Green Jobs and a Just Transition in Moray

By

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This study was commissioned as part of the Just Transition Project at UHI Moray. The project is a 12-month project examining the implications of the shift to Net Zero on the employment, skills and infrastructure requirements of the region over the next 10 – 15 years. Delivered in partnership with industry, local government and the third sector, the project examines the knowledge and skills gaps, curriculum, training and infrastructure requirements, as well as enterprise pathways supporting the emerging green economy in Moray. The project is funded by the Scottish Government's Just Transition Fund.

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Executive Summary

The Scottish Government has committed to achieving Net Zero by 2045. The transition to Net Zero has the potential to boost green growth and generate green employment across Scotland. To assess progress of these plans, measurement of green jobs and the demand for skills required for these jobs is needed. Achievement of the transition to Net Zero is intended to transform all sectors of Scotland's economy and society in a way that is fair to all as part of a just transition. At the same time, the Scottish Government promotes the introduction of fair work, which means improving job quality across the country. This report presents the findings on the analysis of green jobs conducted by Warwick's Institute for Employment Research (IER) as part of the Just Transition Project, led by UHI Moray. The research provides current estimates and future trends of green jobs in Moray using the Standard Occupational Classification (SOC), disaggregates the data by green job type and assesses the principles of fair work and a just transition in relation to green jobs.

IER's Labour Market Information for All (LMI for All) vacancy data was used for the research. The analysis distinguished three types of green jobs – New and Emerging Occupations or 'pure' green jobs which are completely novel or emerging from the transition to a green economy, Enhanced Skills and Knowledge Occupations which capture changing requirements in some existing jobs, and Increased Demand Occupations which result when green economy activities increase employment demand for some existing occupations. Jobs not categorised as green (based on the afore-mentioned typology) are non-green jobs. While the focus is primarily on the Moray region, the report also provides results for Aberdeenshire, the Highlands and Islands and Scotland.

The findings show that 31.7% of job vacancies in Moray are for green occupations, and there are 34.4% vacancies in green occupations in Moray, Aberdeenshire and the Highlands and Islands combined. New and Emerging green jobs account for 8.4% of green jobs in Moray only, and 9.9% of green jobs in Moray, Aberdeenshire and the Highlands and Islands collectively. Enhanced Skills and Knowledge green jobs account for the largest share of green job vacancies across all geographies analysed, and is 64.5% in Moray specifically. 27.1% of vacancies in Moray are Increased Demand jobs. The high presence of Enhanced Skills and Knowledge and Increased Demand job vacancies shows the possibility for and importance of non-green jobs to change to support the green economy. In the next twelve months, the number of vacancies in occupations in all types of green jobs are projected to grow.

In general, New and Emerging green jobs have relatively higher demands for technical skills/training, though a large share of vacancies in green occupation also requires cross-

sector transferable skills such as communication skills and working in a team. The majority of New and Emerging green jobs require experience.

With respect to fair work/job quality, vacancies in occupations classified as green jobs are more likely to mention teleworking/remote working and temporary/fixed contracts but less likely to mention part-time working. Green jobs are higher paid than non-green jobs (based on the median wage advertised).

The findings provide a baseline for monitoring progress towards green ambitions in Moray (as well as Aberdenshire and the Highlands and Islands) and suggest that the region is starting from a good foundation. To ensure further and sustained progress, it is recommended that the greening of jobs in non-green sectors should be encouraged. One way of encouraging this greening of jobs will be through training that delivers up-skilling and re-skilling enabled by new micro-credentials, and which might also support the drive to a more inclusive Net Zero economy by drawing in workers in non-green sectors. A second, related, recommendation concerns the routine monitoring of the skills demanded in the green economy and direct consultation with firms in this regard. These types of continuous research/consultation would help to inform skills training efforts and ensure policies remain current and sensitive to demand. Third, it is recommended that, there should be further work towards developing more inclusive green employment as part of a just transition – focusing on the age and gender of workers for example. Improving job quality is one way in which under-represented workers can be attracted to jobs in the green economy. Fourth, to better inform policy development, capturing data on the labour supply side of the green economy is needed to complement the demand side data presented in this report. Scottish census data on employment reported by households could be matched to the 2020 SOC, then mapped to the GreenSOC to give an estimate of the existing stock of green employment, and the types of skills and qualifications that are most common among workers in these occupations.

1. Introduction

In 2019, the Scottish Government declared a climate emergency.[1] It then set its ambition to reaching Net Zero greenhouse gas (GHG) emissions by 2045 with a 75% reduction by 2030.[2] The transition to Net Zero has the potential to boost green growth and generate green employment across Scotland. However, there is a risk that some people and places could be left behind, unless mitigation actions are taken. The transition therefore needs to be both green and just. A Just Transition ensure a fairer, greener future for all, and in participatory and inclusive in achieving this.[3] The Scottish Government recognises this and has committed to leading the production of key just transition plans.[4] Moreover, the Just Transition Commission was established to provide independent scrutiny and advice on how to "put justice at the heart of climate action in Scotland."[5]

Green jobs and skills are integral to the transition and the Climate Emergency Skills Action Plan 2020-2025 (CESAP) provides a clear policy focus on jobs and skills.[6] However, until recently, little was known about the extent of green jobs in Scotland nationally.[7] At the regional level within Scotland, projections about the impact of green jobs and skills still tend to run ahead of the evidence.[8] As significant government support will likely be required to deliver a just transition,[9] more evidence is needed on how the transition to Net Zero is changing demand for jobs and skills at the regional level.[10] This evidence gap exists for Moray and was identified as a challenge in the 2022 Moray Economic Strategy.[11] At the same time, there is a push by the Scottish Government to translate the Fair Work policy into practice, which means improving job quality across the country.[12] There is a recognition that delivery of Fair Work is journey with much still to be achieved.[13]I

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1 See Climate change - gov.scot (www.gov.scot).

2 See Climate change - gov.scot (www.gov.scot).

3 See: https://www.gov.scot/groups/just-transition-commission/.

4 See https://www.gov.scot/groups/just-transition-commission/

5 See https://www.justtransition.scot/

6 SDS (2020).

7 Cardenas Rubio et al. (2022).

8 Cardenas Rubio et al. (2022).

9 Hogarth (2012), Lenox and Duff (2021), Sofroniou and Anderson (2021).

10 Gagliardi et al. (2016), Poschen and Renner (2015).

11 Moray Economic Partnership (2022, p.18)

12 Scottish Fair Work Convention (2016).

13 Findlay (2020).

The Just Transition Project, led by UHI Moray, aims to understand the implications of the shift to Net Zero on the training, education and infrastructure requirements of the Moray region over the next 10–15 years. Gaining these insights enables UHI Moray to better position itself to support the region's transition to Net Zero through a focused programme of infrastructure development, training, skills development and education.[14] The project will be delivered in partnership with industry, local government and the third sector through key work packages.[15]

A key starting point is gaining an understanding of the level and extent of green employment in the Moray region, and how existing green employment reflects the ambitions for fair work and a just transition. Findings are presented based on four objectives agreed between UHI Moray and IER:

1. Provide data on current and future green jobs and skills in the Moray region
2. Quantify green and non-green jobs in the Moray region at the 6-digit level of SOC
3. Categorises green jobs by type in the Moray region
4. Assess the extent of just and Fair Work through green jobs in the Moray region

Figure 1.1 provides more details on the four objectives.

Figure 1.1: Objectives covered in this report

[14] See Just Transition - What is Just Transition? (uhi.ac.uk).

[15] See Just Transition - What is Just Transition? (uhi.ac.uk).

The analysis draws on a methodology developed by IER with the University of Strathclyde for estimating the extent of green jobs. The methodology was first developed for Scotland (nationally),[16] and subsequently applied to regions in England such as York and the Midlands.[17] For the present study, the methodology has been further developed and adapted to provide Moray-specific evidence. In addition, data is included on aspects of job quality that are important features of a just transition.

The report thus provides new evidence on green employment in Moray. It serves as a benchmark as the Moray region (and Scotland in general) embarks on Net Zero ambitions and provides a knowledge base for identifying skills and employment opportunities/gaps/ bottlenecks that may arise as a result of the transition to Net Zero, and the decarbonisation of existing oil and gas sector in North-East Scotland.

