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Common Weal Policy

WORK THE LAND: THE EMPLOYMENT POTENTIAL OF LAND REFORM

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The coalition for grouse moor reform

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The coalition for grouse moor reform

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REVIVE is a coalition of like minded organisations working for grouse moor reform in Scotland.

For more information visit:

www.commonweal.scot

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Or contact us at:

hello@common.scot

AUTHORS

Robin McAlpine and Craig Dalzell, Common Weal

KEY POINTS

- It is argued that the reform of either land ownership in Scotland or its grouse moors would harm fragile economies by reducing employment opportunities. The paper argues that this is only true if alternative possible uses of the land are ignored and examines ten possible alternative uses and the jobs they could bring.
- The current use of land is not efficient in terms of creating jobs and incomes. Scotland's private shooting estates create 2,640 jobs directly and indirectly and an average income for those jobs of £11,401 - which is less than minimum wage for a full-time job. No hill farm makes a profit without public subsidy; the £11,052 average income for sheep needs £38,124 of subsidy and the average income of £24,378 for beef requires £46,268 in subsidy. These activities take up a large proportion of Scotland's land.
- Ten alternative job types are examined - land manager, wildlife manager, commercial forestry, wood processing, deer stalking/venison, horticulture, crofting, energy engineer, housebuilding and ecotourism. All apart from crofting (which is best considered a supplementary income) pay more than the average incomes from current use.
- In each case a conservative potential number of jobs is estimated. These cannot be summed to create a total as without mapping Scotland and allocating land for each purpose there would be double counting where land has more than one potential use.
- Nevertheless, the potential in jobs in rural Scotland is in the tens of thousands.
- These are only the direct jobs created by these ten opportunities and this does not include the large number of indirect and induced jobs which would also be created in supply chains, services, retail and leisure, public services and as a result of growing communities, nor the potential for existing businesses expansion, home-working relocation and job start-up entirely unrelated to these ten job types which would be made possible as a result of significantly expanded housing availability.

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INTRODUCTION

Rural depopulation is not a problem faced only by Scotland but is a worldwide trend – and yet Scotland is the 47th least densely populated country in Europe¹. Our history is marked by the Highland Clearances of the 16th and 17th centuries and mass emigration in the 19th and 20th centuries which have made rural depopulation a particular issue. And this trend continues; in 2019 the areas of Scotland which saw the highest drops in population and the fastest rise in average age were heavily skewed towards rural and coastal areas².

There are many reasons for this³ including housing availability, the impact of rurality on public services, utility availability (particularly broadband) and educational opportunities. And all these factors interact – business start-up is hard without broadband, maintaining service provision for a declining community becomes increasingly expensive, business expansion is difficult without housing for staff). But probably none is more significant (and particularly for younger residents) than the availability of employment opportunities. Put simply, where there are a lack of viable job opportunities suitable to sustain incomes, the population driver is inevitably towards either decline or an ageing population, increasingly of retirement age.

Many of these issues are inextricably linked to land and land availability, but there is a direct conflict of interpretation of the implications of this for land reform. Those who campaign for land reform argue that more land is needed to tackle the issues which depress employment opportunities, while large landowners argue that their estates create jobs which means that breaking up those estates will harm employment availability when so few jobs exist.

The case-study example of this debate is the job creation arguments around grouse moors and their management. For both those who seek to reform the practices of grouse shooting for animal welfare reasons and those who argue for the reform of land ownership, grouse moors are seen as totemic. On the animal welfare front the ‘circle of destruction’⁴ that devastates biodiversity on and around grouse moors

represents all that is wrong with Scotland’s approach to wildlife. For land reformers, the fact that around a seventh⁵ of Scotland’s rural land area is given over to the practice of such an economically unproductive⁶ activity as grouse shooting is indicative of how Scotland’s incredibly concentrated land ownership pattern⁷ is bad for the country.

