

We recognise the challenges involved in devising a fair and robust banding scheme. Research is already well-advanced in Scotland, with for example the evolving ECOSSE (Estimation of Carbon in Organic Soils – Sequestration and Emissions) model which simulates soil carbon and nitrogen dynamics in both mineral and organic soils based on climate, land use, land management and soil data. Satellite imagery and other developing technology could also be utilised.[iii]

The introduction of such a system would pose a challenge to estates whose current primary land management objective is sports shooting. Landowners who maintain unsustainably high deer densities to maximise the number of stags available for trophy hunting, and those who manage land for driven grouse shooting to the detriment of carbon capture, would likely be banded at the high end of the scale. A carbon emissions land tax, alongside robust regulation at national level to protect habitats under pressure from sports shooting, could become a major driver of change towards more responsible land management that contributes to climate and biodiversity targets.

WHAT DOES THE DATA SAY?

Peatlands and wetlands

Scotland's blanket bogs and lowland raised bogs cover more than 20 per cent of our total landmass. They are our largest terrestrial carbon store, holding about 1.6 billion tonnes of carbon in the ground – equivalent to over 180 years of Scotland's entire greenhouse gas emissions at current rates.[iv]

Over 80 per cent of our peatlands are damaged or degraded.[v] Recent estimates by the Scottish Government suggest that these damaged peatlands release around six million tonnes of greenhouse gases (6 $MtCO_2e$) every year – just marginally less than the 6.2 Mt CO_2e of greenhouse gas emissions from Scotland's 2.6 million residential households.[vi] [vii]

While Scotland is famous for its peatlands, we also have other types of wetlands, mainly around our lochs, rivers, and coastline. As well as playing a vital role in flood defence, our swamps, fens, salt marshes, wet grassland, wet woodland and wet heathland are vital carbon stores. Coastal wetlands such as salt marshes, although smaller in scale than peatlands, have the highest rates of carbon sequestration per hectare of all our natural systems. Yet

these and other sensitive wetlands are under constant threat of damage and destruction, from built development, agricultural drainage, vehicle damage and rising sea-levels as a result of climate change.[viii]

Woodlands
A new study focused on Scotland's uplands by the School of Earth and Environment at the University of Leeds has demonstrated the colossal potential for carbon removal and storage that could be achieved by native woodland regeneration and planting beyond areas currently identified. It estimates that "native woodland could expand to cover an additional 3.9 million hectares of the Scottish uplands removing an average of 6.96 Mt CO_2e a year".[ix]

This suggests Scotland's lower productivity agricultural land has the potential through woodland and peatland restoration **to reduce our national carbon emissions by just under 13 Mt CO_2e a year – which is the equivalent of removing every single vehicle from our roads.**

Until recently, much of the assessment of carbon sequestration for woodland has focused on commercial timber, which is generally faster growing than native woodland. The wrong type of tree planting in the wrong place, however, can be counterproductive in the long term. A report in October 2020 for the Irish Department of Agriculture found that the country's forest estate has turned from a carbon sink into a net emitter of greenhouse gases.[x] Industrial-style commercial planting with large-scale soil disturbance during the mechanical planting operation, followed by clear-felling, produces significant loss of carbon by changing soil dynamics far into the future.[xi]

Conversely, recent international research has shown that forests containing various tree species can store twice as much carbon as the average monoculture plantation.[xii] While native woodland generally takes longer to remove greenhouse gases, it can store carbon for many centuries through natural regeneration. It also has multiple other benefits to society such as improved soil fertility; flood alleviation; enhanced landscapes; recreation; high quality sustainable wood products; and crucially, increased biodiversity and flourishing wildlife.

Grasslands and farmland
Scotland's has lost much of its carbon-rich grasslands as a result of centuries of ever-intensifying agriculture. Yet that damage can be reversed through better managed farmlands – for example, by return to rotational natural grazing. Our remaining healthy grasslands survive only in places where traditional farming and crofting is practised.[xiii]

With the end of the Common Agricultural Policy, the future of Scottish farming may best be secured by embracing change. As Donald MacKinnon, the Chair of the Scottish Crofting Federation, recently pointed out: "The climate emergency is going to dominate all we do and crofters have an important part to play, having a very sound record in good management of our environment. A significant proportion of high nature value areas in Scotland are under crofting tenure, for example the machair, known for its incredible biodiversity, and peatlands, which are the best ecosystem for sequestering carbon. Crofting is starting from a good position, but we can always do more to reduce our greenhouse gas emissions."[xiv]

DELIVERING CARBON CAPTURE

We welcome and support the programmes of woodland expansion and peatland restoration that are already underway. By boosting that action, we can achieve – and even far exceed – the greenhouse gas targets set by the Scottish Government, thus making an exceptionally large contribution from a small country to the global struggle to halt climate change.

As a nation we need to play our part in delivering environmental, social and inter-generational justice both at home and globally. We believe it is imperative that all large landowners take their share of responsibility for delivering these necessary targets and achieving a just transition to a net zero economy.