This report is structured as follows. Section 2 provides a brief overview of the green economy in Scotland and policies in Scotland and Moray to deliver a just transition and Fair Work. Section 3 defines green jobs. Section 4 outlines the methodological approach used to identify demand for green jobs in Moray, Aberdeenshire and the Highlands and Islands. Section 5 presents findings on demand for green jobs in Moray, Aberdeenshire and the Highlands and Islands. Section 6 discusses Fair Work and the just transition in relation to green jobs. The final section summarises the key lessons from the research and offers recommendations.

[16] Cardenas Rubio et al. (2022).

[17] Dickinson et al. (2022); Cardenas Rubio et al. (2023).

2. Background to the green economy and a just transition in Scotland and Moray

The Scottish Government set an ambitious target of Net Zero carbon emissions by 2045 and a 75% reduction by 2030. In achieving this aim, the Government emphasises a 'just transition',[18] whilst also remaining committed to delivering Fair Work in Scotland'.[19] Importantly, the government recognises that a just transition is both an *outcome* – "a fairer, greener future for all" – and a *process* – "to be undertaken in partnership with those impacted by the transition to Net Zero."[20] Applied to employment, a just transition towards an environmentally sustainable economy needs to contribute to the goals of decent work for all and social inclusion.[21] Delivering Fair Work means ensuring that workers have effective voice, opportunity, security, fulfilment and respect in Scottish workplaces.[22] According to The Fair Work Convention: "Fair work is work that offers all individuals an effective voice, opportunity, security, fulfilment and respect. It balances the rights and responsibilities of employers and workers." [23]

The Climate Emergency Skills Action Plan 2020-2025 (CESAP) has a sharp focus on jobs and skills and prioritises the development of quality green jobs as part of a green labour market recovery from the Covid-19 pandemic.[24] Furthermore, Scotland's Learning for Sustainability Action Plan 2023-2030 emphasises the interdependence of "people, planet, and prosperity" and recognises that learning as part of a green transition can be developed from early ages through changes to curriculum and pedagogy alongside partnership with communities.[25]

A recent study on green jobs in Scotland estimated that 39.9% of employment in Scotland was green – comprising 4.3% New and Emerging green jobs, 25.7% Enhanced Skills and Knowledge jobs, and 9.9% Increased Demand jobs.[26] Importantly, the demand for green jobs in Scotland has been growing, suggesting a transition in the economy towards greener activities. The data from this recent study focuses on Scotland nationally. Beyond this, there

[18] See: https://www.gov.scot/groups/just-transition-commission/; https://www.gov.scot/policies/climate-change/just-transition/

[19] Scotland's Fair Work Convention (2016).

[20] See: https://www.gov.scot/groups/just-transition-commission/.

[21] ILO (2015).

[22] Scotland's Fair Work Convention (2016).

[23] Scotland's Fair Work Convention (2016).

[24] SDS (2020).

[25] Scottish Government (2023).

[26] Cardenas Rubio et al. (2022, p.3).

is need to better understand green employment at the regional level to ensure sufficient skills and expertise are available in regional labour markets. Moray is one such region.

Moray is located in North-East Scotland and has a population of about 96,000.[27] It has a labour force participation rate of about 77%. The main sectors of employment are manufacturing, human health and social work, and wholesale and retail. Companies tend to be small: around 80% of registered private business have 0-9 employees.[28] Since the pandemic, businesses in Moray have faced labour shortages and increased labour costs.[29]

Developing a green economy and a just transition is imbedded in the 2022 Moray Economic Strategy,[30] and its 2021-2026 Social Enterprise Strategy.[31] The 2022 Moray Economic Strategy identifies five sectors to directly support the transition: (i) energy – with a focus on and offshore wind, hydrogen),[32] (ii) construction – in particular retrofitting of housing and other properties, transport – moving away from fossil fuels across all modes of transport, (vi) manufacturing – particularly engineering, and (v) agriculture, forestry and land use management. The Strategy also outlines various strategic outcomes centred on labour and employment, skills, productivity, and environmental sustainability.[33]

On the ground, the evidence from businesses is positive but there is opportunity for improvement. In a recent survey of businesses in the Highlands and Islands (which include Moray) three quarters of businesses reported that they were well informed about their responsibilities in relation to climate change legislation.[34] A third were already measuring their carbon emissions, or planning to within six months, while almost half were already reducing or planning to reduce their emissions.[35] Outside of measured emissions, the vast majority (95%) were taking some action related to the environmental impacts of their operations or were planning to within six months.

As noted above, a just transition is both green and inclusive. There remains scope for improvement concerning social inclusion in employment, as previous studies have highlighted

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27 HIE (2020).

28 HIE (2020).

29 Moray Economic Partnership (2022)

30 Moray Economic Partnership (2022)

31 TSI Moray and HIE (2021)

32 Highlands and the Islands have a strong legacy in the oil and gas industry, alongside an abundance of renewable energy resources. See Energy | Highlands and Islands Enterprise | HIE

33 Moray Economic Partnership (2022, p.21)

34 HIE (2023)

35 HIE (2023)

gaps that need to be addressed to enhance opportunities for women and youths in Moray.[36] Addressing challenges around inequality forms part of the Moray Growth deal, which aims to facilitate economic growth that is sustainable, fair and inclusive.[37]

[36] Innovation School and HIE (2018); Ekosgen and HIE (2017).

[37] Moray Economic Partnership (2022, p.11)

3. Defining green jobs

Until recently, measurement of the extent and demand for green jobs was a challenge due to lack of agreed definitions.[38] Previous attempts to define green jobs generally fit into one of two main camps: 'purist' or 'inclusive'.[39] Purist definitions are narrower in scope[40] and typically focus on a small number of jobs in designated 'green sectors' such as the 'environmental sector' or those that are directly part of green activities.[41] Inclusive definitions, on the other hand, take into account the significant impact the transition to Net Zero will have on a much broader range of jobs across the whole economy that support that transition.

To address this issue, and bridge the gap between the two camps, IER working with the University of Strathclyde, developed the GreenSOC for the UK. To classify each occupation into its respective green category, a rigorous multi-stage research and screening process was employed. This process involved several key steps, including an extensive literature review of academic papers and reports from reputable sources on previously developed taxonomies, drawing on the US O*NET,[42] and stakeholder consultation.

Building on the O*NET, Dierdorff and colleagues developed a framework to identify activities in the green economy.[43] Their framework recognises that green activities and technologies have different effects on different occupations. Specifically, the authors refer to the greening of occupations "to the extent to which green economy activities and technologies increase the demand for existing occupations, shape the work and worker requirements needed for occupational performance, or generate unique work and worker requirements." The GreenSOC builds on Dierdorff et al.'s framework. Using this framework, green jobs can be categorised into three types:[44]

1. ***New and emerging:*** occupations that have come into existence as a direct result of the growth and development of the green economy and can be thought of as 'pure' green jobs;

[38] ILO (2018), ONS (2021).

[39] Sofroniou and Anderson (2021).

[40] Renner et al. (2008).

[41] Hogarth (2012).

[42] The O*NET is a comprehensive occupational classification system that extensively catalogues and consolidates information about occupations in the United States, including details about their tasks, required skills, and knowledge utilisation. It serves as a valuable resource offering detailed descriptions of various occupations. See: O*NET OnLine (onetonline.org)

[43] Dierdorff et al. (2009)

[44] See Cardenas Rubio et al. (2022) for more details on the classification, and Dickinson et al. (2022) for an application to the York area.

2. ***Enhanced skills and knowledge:*** occupations subject to significant changes in work and worker requirements, and;
3. ***Increasing demand:*** occupations with an increase in employment demand levels without significantly changes in the job requirements.

Table 3.1 provides a more detailed description of the three types of green jobs discussed in this report.