The question of how much grouse moors actually generate in employment and income will be examined in more detail below but using the numbers provided by landowners themselves it suggests the total direct and indirect jobs created by grouse moors is around 2,640 with an average direct or induced salary of £11,401, which is below minimum wage levels. Common Weal has also pointed out that given the enormous land resources dedicated to grouse moors the economic impact per hectare of land is remarkably low. In fact if compared to ten alternative uses of land, all of them are substantially more productive (see reference 6 above).

What this paper seeks to argue is that claims that land reform (and particularly the reform of large estates and the uplands) would harm rural employment is only sustainable if policymakers disregard the impact of alternative uses of that land and the employment potential that creates. It does so by looking at a range of alternative uses for the land, describes the jobs which could be created and in each case seeks to make a broad estimate of the following:

- What is an estimated salary for that job?
- How many hectares of land would be required to create one job
- Very broadly, what kind of total numbers of jobs might Scotland sustain?

To do this this paper will seek to identify existing salary data for each of the jobs suggested, or for jobs which are of a closely similar nature. It will then (where possible) try to identify what is known about the area currently dedicated to that activity and the total employment numbers that have been created by that land area to indicate the job-to-land-area ratio. Finally, it will make a rough estimate of how much of that activity Scotland’s land could sustain if ownership was

reformed and from there estimate a 'conservative maximum' number of jobs that might be created. The detailed methodology for each example is contained in 'Methodology Details' after the references at the end of this report.

Some caveats are necessary here. First, this paper does not seek to estimate what impact on wages might be created by expanding the number of jobs in that industry sector (for example as a result of greater competition for existing skills). Second, the productivity data of existing land use may not immediately be transferable to new land used for the same purpose as it may take time for that land to develop and be improved to perform to the same standard. Perhaps the biggest caveat is that the 'total potential jobs' will be little more than a broad estimate to give an indication of scale (and so taken as no more than loosely indicative) and cannot be summed to give a total number as in some cases this may represent competing or alternative uses for the same land. More accurate estimations for any of these would require detailed surveying of land and would rely on data which is not all available. And finally it is also important to be clear that this is by no means an economic impact assessment of the potential of land reform for rural Scotland – that would generate much larger outcomes with the induced effective of things like additional housing supply and the impact on existing businesses and communities. Nor does this paper look at the secondary, induced or multiplier effects of these new jobs (if there are large numbers of new jobs in rural Scotland, they will increase the demand for local services and therefore stimulate local economies).

However the aim of this is not to be precise nor comprehensive but to show that alternatives are possible. It is to show that reforming land and reforming grouse moors does not mean destroying jobs but has the potential to create many more, and that the jobs which can be created are often very much more sustainable and better paid than any that would be lost. Far from land reform being a threat to rural communities and jobs, it is an enormous opportunity.

WHERE DO WE BEGIN?

It is important to recognise that land reform is by no means only a rural issue, but for the purposes of this paper we shall look only at rural land reform. It is therefore important to note what this does not mean. For the most part rural land reform does not relate to lowland, developed agricultural land, although the availability of farm and horticultural land for new entrants is certainly an issue. Much of the land reform agenda relates to land which is not prime agricultural land. It is about large estates, the uplands and some of the land surrounding existing communities. So what kinds of employment do these create?

There are two dominant forms of employment associated with this type of land; grouse moor and shooting estate management (and associated activities) and hill farming.

A report commissioned by the Scottish Government⁸ estimated that there were about 2,500 jobs created by grouse moors with a total of £14.5 million spent on wages. However, as the first number includes indirect jobs and the latter only direct wages it does not give a reliable account of individual incomes. Revive commissioned a report looking at available data as well. It worked from research by Scottish Land and Estates (the representative body of estate owners) which estimated the total number of jobs (including indirect jobs) at 2,640. However as this also contained a figure for all wages both direct and indirect (£30.1 million) it was possible to estimate the average wages paid or induced by grouse moors. This is £11,401, or less than minimum wage for a full-time job⁹.