OTHER PUBLIC BENEFITS

A crescendo of alarm bells is now ringing over another great global emergency: the loss of biodiversity at a rate unprecedented in human history. As David Attenborough recently declared: "Together we can build a better future if we make the right political decisions at a critical moment."

Ecological restoration to combat climate change could concurrently bring back an abundance of life to many of Scotland's depleted landscapes. Expanding habitats would also allow species greater freedom to spread out of confined areas and more easily adapt to the impacts of climate change. In addition, healthy peatlands improve water quality by removing atmospheric pollutants, and alleviate flooding by soaking up water and slowing down the flow of rivers from uplands into more populous lowland areas.

Restoring ecosystems to prioritise carbon storage could also help jump-start new forms of nature-based economic activity across many of our most fragile and sparsely populated areas, building upon the expansion of this sector between 2015 and 2019, when employment grew at five times the rate for the wider Scottish economy.[xv] There are already 195,000 nature-related jobs in Scotland – more than in the entire construction industry and almost three times more than are employed in the energy sector.

A recent report published by three wildlife charities (Scottish Wildlife Trust, RSPB and WWF) suggests that a major programme of restoring, protecting and expanding Scotland's peatlands and woodlands could create up to 3,500 direct jobs and similar number of indirect jobs.[xvi]

Most of these new jobs would be located in some of Scotland's most sparely populated areas, giving a huge boost to fragile local economies. At the same time, transformed landscapes could over time help spread the benefits of tourism beyond our most famous beauty spots to other less favoured rural areas. At a national level, removing 13 $MtCO_2e$ would be worth £390m a year to the Scottish economy at current EU Emissions Trading System (ETS) prices.

We believe that a collective effort to multiply the natural capital of our uplands, involving the Scottish Government, the Scottish Land Commission, Community Land Scotland, Forestry and Land Scotland, the Just Transition Commission, environmental NGOs and individual landowners could bring new hope and optimism to rural Scotland and drive forward the repeopling of our glens.

NEXT STEPS

Since the first draft of this paper was published, Scotland's Climate Assembly has included the idea of carbon emissions land tax among a list of 81 'Recommendations for Action' to the Scottish Government. We are now urging the Scottish Government to lead a public consultation on the merits of this ground-breaking proposal, which we believe could become an exemplary international model, helping drive forward progressive change in land management on a global scale.

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[i] Scottish Greenhouse Gas Emissions; Scottish Government, 2019

[ii] Scale and Concentration of Land Ownership – The Elephant in the Room?; SPICE Spotlight: Scottish Parliament Information Centre (SPICE), March 2019

[iii] ECOSSE; Smith J, Dondini M, Richards M, Jones EO, Fitton N, Pogson M, Gottschalk P, Bellarby J, Oyesiku-Blakemore J, Nayak D, Coleman K, Hillier J, Flynn H, Wattenbach M, Aitkenhead M, Yeluripurti J, Farmer J, Smith P; University of Aberdeen.

[iv] Science Scotland, Issue 21, Autumn 2017, Royal Society of Edinburgh

[v] Scotland's Soils: Peatland Restoration; Scotland's Environment Web; SEPA; Updated 19 June 2019

[vi] Scottish Government. (2018a). Climate change plan: the third report on proposals and policies, 2018–2032

[vii] Scottish Government. (2020) Sources of Scottish Greenhouse Gas Emissions, 2018

[viii] Wetland Carbon Storage Controlled by Millennial-scale Variation in Relative Sea-level Rise, *Nature,* 7 March 2019

[ix] The Carbon Sequestration Potential of Scottish Native Woodland; Tasmin I. Fletcher, Catherine E. Scott, and Dominick V. Spracklen, School of Earth and Environment, University of Leeds 2020.

[x] Irish Forestry Net Emitter of Greenhouse Gases; Irish Times, 29 October 2020.

[xi] Evidence for Losses from Strongly Bound SOM Pools After Clear Cutting in a Northern Hardwood Forest; Emily M. Lacroix, Chelsea L. Petrenko, Andrew J. Friedland; University of Darmouth; Soil Science, 2016

[xii] Planting a Mix of Tree Species 'Could Double' Forest Carbon Storage; Carbon Brief, 22 August 2018

[xiii] Grasslands: Scotland's Living Landscapes; Scottish Natural Heritage, 2001

[xiv] Scottish Crofting Federation's New Chair Ready to Fight for the Future of Sector; Ross-shire Journal, 26 May 2021

[xv] Nature Based Jobs and Skills for Net Zero – An Initial Assessment*;* NatureScot, December 2018

[xvi] A Nature Recovery Plan; RSPB Scotland, Scottish Wildlife Trust, WWF; March 2021

NB:
We recognise the economic and cultural importance of Scotland's agricultural sector. In assessing larger farms that may be eligible for a carbon emissions land tax, it will be necessary to avoid unintended consequences, such as replicating the experience of the industrial sector, in which carbon production was effectively exported to other parts of the world. It would be counter-productive, for example, to increase imports of beef from countries whose agricultural practices are damaging at the expense of high-quality Scottish beef. It should also be noted that at least 93 per cent of farms in Scotland fall under the 1,000ha threshold and would therefore be exempt from taxation under our proposal**.**

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