Table 3.1: Green Occupational Categories

Green New and Emerging Occupations The impact of green economy activities and technologies creates the need for unique work and worker requirements, which results in the generation of new occupations. These new occupations can be entirely novel or 'born' from an existing occupation. An example would be solar system technicians who must be able not only to install new technology but also to determine how this technology can best be used on a specific site.
Green Enhanced Skills and Knowledge Occupations The impact of green economy activities and technologies can result in significant change to the work and worker requirements of existing occupations. This impact may result in an increase in employment demand for those occupations. The essential purposes of the occupation remain the same but tasks, skills, knowledge and external elements, such as credentials, have been altered. An example are architects, an occupation in which greening has increased knowledge requirements pertaining to energy efficient materials and construction, as well as skills associated with integrating green technology into the aesthetic design of buildings.
Green Increased Demand Occupations The impact of green economy activities and technologies can increase employment demand for some existing occupations. However, this impact does not entail significant changes in the work and worker requirements of the occupation. The work context may change but the tasks do not. An example is the increased demand for electrical power line installers and repairers related to energy efficiency and infrastructure upgrades.

Source: Adapted from Dierdorff et al. (2009, pp. 4, 11 & 12)

The approach taken covers the narrow definition of pure green jobs, while also recognising the transformation of existing jobs as these jobs become greener. It also considers jobs whose demand has increased due to the impact of the green economy.

While the O*NET serves as a solid foundation for identifying green occupations, there are challenges associated with adapting this classification to other contexts such as the UK. First, the O*NET uses the US SOC which is different to the UK SOC. Second, since the O*NET system is primarily designed for the US labour market, it may not fully account for the nuances and specific characteristics of non-US labour markets, like the UK. To address these challenges and identify green occupations within the UK SOC2020, the following steps were undertaken to develop the GreenSOC:

1. Use of crosswalks: A crosswalk was employed to establish a connection between the US O*NET-SOC and the UK SOC2020. This mapping facilitated the identification of green occupations within the UK SOC2020 framework. Subsequently, the SOC2020 occupations were categorised into different green groups, including New and Emerging, Enhanced Skills and Knowledge, Increased Demand, and Non-Green occupations.
2. Manual examination by experts: A panel of experts from the University of Warwick and University of Strathclyde conducted a thorough manual examination of the occupational list. They reviewed and assessed the occupations to ensure their alignment with the green criteria and their appropriate categorisation within the green groups.
3. Review process with stakeholders: The identified list of green occupations at the SOC2020 4-digit level underwent a further review process involving Skills Development Scotland (SDS) and other key stakeholders. The purpose of this review was to obtain feedback, validation, and consensus on the final list of green occupations. Subsequent to these discussions, agreements were reached among SDS, experts from the University of Warwick and University of Strathclyde, and other stakeholders. This stakeholder consultation led to a careful revision of occupational classifications initially developed.

This mapping allows an approximation of the number of jobs in green occupations. It is important to acknowledge that the green economy is a dynamic and evolving concept. Occupations that were once considered non-green may undergo changes and be classified as green in the future. Moreover, given the evolving nature of the green economy and the difficulties in disaggregating the information available, there are instances where coding occupations becomes complex, leading to blurred lines. In such cases, the expertise and

opinions of domain experts play a vital role in accurately classifying these occupations as best possible.

4. Data and Methodology

The main focus of the analysis is on Moray. However, given the size of the population of Moray, estimates of green jobs are presented for Moray, Aberdeenshire, and the Highlands and Islands in some cases to improve robustness. Encompassing all three types of green jobs, the analysis of green jobs for Moray, Aberdeen and Highland and Island region is based on data from the IER vacancy database. This section explains the methodology employed to collect and analyse the data.

Vacancy data

There is increasing academic and policymaking recognition that job portal data offer a cost-effective and efficient source of valuable labour market information.[45] These online platforms serve as central hubs where employers post comprehensive job listings, including details such as job titles, salary information, required qualifications and experience criteria. Using advanced web scraping and text mining techniques, IER has collected extensive data on job vacancies from prominent UK job portals since February 2019.[46] This data is then standardised to ensure uniformity and usability for analytical purposes. Additional websites were incorporated to expand the data collection efforts in the Moray region.[47] The dataset used in this study covers the period from February 2019 to July 2023. The data enables regional disaggregation, featuring location information for each job opening, specified by companies as a city, town, postcode and so on. To facilitate analysis at various geographical levels, IER has developed distinct procedures for standardising this location information, including but not limited to Local Authority Districts, Local Enterprise Partnerships and Counties. This standardised location data was employed to identify and analyse job vacancies in Moray, Aberdeen and the Highland and Island region.

GreenSOC at 6-digit level

The initial GreenSOC was developed using the UK SOC 4-digit level. While this development allowed us to identify green occupations for different regions, including Scotland,[48] it has certain limitations in terms of granularity. For instance, the Unit Group '2129: Engineering professionals' envelops a broad range of occupations, including, for example, mining engineers, oil and natural gas engineers, petroleum engineers, sustainability engineers,

[45] It should be noted that there can be challenges using such data - see Cardenas Rubio and Warhurst (2022).

[46] Websites include: reed.co.uk, jobs.theguardian.com, jobs.nhs.uk, jobs.ac.uk, totaljobs.com and caterer.com

[47] These additional websites include: myjobscotland.gov.uk, s1jobs.com, scotland-jobs.co.uk, and myworldofwork.co.uk/getting-a-job.

[48] Cardenas-Rubio et al. (2022)

turbine engineers. Some of these petroleum engineers, for example, work on green activities, while some do not. Including all petroleum engineers as 'green' is lumpy and possibly presents an upper-level estimate. In this regard, it is important to note that the figures presented within the GreenSOC at the 4-digit SOC level should be considered as approximate upper-level estimates due to constraints in the available data. A more precise understanding and to inform targeted policy measures for reskilling and upskilling requires data disaggregated to the 6-digit level within the SOC. More precision is now possible with recent ONS development of the new 6-digit SOC.[49] Given that the newly introduced 6-digit SOC level offers enhanced granularity for occupation identification, one objective of this project was to advance the GreenSOC to the 6-digit level. To do so, the following steps were taken which build on the foundation of the 4-digit level GreenSOC:

- **Coding using GreenSOC at 4-Digit Level:** The first step involved coding the vacancy database using the existing GreenSOC at the 4-digit level.
- **Extension to SOC 2020 6-Digit Level:** To achieve granularity, the categorisation of the vacancy data was extended to the SOC 2020 6-digit level. This process utilised an algorithm that incorporates machine learning techniques, CASCOT, and visual inspections by team members.
- **Maintaining Consistency:** To maintain consistency with the established GreenSOC, the 6-digit level green categories were extrapolated from the 4-digit classification. Thus, if an occupation was coded as green at the 4-digit level, all its subgroups at the 6-digit level are also considered green.

Refinement through analysis and review:

- **Keyword Mapping:** Job descriptions were analysed to identify keywords closely related to the green economy. These keywords included terms like 'solar energy,' 'zero emission,' and 'eco-friendly,' and were selected following a manual examination of keywords found in reports and other pertinent literature sources, such as the CESAP report, among others. These keywords helped to identify occupations with green skill requirements and recognise emerging green occupations.
- **Measuring shares within SOC occupational groups:** The proportion of vacancies mentioning green-related keywords within SOC 6-digit groups was calculated.

reshold is underpinned by a balance between statistical rigor and practicality. Relatively small groups are more susceptible to random variations, which may lead to less reliable findings.

[49] A comprehensive study examining how the greening of the economy impacts the demand for specific occupations is essential to address this limitation.