Another Scottish Government-commissioned study¹⁰ surveyed gamekeepers themselves. It found that 58 per cent earned between £15,000 and £25,000 annually and another 31 per cent between £25,000 and £25,000. However this was from a sample size of only 152 and related only to those in full-time employment while many of the jobs among the 2,640 will be part-time or seasonal. On the other hand, some of these jobs will come with tied housing which may increase their value but prevent the ability to build up housing assets.

A recruitment company¹¹ estimates that underkeepers can earn around £11,000 a year and single-handed keepers can earn £16,000 a year and above, with head keepers able to earn £20,000 a year and upwards.

Hill farming is easier to assess as more comprehensive data is available (not least because it is all in receipt of public subsidy). Upland ewe flocks made an average net margin of 35p per ewe per year in 2019. With Hill ewe flocks, on the poorest land, the average net margin is negative; every ewe costs the owner £26.15 per year. The owners stay in business only through the subsidy, historically from the European Union¹². The Scottish Government's Farm Business Survey¹³ shows that no kind of hillside livestock farming would make a profit without public subsidy. In Scotland the average profit for a hill farm (2015/16 to 2016/17) was £11,052 for sheep (of which the average support was £38,124) and £24,378 for beef (of which the average support was £46,268)¹⁴. These are hard, demanding jobs for low to average incomes which rely almost entirely on public subsidy.

As a comparator, in 2019 the median (i.e. the typical) annual pay for everyone employed in Scotland was £24,486 while the median salary for someone in full-time employment was precisely £30,000¹⁵. The current use of the land most likely to be affected by land or grouse moor reform is by no manner of means generating large numbers of well-paid jobs given the sheer volume of land they take up.

ALTERNATIVE USES

So what are the alternatives? This paper will now look at ten possible kinds of employment which could be generated and sustained by alternative uses of this land. It will not look at land uses which require large amounts of prime arable land (such as large arable crops or premium cattle grazing) but will focus on economic activity which can be undertaken on non-prime and upland land. This includes some horticulture options which require smaller patches of fertile land or alternative forms of growing and will often be in poly tunnels.

Land manager

Land does not just 'develop itself'. If land is to be brought back into productive use or be restored to environmentally-beneficial natural habitats, interventions are needed. This is clearly the case with forestry development but if we want to see substantial progress on rewilding, that will require action too. While (by definition) land left alone without the distorting impact of human interventions such as close-grazing sheep or sustaining otherwise unsustainable deer populations would return to a natural state eventually, it would take a very long time in many places. The human interventions that have been taking place for such a long period mean that necessary conditions such as regenerative seed stocks do not exist. In time wind and wildlife will return these naturally, but the emphasis is on time; left to regenerate entirely on its own, the time to reach a mature-state forest is measured in centuries. The same would be true for other land management issues such as the restoration of peatland and the better management of riparian areas (the land surrounding rivers, streams and bogs). If we are to repair what humankind has done in even a few generations we must actively manage the land. There are excellent examples of this happening in Scotland in some of the more enlightened private estates and through the work of public bodies (particularly Forestry and Land Scotland). But this work must be expanded – and quickly. These are long-term, skilled jobs and the subsidy regimes which support the practices which have done the damage should be redirected to support these new jobs. The sheer scale of Scotland's land means these numbers will be substantial – in the Common Home Plan¹⁶ (Common Weal's fully-costed, comprehensive Green New Deal) estimated that managing all of Scotland's rural, non-agricultural land could require a workforce of up to 20,000.

Land Manager	
Typical Salary	£24,450.00
Hectares Per Job	24
Number of Potential Jobs	20,000

Wildlife manager

Rewilding is not only about plants but also wildlife. This can range from action to restore Scotland's natural populations of water voles (which have been decimated by poor river management practices) through to the reintroduction of species such as lynx for natural deer control. Both research and practice is needed to bring Scotland's levels of biodiversity back from where they are and there is little of our natural wildlife which is unlikely to need any attention (from insects through the bird populations through to larger mammals). This overlaps with land management – for example the loss of natural meadows results in the loss of the insects which in turn support the population of grassland-reliant birds. But wildlife management is also a discipline in and of itself, again creating skilled, long-term jobs.