- **Statistical Rules:** Various statistical rules were applied to identify green occupations at the 6-digit level. The general rule was to classify occupations as green at the 6-digit level if they had a higher proportion of vacancies mentioning green-related words compared to the median of the group at the 4-digit level. If all occupations within the same 4-digit category exhibited a high proportion of green words (more than 10%),[50] they were considered green. For categories with insufficient data (less than 100 vacancies for the entire UK), the SOC 4-digit classification was used. The rationale behind this approach is to create a practical and meaningful way to classify occupations as "green" within the given dataset, while also ensuring statistical significance and consistency. The criterion of "more than 10%" for green words is used to ensure that the presence of green-related keywords is not merely sporadic but is statistically significant. A 10% threshold implies that a substantial portion of job descriptions within a category contains green terminology. In cases where there are few job vacancies (less than 100) for a given SOC 4-digit category,[51] it is challenging to draw reliable conclusions based on such limited data. In such situations, the higher-level SOC 4-digit classification is used as a default. This maintains consistency in the analysis.
- **Limitation with increased Demand Occupations:** Determining 'Increased demand' occupations at the 6-digit level proved challenging due to insufficient data for filtering.[52] As a consequence, the 'Increased demand' category at the 4-digit level was applied to all subgroups within that category.
- **Manual Expert Examination:** A panel of experts from the University of Warwick and the University of Strathclyde manually reviewed and assessed the SOC 6-digit occupational list to ensure alignment with green criteria and accurate categorisation within the green groups.
- **Stakeholder Review:** The list of identified green occupations at the SOC 2020 4-digit level underwent an additional review process with stakeholders from UHI Moray.

[50] This threshold was established following a meticulous manual examination of the dataset, which revealed that occupations exhibiting a proportion of green-related keywords exceeding 10% consistently correlated with roles in the green economy.

[51] The choice of a 100-observation threshold is underpinned by a balance between statistical rigor and practicality. Relatively small groups are more susceptible to random variations, which may lead to less reliable findings.

[52] A comprehensive study examining how the greening of the economy impacts the demand for specific occupations is needed in order to address this limitation.

5. Mapping green jobs

Labour market demand (from employers) is dynamic and changes in response to economic conditions, business cycles and business objectives. This section explores the demand side of green jobs through analysis of job vacancy data. As discussed in section 4 above, IER collected data from online vacancies sites using web-scraping techniques.[53] As outlined in Section 3, the analysis of green jobs below uses the inclusive approach to green jobs covering both 'purist' green jobs and those jobs that are greening. In so doing, green jobs are classified based on the respective shares of vacancies which fall into the categories New and Emerging green jobs, Enhanced Skills and Knowledge green jobs and Increased Demand green jobs. The comparison with non-green jobs is also made.

Estimates of green jobs are presented for Moray, Aberdeenshire, and the Highlands and Islands. These estimates are benchmarked against measures for Scotland and the rest of the UK (that is, the UK excluding Scotland). Table 5.1. summarises data on total vacancies (green and non-green) used in the analysis for each geographic area between February 2019 to July 2023.

Table 5.1: Job vacancy numbers, February 2019 to July 2023

	Total Job Vacancies Analysed
Moray	7,035
Aberdeenshire	37,939
Highlands & Islands	34,852
Scotland	504,386
Rest of UK	5,115,183

Source: IER - LMI for All vacancy dataset

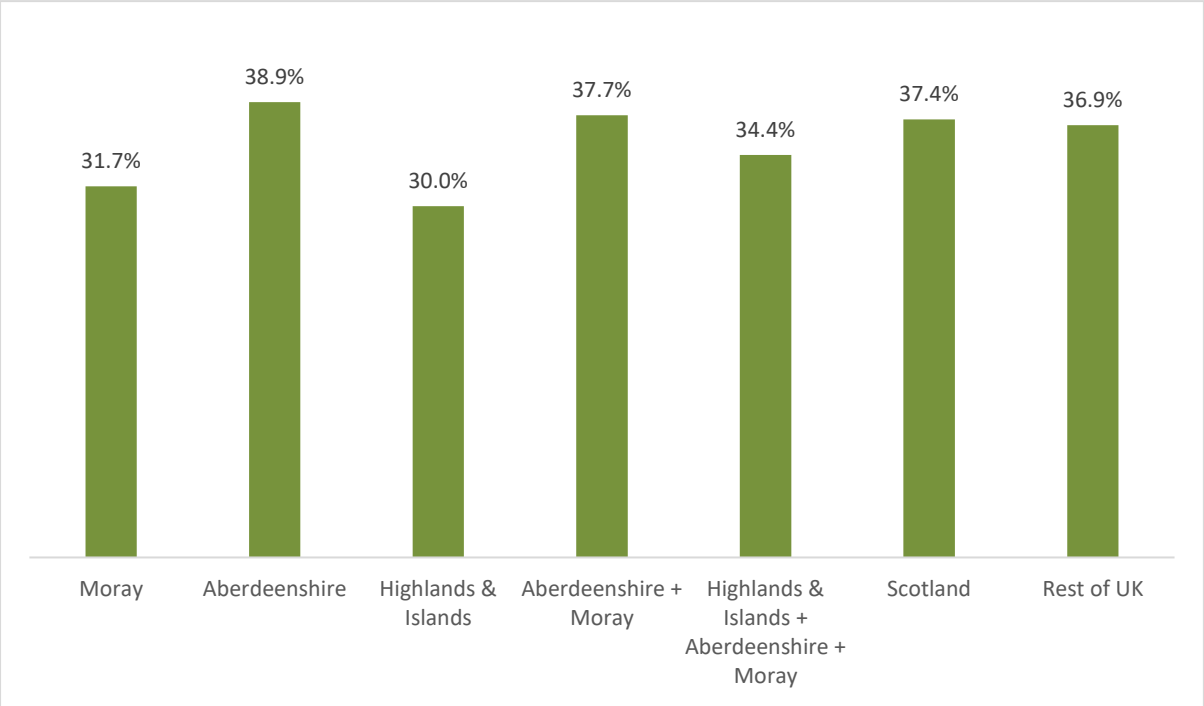
5.1. Green jobs

As a share of all vacancies between 2019-2023, vacancies in green occupations represent 31.7% of job vacancies in Moray (Figure 5.1). This figure is above the estimate for the Highlands and Islands (30%), but over seven percentage points lower than the estimate for Aberdeenshire (38.9%). Collectively, there are 34.4% vacancies in green occupations in

[53] As noted in the methodology section, the data does not capture vacancies that may have been posted beyond the portals scraped, such as in print or by word of mouth. Nevertheless, IER vacancy data is one of the most comprehensive sources for demand-side analysis.

Moray, Aberdeenshire and the Highlands and Islands combined. There is a larger share of vacancies in green occupations in Scotland overall (37.4%) and the rest of the UK (36.9%).

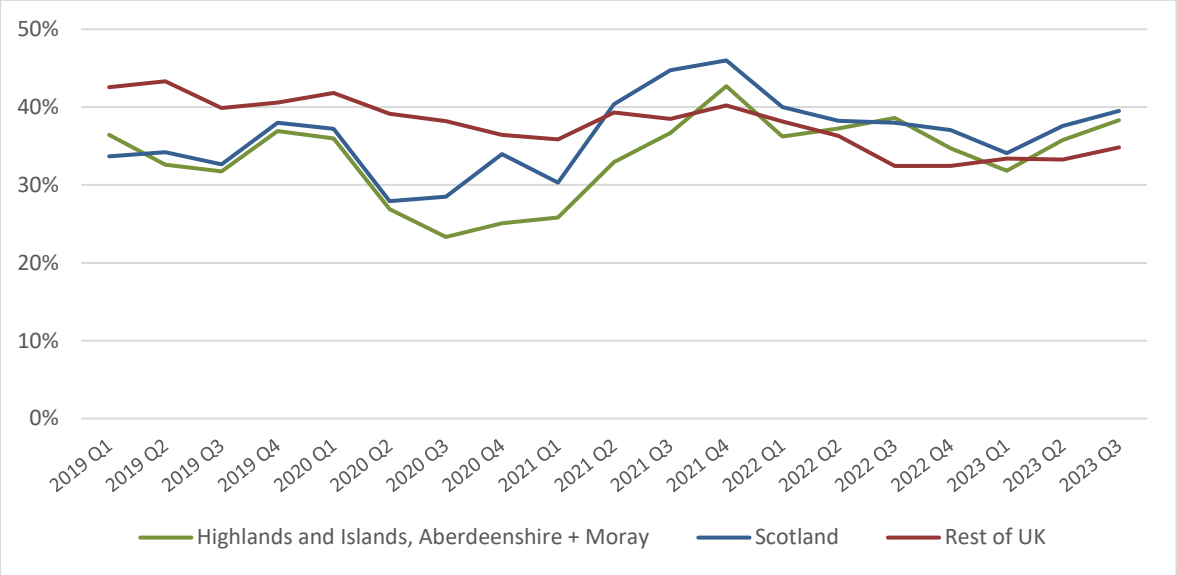
Figure 5.1: Average share of green job vacancies, February 2019 to July 2023



Source: IER - LMI for All vacancy dataset

The share of vacancies in green occupations fluctuated over the period. In Moray, Aberdeenshire and the Highlands and Islands combined, there was a steady increase in the share between Q3 2020 and Q4 2021 reflecting the closure and reopening of the economy due to the COVID-19 pandemic. A similar pattern is observed for Scotland as a whole over this period, but not the rest of the UK. The lowest observed share of vacancies in green occupations in Moray, Aberdeenshire and the Highlands and Islands combined was 23.3% in Q3 2020, while the largest share was 42.7% in Q4 2021. As noted above, the period average for Moray, Aberdeenshire and the Highlands and Islands combined is 34.4%.