Wildlife Manager	
Typical Salary	£20,802.00
Hectares Per Job	3,684
Number of Potential Jobs	500

Forestry

There is also clear crossover between forestry, land management and rewilding. Common Weal estimates that up to about 50 per cent of Scotland's land area should be given over to forestry and that, of that, about half is suitable for commercial forestry¹⁷. Common Weal has also set out a vision for how Scotland can support, sustain and grow an advanced timber industry (see below) and this creates the potential to greatly increase the demand for Scottish timber. However, this should be managed in terms of best practices such as continuous cover (where timber is harvested selectively to ensure that the overall forest maintains its structure) rather than clearfell (where large tracts of forest known as coups are felled at once, wiping out habitats and scarring the land). This industry must also involve a more balanced approach to timber; Sitka Spruce (which dominates commercial forestry) is an effective crop in Scotland but it must be

balanced with other softwoods for soil health and habitat reasons and must also be balanced by substantial planting of hardwood crops. Most hardwood crops take at least two generations to be commercially available but there is little that is 'short term' in forestry and so Scotland must plan for the long term. All of this will create a large number of skilled and semi-skilled jobs.

Commercial Forestry	
Typical Salary	£20,802.00
Hectares Per Job	42
Number of Potential Jobs	21,000

Wood processing

Scotland has neglected wood as a material. In the inter-war years (and again after the World War Two) there was a race to replenish timber stocks as quickly as possible to prepare for future war. This led to the introduction of the fast-growing Sitka Spruce which is so visible in Scotland's landscape (often planted in blocks and surrounded by barren ground). But Sitka Spruce does not produce particularly high-quality timber (it is very soft) and of course the practices of war moved on. The idea became prevalent that Scotland was only suited to poor-quality wood crops. That is not the case; a long-term view was simply not taken and hardwood crops were never replanted at scale, so Scotland began importing much of its timber. This is not the pattern of what happened in similar countries. Many of the Nordic countries have less conducive conditions for forestry than Scotland but took such a long-term approach. Softwood is generally not used for structural purposes but if it is cross-laminated (thin strips glued together with the grains alternating) or is combined in volume (such as with dowel laminated construction products¹⁸) it suddenly becomes a very effective material for construction. The Nordic countries produce Glulam beams which can be comparable to steel in terms of their load bearing for construction. These advanced timber products are the norm in some countries. But even more basic uses of poorer-quality wood are options for Scotland, perhaps particularly various forms of wood-based insulation like cellulose or

fibreboard, given that currently Scotland imports these rather than manufacturing them. These are all old technologies, but there are many rapidly-emerging new technological uses for wood crops. The world needs to move urgently away from petrochemical-based plastics and the alternative is bioplastics which are derived from biomass crops such as wood. And of course the unprocessed wood is bulky and difficult to transport so it makes enormous sense to locate a lot of the primary processing close to the timber production in rural Scotland. And there are other wood-based manufacturing opportunities – it is possible to produce components using 3D printing and bioplastics or even wood dust. All of these and many more are options with offer bountiful opportunities for Scotland in the future and Common Weal has explained how public policy could help to grow these rapidly¹⁹. They are all high-skill jobs and in themselves open up the potential for a new strand of light manufacturing in Scotland based in particular around bioplastics and advanced cross lamination.

Wood processing	
Typical Salary	£23,400.00
Hectares Per Job	N/A
Number of Potential Jobs	1,500

Deer stalking and venison

Forestry in Scotland is currently expensive to establish for a very simple reason; we have far too high a deer population in ratio to our forestry and the deer population isn't contained²⁰. As with grouse, many sporting estates manage deer populations for commercial hunting and seek to keep them artificially high. Generally with no containment and no natural predators, the deer then roam across Scotland's landscape and forage on saplings and the bark of young trees. This has a devastating effect on natural forestry; without the saplings and young trees forests are unable to regenerate themselves or expand and so get older and older until they die back. It also has a devastating effect on the deer who suffer and often die in the winter without sufficient sources of food and shelter. This would balance

population numbers again, but the shooting estates continue to maximise deer numbers the following year and so the cycle continues. In most of Scotland, to establish new forestry or to let existing forestry develop naturally and sustainably, expensive deer fencing has to be installed for protection. This disincentivises both commercial and non-commercial forestry development in Scotland, reducing the total volume of forestry in relation to deer numbers and so again continuing the cycle. Reintroducing natural predators such as the lynx is part of the solution to this, but wild venison is also an ethical and plentiful source of meat in Scotland and so an economic opportunity. Both for the purpose of deer management and meat production, deer stalking will be part of the pattern of rural employment in Scotland.

Deer Stalking	
Typical Salary	£19,000.00
Hectares Per Job	4,000
Number of Potential Jobs	600

Horticulture

Not all of Scotland's prime agricultural land is used productively (large farms may not develop small, less accessible or awkwardly-shaped plots) – but the vast majority is. There is some agricultural opportunities in upland farming but this will mostly be used for animal feed. But there is much more potential for horticulture, particularly where it is protected in poly tunnels or greenhouses. There is less suitable land in less agriculturally-developed areas of Scotland, but it is available and other land can be improved. In addition there are now a wide range of other growing options such as no-dig (where crops are grown in compost placed on top of the land) or raised beds which can be implemented on any land type. Many communities in rural (and island) Scotland have viable proposals for food-growing businesses but are unable to realise them as a result of lack of available land²¹. Land reform will give Scotland the ability to increase its food-producing businesses.

Horticulture	
Typical Salary	£17,000.00
Hectares Per Job	3
Number of Potential Jobs	7,000

Very small farming (crofting)

We have seen above that hill farming in Scotland is profitable only on the basis of large subsidies and even then does not provide large incomes. Hill farming is inefficient because the flocks are spread so thinly across such a wide area of land, making it labour-intensive to manage and increasing flock loss (particularly during lambing season). This does not mean there is no form of viable hill farming. If investment is made in creating enclosed grazing for sheep which are brought down from the higher hillsides to below the 'top dyke', introducing new breeds of more hardy cattle and supplementing this with other feed crops it is certainly possible to maintain farming in the uplands and likely that this will prove to be more economically viable. However, this is difficult to measure and assess and so the numbers below are based on very small farming (crofting). These are generally ineligible for subsidies and crofting should be considered a supplementary income rather than a primary one. The potential for crofting in total numbers is theoretically very high but in reality it will be dependent on the ability to be combined with another of income.

Crofting	
Typical Salary	£2,000
Hectares Per Job	5
Number of Potential Jobs	20,000

Energy engineering

The potential for onshore wind energy generation has not been exhausted in Scotland and the ability to expand this in an environmentally sympathetic way remains. In addition to this

Scotland has barely begun to roll out solar energy options at scale in rural Scotland, both for electricity (solar PV) and heat (solar thermal). Just as importantly for creating good jobs in this sector is to address Scotland's terrible record in capturing the economic benefits of our renewables industry because of ownership patterns and the approach to manufacturing and servicing technology. These are not the only opportunities. Rural Scotland is the location of most of the country's energy storage which at the moment is almost all pump-store hydroelectric. But if Scotland is to move to being an energy-secure economy using only renewable energy then electricity storage will become a much more important part of our energy system. There are different types of energy storage for both electricity and heat and they lend themselves to different locations. For example heat storage is most efficient if deployed close to the communities which will use the heat and battery-electric storage is generally best for 'grid smoothing' (managing the peaks and troughs of demand through the day or over a few days) and so also best deployed close to where it is used. But longer-term forms of energy storage (often known as 'redundancy' or spare energy stored for longer periods and released when renewable generation is abnormally low or energy demand abnormally high) can be deployed anywhere on the grid and can be integrated with energy generation, bringing more potential employment opportunities to rural areas. That includes the enormous potential for hydrogen in Scotland.