Figure 5.2: Share of green job vacancies, February 2019 to July 2023



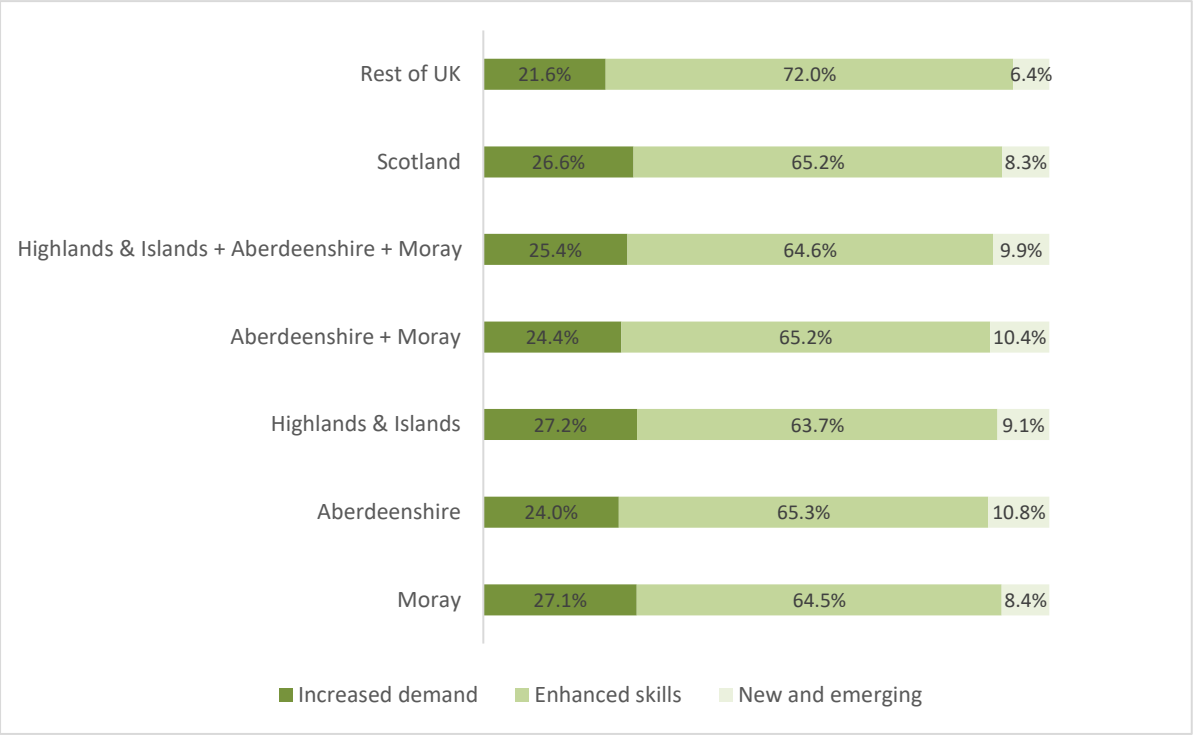
Source: IER - LMI for All vacancy dataset

The distribution of green job vacancies by green job type is shown in Figure 5.3. New and emerging green jobs, which are often viewed as 'pure' green jobs, accounted for the smallest share of green jobs across all geographies. This share ranges from 6.4% in the rest of the UK to 10.8% in Aberdeenshire. In Moray, the share of New and emerging green jobs is 8.4%. It means that 8.4% of vacancies in green occupations in Moray are in occupations that have come into existence as a direct result of the growth and development of the green economy. Collectively, Moray, Aberdeenshire and the Highlands and Islands perform relatively well in this metric with a share of 9.9% compared to 8.3% for Scotland and 6.4% for the rest of the UK.

Enhanced Skills and Knowledge green jobs account for the largest share of green job vacancies across all geographies analysed. As noted in section 3, by definition, these types of green jobs are in occupations subject to significant changes in work and worker requirements. A large share of green job in this category is thus an indication of the greening of occupations. Enhanced Skills green jobs are 64.5% of green jobs in Moray, 65.3% in Aberdeenshire and 63.7% in the Highlands and Islands. Collectively, the share for Moray, Aberdeenshire and the Highlands and Islands combined is 64.6% (compared to 65.2% for Scotland and 72% for the rest of the UK).

27.1% of vacancies in Moray are Increased Demand green jobs, which suggests green economic activities and technologies have increased employment demand for some existing occupations (such as those working in occupations related to installation and repairs).

Figure 5.3: Proportion of Green job vacancies by green category, February 2019 to July 2023

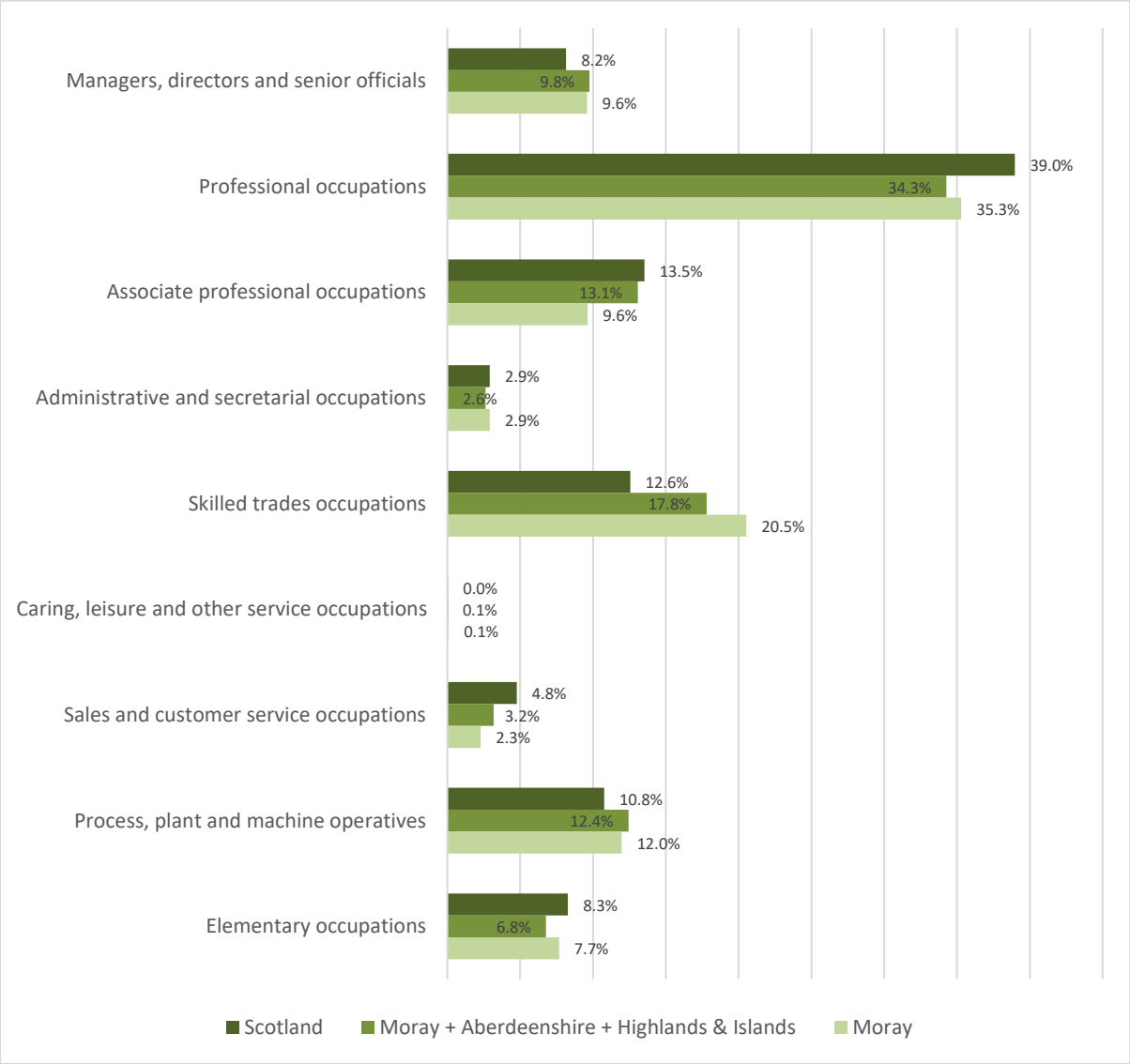


Source: IER - LMI for All vacancy dataset

5.2. Occupational groups

The occupational groups with the largest share of green job vacancies are professional occupations – 35.3% in Moray; 34.3% in Moray, Aberdeenshire and the Highlands and Islands; and 39% in Scotland. For Moray, professional occupations are followed by skilled trades occupations, and process plant and machine operatives – see Figure 5.4. Very few vacancies in green occupancies relate to caring, leisure and other service occupations.

Figure 5.4: Green job vacancies by SOC2020 Major Occupational Group, February 2019 to July 2023



Source: IER - LMI for All vacancy dataset

The large share of green job vacancies observed in the professional occupations group (see Figure 5.4) is likely driven by occupations in the New and Emerging and Enhanced Skills type. As shown in Table 5.2, the second largest share of observed New and Emerging vacancies (33.2%) and largest share of observed Enhanced Skills vacancies (50.4%) in Moray exist in the professional occupations group. The occupational group with the largest share in the Increased Demand type is skilled trades occupations (28.6%). There are no observed New and Emerging green jobs in the SOC2020 Major Occupational Groups of managers, directors and senior officials, sales and customer service and elementary occupations. The only three (of the nine major) occupational groups that have all three green job types in the vacancy data are associate professional and technical occupations**,** skilled trades occupations, and process,

plant and machine operatives. Non-green jobs exist across all occupational groups, with the largest shares in professional (25.2%) and caring, leisure and other service occupations (24.4%).

Table 5.2: Types of green job vacancies by SOC2020 Major Occupational Group February 2019 to July 2023, Moray (%)

Occupational group	New and Emerging	Enhanced Skills and Knowledge	Increased Demand	Non-Green
Managers, directors and senior officials	-	14.9	-	2.7
Professional occupations	33.2	50.4	-	25.2
Associate professional and technical	44.4	4.9	10.1	12.1
Administrative and secretarial	4.3	-	9.4	12.0
Skilled trades occupations	3.2	19.4	28.6	2.9
Caring, leisure and other service	1.1	-	-	24.4
Sales and customer service	-	-	8.4	7.2
Process, plant and machine operatives	13.9	7.9	21.2	2.3
Elementary occupations	-	2.5	22.3	11.2
	100	100	100	100

Source: IER - LMI for All vacancy dataset

The overall distribution of green jobs type by occupations at the one-digit SOC2020 Major Occupational Group) is largely similar in Moray, Moray, Aberdeenshire and the Highlands and Islands, and Scotland – see Tables 5.3 and 5.4. One difference in comparing the three geographic areas is that unlike Moray (only), there is a very small share of New and Emerging green jobs in sales and customer service occupations (less than 1%) in Moray, Aberdeenshire and the Highlands and Islands and Scotland.

Table 5.3: Types of green job vacancies by SOC2020 Major Occupational Group February 2019 to July 2023, Moray + Aberdeenshire + Highlands and Islands (%)

Occupational group	New and Emerging	Enhanced Skills and Knowledge	Increased Demand	Non-Green
Managers, directors and senior officials	-	15.1	-	3.3
Professional occupations	44.2	46.3	-	23.2
Associate professional and technical	32.6	11.1	10.4	12.8
Administrative and secretarial	2.3	-	9.4	10.7
Skilled trades occupations	4.5	18.1	22.2	5.4
Caring, leisure and other service	0.1	0.1	-	24.5
Sales and customer service	0.1	0.2	11.9	7.0
Process, plant and machine operatives	16.0	7.6	23.2	1.8
Elementary occupations	-	1.5	22.9	11.5
	100	100	100	100

Source: IER – LMI for All vacancy dataset

Table 5.4: Types of green job vacancies by SOC2020 Major Occupational Group February 2019 to July 2023, Scotland (%)

Occupational group	New and Emerging	Enhanced Skills and Knowledge	Increased Demand	Non-Green
Managers, directors and senior officials	-	12.5	-	4.2
Professional occupations	45.0	54.1	-	23.7
Associate professional and technical	30.0	11.2	14.0%	16.4
Administrative and secretarial	3.3	0.0	9.9	14.4
Skilled trades occupations	5.0	13.4	12.8	4.5
Caring, leisure and other service	0.1	-	-	19.4
Sales and customer service	0.3	0.2	17.3	6.7
Process, plant and machine operatives	16.3	7.7	16.5	1.7
Elementary occupations	-	0.7	29.4	8.9
	100	100	100	100

Source: IER – LMI for All vacancy dataset

Table 5.5 shows the top five occupations by the number of job vacancies for each type of green jobs at the 2-digit level (SOC2020) for Moray. The top five occupations under New and Emerging green jobs captures 98.4% of vacancies for this type of green job, for Enhanced Skills the top five occupations represent 72.9% of all vacancies classified as Enhanced Skills, and for Increased Demand, it is 73.4%.

Table 5.5: Top five occupations by number of job vacancies in each category by SOC2020 2-Digit Level February 2019 to July 2023, Moray

New & Emerging	Enhanced Skills and Knowledge	Increased Demand
31: Science, engineering and technology associate professionals **21**: Science, research, engineering and technology professionals **81**: Process, plant and machine operatives **41**: Administrative occupations **52**: Skilled metal, electrical and electronic trades	**23:** Teaching and other educational professionals **11:** Corporate managers and directors **24:** Business, media and public service professionals **21:** Science, research, engineering and technology professionals **53:** Skilled construction and building trades	**92:** Elementary administration and service occupations **53:** Skilled construction and building trades **82:** Transport and mobile machine drivers and operatives **52:** Skilled metal, electrical and electronic trades **31:** Science, engineering and technology associate professionals

Source: IER – LMI for All vacancy dataset
Administrative occupations include "National government administrative occupations n.e.c."

Examining job vacancies at SOC2020 6-digit level provides more detailed information about the types of occupations within each green job category. The data here is analysed for Moray, Aberdeenshire and the Highlands and Islands in order to increase the sample size and improve the robustness of the analysis. Table 5.6 shows the top five occupations by the number of job vacancies for each type of green jobs. The data shows that engineering occupations dominate the New and Emerging jobs category. The top five occupations at the 6-digit classification for New and Emerging green jobs account for 42.8% of all vacancies for that green job type.

The top five occupations for both Enhanced Skills and Increased demand green jobs are more varied spanning managerial positions to skilled trade occupation to drivers. The top five listed in Table 5.6 below account for 28.4% and 51.9% of all vacancies classified as Enhanced Skills and Knowledge and Increased Demand green jobs, respectively. Comparing Table 5.6. to Table 5.7 (for Scotland) there is similarity in the top five occupations across types of green jobs, though the results are not identical. For example, there is a higher representation of financial sector occupations under Enhanced Skills and Knowledge in the data for Scotland.