Energy Engineer	
Typical Salary	£33,700.00
Hectares Per Job	5.5
Number of Potential Jobs	2,000

Housebuilding

It is widely accepted that many parts of rural Scotland face a housing crisis²² with availability reducing and prices rising sharply. There are many reasons for this including the conversion of properties to short-term let (AirBnB), the problem of second and holiday homes and the

nature of the housing stock that is built (often designed to meet the needs of the second and holiday home market rather than local need). But the lack of access of many communities to land on which they can expand housing supply based on local need is crucial. Land reform would open up the capacity for communities to build housing for local need and, along with better local democracy, enable them to manage the development and growth of their communities. Linked to the development of better locally-produced, wood-based building materials and following models of housebuilding such as those of Austria where there are many more locally-owned, smaller-scale housebuilding businesses, the ability to create housebuilding jobs to serve local areas is substantial.

Housebuilding	
Typical Salary	£33,700.00
Hectares Per Job	11
Number of Potential Jobs	18,000

Ecotourism

Tourism is crucial to Scotland but there is also increasing evidence²³ that there are problems of over-tourism and it can be heavily concentrated in a few areas. There is a strong argument that Scotland should alter its pattern of tourism to protect communities which are being hollowed out by AirBnB, to relieve the environmental pressures that some parts of the country face and to increase the proportion of higher-value tourism. Scotland has enormous potential for niche but expanding markets²⁴ like ecotourism. This does not rely on a small number of high-profile locations but is often instead activity-based and so can be developed in any part of Scotland where land is available in an attractive landscape. It is difficult to assess the nature of the jobs in ecotourism compared to standard tourism (which is known for a preponderance of low-pay and insecure jobs²⁵) because ecotourism takes many different forms. But there is reason to believe²⁶ that Scotland has the capacity to develop a higher-value, higher-paid ecotourism industry spread across rural Scotland.

Ecotourism	
Typical Salary	£18,564
Hectares Per Job	N/A
Number of Potential Jobs	3,000

CONCLUSION

This paper is only a snapshot of some of the kinds of employment opportunities which could open up if Scotland reformed its land ownership and people, communities and the nation as a whole were able to get better access to land and use it more productively. It would enable the establishment of new land-based businesses, the development of housing and community planning which supported rather than suppressed the future opportunities of communities and would make national missions such as tackling climate change and restoring biodiversity easier to achieve. None of this is going to produce employment outcomes which are worse than those resulting from current ownership and use patterns. Indeed the average income per person is nearly double that of current outcomes and the number of potential jobs many times greater.

It should be remembered that when landowners talk about 2,500 jobs from estate ownership that includes not just direct but indirect jobs. If we think about the secondary jobs that would go along with those outlined above – from local shops, supply chains, pubs, cafes and restaurants, services ranging from hairdressers to accountants and the public sector jobs in providing public services for all of these people – we can see just how great the potential is. But that is not the end of the story, because some of the specific outcomes delivered by these jobs then facilitate other jobs. Existing tourism and hospitality businesses which have been unable to expand because of lack of housing for staff could then expand, light manufacturing jobs derived from the outputs of wood processing could be created, energy-intensive businesses might relocate to where energy generation takes place. And this is not the end of the story either, because all of this brings the scale which makes

proper infrastructure investment viable again. Thriving rural communities with good broadband can become the home for a wide range of economic activity, from people who are moving to home working relocating to people who want to start web-based businesses and can do it anywhere. All of these opportunities cascade outwards from the act of breaking the logjam in land availability in Scotland.

The impact of land reform on jobs in Scotland's rural communities should not be something these communities fear but something they should embrace.

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METHODOLOGY DETAILS

In all cases throughout this paper we have made conservative estimates and rounded numbers accordingly.