Table 5.6: Top five occupations by share of vacancies by SOC2020 6-Digit Level February 2019 to July 2023, Moray, Aberdeenshire and Highlands and Islands

New & Emerging	Enhanced Skills and Knowledge	Increased Demand
3119/99: Science, engineering and production technicians n.e.c. **2129/99**: Engineering professionals n.e.c. **2127/00**: Engineering project managers and project engineers **3112/99:** Electrical and electronics technicians n.e.c. **3113/99**: Engineering technicians n.e.c.	**1150/00**: Managers and directors in retail and wholesale **8214/99**: Delivery drivers and couriers n.e.c. **2314/00**: Primary education teaching professionals **2134/03**: Software developers **5223/99**: Metal working production and maintenance fitters n.e.c.	**9252/00**: Warehouse operatives **7219/99**: Customer service occupations n.e.c. **5241/03**: Installation and maintenance electricians **8211/00**: Large goods vehicle drivers **5316/03**: Joiners

Source: IER - LMI for All vacancy dataset
**n.e.c. means not elsewhere classified*

Table 5.7: Top five occupations by share of job vacancies by SOC2020 6-Digit Level, February 2019 to July 2023, Scotland

New & Emerging	Enhanced Skills and Knowledge	Increased Demand
3119/99: Science, engineering and production technicians n.e.c. **2129/99**: Engineering professionals n.e.c. **8143/00**: Routine inspectors and testers **3113/99**: Engineering technicians n.e.c. **2127/00**: Engineering project managers and project engineers	**2134/03**: Software developers **8214/99**: Delivery drivers and couriers n.e.c. **1150/00**: Managers and directors in retail and wholesale **2421/02**: Financial accountants (qualified) **2422/02**: Financial advisers and planners	**9252/00**: Warehouse operatives **7219/99**: Customer service occupations n.e.c. **3132/00**: IT user support technicians **8211/00**: Large goods vehicle drivers **5241/03**: Installation and maintenance electricians

Source: IER - LMI for All vacancy dataset
**n.e.c. means not elsewhere classified*

5.3. Skills, knowledge and experience in demand

Data on the skills demanded by employers were extracted from the vacancy data. Table 5.8 presents the top twenty skills cited (of all skills mentioned) in job vacancy adverts within each type of green job in Moray, Aberdeenshire and the Highlands and Islands. Using the European

Skills, Competences, Qualifications and Occupations (ESCO) classification,[54] skills can be categorised as sector-specific skills, cross-sector skills and transversal skills.[55] Sector specific skills are those that are specific to one sector, but are relevant for more than one occupation within that sector. Cross-sector skills are those that are relevant to occupations across several economic sectors, Transversal skills are relevant to a broad range of occupations and sectors. They are often referred to as *core skills*, *basic skills* or *soft skills* and can help employees to adapt to change.[56]

As shown in Table 5.8, the most demanded skill across all types of green job vacancies is 'communication skills'. It is also the most demanded skill among non-green job vacancies (though not shown in the table). This finding is unsurprising as workers' communications skills was named as a skill that businesses need to improve in a 2021 UK Skills Gap Report.[57] Communication skills are transferable and can be classified as a cross-sector skill. Another high demand cross sector skills that emerged in the top five across all types of green job vacancies is 'working in a team'. A sector-specific skill (based on the ESCO classification) that was highly cited in job vacancy adverts is 'customer service'. Though the type of customer service provided is likely to be sector-specific, there are elements of this skill set that can be transferred across sectors.

Unique to green job vacancies is the demand for technical skills such as energy management/energy solutions, electronics, control systems, mechanical engineering, electrical engineering, quality standards, Structured Query Language (SQL) and JavaScript. This is particularly the case for New and Emerging green occupations, and corroborates findings earlier in the report which showed that professional, associate professional and technical occupations (particularly engineering occupations) make up a large share of New and Emerging green jobs. However, in other research, stakeholders in Moray pointed to a shortage of skilled workers in STEM and engineering related occupations, [58] which may affect the region's ability to meet demand for occupations in New and Emerging green jobs. The skills demanded by employers also demonstrate the 'greening' of some roles as discussed in section 3. For example, under Enhanced Skills job vacancies, skills in accounting and financial

[54] See ESCO: https://esco.ec.europa.eu/en/about-esco/escopedia/escopedia/skill-reusability-level

[55] Table 5.8 draws on the ESCO skills taxonomy. Further work is required with stakeholders to localise and refine these green skills labels..

[56] See ESCO: https://esco.ec.europa.eu/en/about-esco/escopedia/escopedia/skill-reusability-level

[57] Department of Digital Culture, Media and Sport (2021).

[58] Anderson et al. (2023).

management are demanded, and project management skills feature in vacancies under all three green jobs classifications.

Table 5.8: Top twenty skills demanded in vacancy data by type of green job February 2019 to July 2023, Moray, Aberdeenshire and Highlands and Islands

New & Emerging	Enhanced Skills and Knowledge	Increased Demand
• Communication • Work as a team • Energy management/energy solutions • Mechanical engineering* • JavaScript* • Civil engineering • Customer service* • Application process • Risk management • Attention to detail • Electrical engineering • Project management* • Electronics • Lead a team • Safety engineering • Quality standards • Manage a team • Control systems • Maintenance and repair • Manage quality+	• Communication • Work as a team • Customer service* • Lead a team • Manage a team • Manage work • SQL • Accounting • Project management* • Financial management • Maintenance and repair • Quality standards • Logistics • Surveying • Agile development* • Provide information • Work independently+ • Team building • Civil engineering • Support colleagues	• Communication • Work as a team • Customer service* • Attention to detail • Logistics • Quality standards • Provide training • Application process • Understand instructions • Provide information • Manage a team • Contact customers* • Manage work • Lead a team • Health and safety regulations • Health and safety in the workplace • Project management* • Work in teams+ • Office software • Prioritise tasks

* denotes a sector-specific skill
+ denotes a transversal skill. Transversal skills can help employees to adapt to change
Unmarked skills (the majority in Table 5.8) are cross-sector skills.
Source: IER - LMI for All vacancy dataset

An explicit demand for previous experience appears to be the common across both green and non-green jobs based on the vacancy data, with at least half of vacancies explicitly requiring experience.[59] Table 5.8 shows the demand for experience for green jobs and Table 5.9 shows the same for non-green jobs. For green jobs (Table 5.9), Moray recorded the smallest share of vacancies which require experience (51.2%). Similarly, for non-green jobs in Moray, only 50.1% explicitly require experience (Table 5.10). Comparing Tables 5.9 and 5.10, experience

[59] This need not be green-specific experience, just some previous experience.

is required by a larger share of vacancies in occupations classified as green jobs compared to occupation classified as non-green jobs across all geographic areas.

Table 5.9: Experience required for green jobs (%), February 2019 to July 2023

	Experience required	Experience not mentioned	Experience not required
Moray	51.2	45.9	3.0
Aberdeenshire	59.1	39.4	1.6
Aberdeenshire + Moray	58.0	40.2	1.8
Highlands & Islands	56.9	41.5	1.6
Moray + Aberdeenshire + Highlands & Islands	57.6	40.7	1.7
Scotland	64.4	33.4	2.2
Rest of UK	66.8	31.5	1.7

Source: IER - LMI for All vacancy dataset

Table 5.10: Experience required by non-green jobs (%), February 2019 to July 2023

	Experience required	Experience not mentioned	Experience not required
Moray	50.1	45.2	4.7
Aberdeenshire	53.6	43.9	2.5
Aberdeenshire + Moray	54.0	43.1	2.9
Highlands & Islands	52.1	45.1	2.8
Moray + Aberdeenshire + Highlands & Islands	53.1	44.0	2.8
Scotland	60.0	36.9	3.1
Rest of UK	60.4	38.0	1.6

Source: IER - LMI for All vacancy dataset

5.4. Green jobs and pay

Based on the vacancy data, median advertised wages are higher in green jobs than in non-green jobs across all geographic areas (see Figure 5.5).[60] The median wage for vacancies in green occupations is £34,320 in Moray vs £24,861 for non-green occupations. Adding data from Aberdeenshire to the Moray data, followed by data from the Highlands and Islands, reduces the median wage for green occupation on both occasions (£34,000 and then to £32,500) – see Figure 5.5. The median wage for green jobs for Moray is also higher than that of Scotland and the rest of the UK. It is also noteworthy that the median wage for non-green jobs was lowest in Moray (compared to other geographies).