Land manager

Salary - £24,450 per FTE. (<https://www.adzuna.co.uk/jobs/details/2025782996>)

Hectares per job – 24 (<https://www.rmt.org/fairhill-rise-seol-trust/>)

Potential Jobs - This example is based on an intensive biodynamic conservation project run by the Seòl Trust, scaled up for the land area in Scotland to be managed. This methodology in the Common Home Plan (<https://commonweal.scot/our-common-home>) resulted in a proposal for up to 20,000 additional land management jobs across Scotland to assess current land and aid the transition to new uses.

Forestry - Commercial

Salary - £20,802 per FTE. (<https://uk.indeed.com/cmp/Forestry-and-Land-Scotland/salaries/Forester>)

Hectares per job – 42 (<https://commonweal.scot/index.php/policy-library/back-life-visions-alternative-futures-scotlands-grouse-moors>)

Potential Jobs - Scotland's current commercial forest cover is 1.08 m hectares (http://www.parliament.scot/ResearchBriefingsAndFactsheets/S5/SB_16-93_Scottish_Forestry.pdf). Increasing this by 920,000 hectares (for a total of 2 million hectares of commercial forest) would sustain an additional 21,904 jobs.

Wildlife manager

Salary - This is taken from data on park rangers as a close comparator; £24,338 per FTE. (<https://www.planitplus.net/JobProfiles/View/516/12#:~:text=The%20Forestry%20and%20Land%20Scotland,to%20%20a%20year.>)

Hectares per job – 3,684 (<https://www.nature.scot/naturescot-ranger-services-scotland-achievements-glance>)

Potential Jobs - If the scale of wildlife management expansion was ratioed to the increase in non-commercial forestry (from 440,000 hectares to 2 million hectares), this would sustain an additional 423 wildlife manager jobs. However, there is a case to be made that this is a sector that could benefit from additional investment and a greater density of jobs per hectare.

Wood processing

Salary - £23,400 per FTE (<https://www.totaljobs.com/job/wood-machinist/meridian-business-support-limited-job92108624>).

Hectares per job – N/A (Forest harvesting is included in Commercial Forestry numbers. Construction or processing will take place in single-site factories.

Potential Jobs – This is difficult to assess as it relates to an industry which either doesn't exist in Scotland or doesn't exist at scale anywhere. The British bioplastic sector estimates that it will create 34,000 jobs in the UK (<https://www.nnfcc.co.uk/files/mydocs/NNFCC%20Market%20Perspective%20Biobased%20Plastics%20V13%20Final.pdf>) and if processing is closer to timber supply that would suggest a disproportionate number would come to rural Scotland, which we estimate at 1,500. If Scotland was to use a Green New Deal to stimulate domestic manufacture of organic, sustainable insulation and construction materials and public procurement was used to encourage greater use of domestic timber products the potential additional workforce could be substantial - but it has not been possible to find reliable figures for the scale of this. However we have decided to stick to the conservative estimate of 1,500 jobs in the absence of additional data.

Deer stalker/venison

Salary - £19,600 per FTE (http://ww2.rspb.org.uk/Images/a0600519assistantstalkerai_tcm9-467665.pdf).

Hectares per job – 4,000 (<https://www.gov.scot/publications/summary-report-socioeconomic-biodiversity-impacts-driven-grouse-moors-employment-rights-gamekeepers/pages/7/>).

Potential Jobs – Highly dependent on how many deer we want. If deer stalking is encouraged throughout all new forest then 2,480,000 hectares of new forest would sustain 620 deer stalking jobs.

Horticulture

Salary - £17,000 per FTE (<https://www.planitplus.net/JobProfiles/View/145/9>).

Hectares per job – 3 (<https://commonweal.scot/index.php/policy-library/back-life-visions-alternative-futures-scotlands-grouse-moors-conditions-crofting-2015-2018/>).

Potential Jobs – Current horticulture area in Scotland is 18,200 hectares and sustains around 7,370 jobs. Every additional 18,200 hectares turned over to horticulture could therefore sustain an additional 7,370 jobs.

Very small farming (crofting)

Salary - £2,000 per FTE (<https://www.gov.scot/publications/survey-economic-conditions-crofting-2015-2018/>). [Crofting is an extremely low income activity and was never designed to be much more than subsistence or supplementary farming. Moving to higher value products like premium breeds of sheep may increase income]

Hectares per job – 5 (<https://www.gov.scot/publications/survey-economic-conditions-crofting-2015-2018/>).

Potential Jobs – Doubling the number of crofts in Scotland would create 20,570 new jobs. Increasing the size of holdings and the value of produce would increase the income per job.

Energy engineering

Salary - As an estimate, £33,700 per FTE for a solar panel installer (<https://uk.indeed.com/career/solar-installer/salaries>)

Hectares per job – 5.5 (as per above)

Potential Jobs – Common Weal’s Common Home Plan calls for 13.5GW of heat capacity and 14.8GW of electricity capacity to be built between now and 2045, a total of 42,600 job-years. Split evenly over those 24 years, that’s 1,775 extra jobs in renewables. The bulk of these installation jobs will likely be in rural areas as most of it is likely to be onshore wind and solar PV/Thermal arrays. To increase accuracy offshore wind should be stripped from these numbers which leaves 1,560 jobs per year for onshore renewables. If energy saving is included in this there would be an additional 360 jobs to insulate remote rural houses. It is difficult to assess the jobs in renewable heating in rural areas without extensive surveying and these may not be insignificant. Likewise without a proper plan which sets out options such as energy storage technologies and capacity or the scope of hydrogen technologies in Scotland and their location it isn’t really possible to estimate the potential in employment from hydrogen. So for the sake of this paper we shall assume a very conservative 2,000 energy jobs in total.

Housebuilding

Salary - Construction salary average, £10.73/hour (<https://uk.indeed.com/career/construction-worker/salaries/Scotland>) so £22,318/year per FTE.

Hectares per job – Housebuilding sustains around 3.1 jobs per house (<https://www.hbf.co.uk/news/economic-footprint-uk-house-building-july-2018/>). Typical remote rural housing density in Scotland is 0.03 houses per hectare (<https://www.nrscotland.gov.uk/files/statistics/household-estimates/2017/house-est-17-publication.pdf>). A target of doubling housing in remote rural areas would therefore require about 10.75 hectares per job.

Potential Jobs - The calculation for the potential for land reform to create housing jobs is slightly different from most of the others as each built house requires new land rather than sustaining a job on a particular patch of land indefinitely. A target of doubling remote rural population from ~316,000 to 623,000 (<https://www.gov.scot/publications/rural-scotland-key-facts-2018/pages/2/>) would require 140,450 houses (assuming average Scottish household size of 2.25 people/house - <https://www.nrscotland.gov.uk/files/statistics/household-estimates/2017/house-est-17-publication.pdf>). If built over 24 years (i.e. up to the 2045 Green New Deal target date), this would mean sustaining 18,140 jobs.

Ecotourism

Salary - £18,564 (<https://www.gov.scot/publications/tourism-scotland-economic-contribution-sector/pages/4/>)

Hectares per job - The possible range of activities (an expansive hillside for a mountain biking track, a small paddock for cabins for a base from which to organise bird watching tours) is too great to draw any meaningful conclusion on land requirements.

Potential Jobs - In 2016 the total number of jobs in ‘sustainable tourism’ in Scotland was 207,000 (<https://www.gov.scot/publications/tourism-scotland-economic-contribution-sector/pages/4/>) though that includes city-based tourism assessed as ‘sustainable’. An earlier study suggested that specifically ecotourism jobs numbered 39,000 in Scotland (http://www.outdoorrecreationni.com/wp-content/uploads/2015/11/Assessing-the-economic-impacts-of-nature-based-tourism-in-Scotland_Scottish-Natural-Heritage-2010.pdf). We have simply assumed the potential for a 10% expansion in the size of this sector.