Figure 5.5: Median wages by green and non-green jobs, February 2019 to July 2023

Source: IER - LMI for All vacancy dataset

The higher median wage for occupations under Enhanced Skills and Knowledge green jobs (Figure 5.6) is likely to be driven by the fact that this type of green job includes more senior occupations, particularly managers, directors and senior officials (see Tables 5.2, 5.3 and 5.4). The median wage for New and Emerging green jobs is highest in Moray and Aberdeenshire combined and Scotland (£35,001), for Enhanced Skills occupations it is highest in the rest of the UK (£37,500) and for Increased Demand occupations it is highest in Aberdeenshire and Moray combined (£25,272).

[60] Where a salary range is given in the job advert, the midpoint of the range is used for calculations.

Figure 5.6: Median wages by green job category, February 2019 to July 2023

Source: IER - LMI for All vacancy dataset

The median wage for both green and non-green jobs increased over 2019-2023, though the trend over time varies across Moray, Aberdeenshire and the Highlands and Islands, Scotland and the rest of the UK (see Figure 5.7). That said, closer monitoring of vacancy data and mapping green jobs to other wage data sources such as the ONS's Annual Survey of Hours and Earnings (ASHE) is needed to better analyse and understand longer term trends.[61] One consistent findings across all three figures in Figure 5.7 is that the median wage for vacancies in occupations in the Enhanced Skills and Knowledge category is highest, followed by New and Emerging green jobs , then non-green jobs, followed by Increased Demand green jobs.

[61] See ONS Annual Survey of Hours and Earnings (ASHE) https://www.ons.gov.uk/surveys/informationforbusinesses/businesssurveys/annualsurveyofhoursandearningsashe

Figure 5.7: Green median wages over time, February 2019 to July 2023

Source: IER - LMI for All vacancy dataset

5.5. Future trends

Table 5.11 shows the occupations that are projected to grow in the next year. The projections were made based on the trends observed over the 2019-2023 period in the vacancy data, with increased weight given to the post-covid period.[62,63]. For New and Emerging green jobs, growth is expected in engineering related occupations, alongside skilled trades occupations such as vehicle body builders and repairers. As noted previously, New and Emerging green jobs tend to require more STEM and engineering-related skills, which stakeholders in Moray region have identified a skills shortfall.[64] Addressing this skills gap becomes critical as demand for these jobs grow. The occupations that are projected to have growth for Enhanced Skills and Knowledge green jobs include a wide range of occupations, including managers, engineers, technicians, and researchers. Though the list is smaller for Increased Demand, there is also variety in occupations with a positive growth forecast, that is, an expected increase in job demand compared to the average from previous periods.

The bulk of occupations that are projected to see fewer vacancies posted in the coming year are mainly in occupations classified as non-green, with few appearing under the Enhanced Skills and Knowledge and Increased Demand categories (see Table 5.12). Importantly there is no projected reduction in vacancies for occupations classified as New and Emerging, that is, 'pure' green jobs. It should be noted that the expected reduction in vacancies for the occupations in Table 5.12 does not necessarily indicate that the stock or level of employment in these occupations will decline. It simply indicates that fewer new jobs are being added to the existing stock. To determine if there is a decline, data on the existing level of employment in these occupations (e.g. from the Labour Force Survey) would also be needed.

[62] The methodology for generating the projections presented in Table 5.11 involved the application of a machine learning LSTM model. This model was trained to capture and learn from the temporal patterns within the time series data of job vacancies. The data encompassed a period from 2019 to 2023, allowing the model to assimilate historical trends in labour market demand. To account for the distinctive influence of the post-COVID-19 on employment dynamics, additional emphasis was placed on the data from that specific timeframe (2020). By weighing the data accordingly, the LSTM (Long short-term memory) model was calibrated to discern and incorporate the deviations in job market behaviours brought about by the pandemic. This methodology facilitated the model's ability to project which occupations are anticipated to experience growth in the forthcoming year.

[63] It is important to note that this exercise is experimental due to the relatively short time series of the data, the pandemic effects, the relatively low frequency of vacancies for some occupational groups and inherent biases in the vacancy data.

[64] Anderson et al. (2023).

Table 5.11: Occupations that are projected to have increased vacancies in the next year in each category by SOC2020, Moray, Aberdeenshire and Highlands and Islands

New & Emerging	Enhanced Skills and Knowledge	Increased Demand
2125: Production and process engineers **2129**: Engineering professionals n.e.c. **2121**: Civil engineers **2127**: Engineering project managers and project engineers **8143:** Routine inspectors and testers **5232:** Vehicle body builders and repairers	**1150:** Managers and directors in retail and wholesale **5231:** Vehicle technicians, mechanics and electricians **2311:** Higher education teaching professionals **5223:** Metal working production and maintenance fitters **5315:** Plumbers & heating and ventilating installers and repairers **5221:** Metal machining setters and setter-operators **1122:** Production managers and directors in construction **2423:** Taxation experts **2453**: Quantity surveyors **2124:** Electronics engineers **2162:** Other researchers, unspecified discipline **2123:** Electrical engineers **7115:** Vehicle and parts salespersons and advisers **5225:** Air-conditioning and refrigeration installers and repairers **3116:** Planning, process and production technicians **2433:** Actuaries, economists and statisticians	**5241:** Electricians and electrical fitters **8212:** Bus and coach drivers **4134:** Transport and distribution clerks and assistants **8151:** Scaffolders, stagers and riggers

Source: IER - LMI for All vacancy dataset

Table 5.12: Occupations projected to have fewer vacancies in the next year in each category by SOC2020, Moray, Aberdeenshire and Highlands and Islands

Enhanced Skills and Knowledge	Increased Demand	Non-Green
5113: Gardeners and landscape gardeners **3551**: Buyers and procurement officers	**8152:** Road construction operatives	**9223:** Cleaners and domestics **9263:** Kitchen and catering assistants **4159:** Other administrative occupations n.e.c. **9229:** Elementary cleaning occupations n.e.c. **9211:** Postal workers, mail sorters and messengers **9266:** Coffee shop workers **8152:** Road construction operatives **3222:** Child and early years officers **5113:** Gardeners and landscape gardeners **9264:** Waiters and waitresses **3551:** Buyers and procurement officers **3543:** Project support officers **1139:** Functional managers and directors n.e.c. **4217:** Typists and related keyboard occupations **9261:** Bar and catering supervisors **5436:** Catering and bar managers **2142:** Graphic and multimedia designers

Note: 'New and Emerging' green jobs are not shown in the table as there are no projected reduction in vacancies for this type of green jobs.
Source: IER - LMI for All vacancy dataset

6. Fair work and a just transition

A thematic review of conceptualisations of job quality identified Scotland as an example of a government-led approach to Fair Work.[65] The five dimensions of Fair Work identified in Section 2 - (i) effective voice, (ii) opportunities, (iii) security, (iv) fulfilment and (v) respect [66] – align well with the seven dimensions of Good Work that emerged from the Taylor Review of Modern Working Practices and adopted by the ONS[67]: (i) pay and benefits, (ii) employment contracts, (iii) work–life balance, (iv) job design and the nature of work, (v) relationships at work, (vi) employee voice, and (vii) health and wellbeing. This is important because recent evidence shows that Good Work correlates with employee health and wellbeing and innovation and productivity within firms.[68] Ensuring that work is fair in Moray (and other regions in Scotland) as they embark on a just transition is thus beneficial to both workers, firms and the wider economy and society. Consequently, a link exists between the outcomes for all of Fair Work and the realisation of a just transition.[69]

This section comments on the embedded principles of fair work and a just transition draws on a mix of secondary data from the ONS, complemented by insights from analysis of data from the vacancy database.

6.1. Job quality and fair work – ONS measures

Fair Work is an expression of job quality (Warhurst et al. 2022). Using the Good Work measures, the ONS now periodically evaluates job quality across the UK. The ONS dataset is still evolving and currently does not yet cover all of the seven Good Work measures or five Fair Work dimensions. The analysis presented below is thus driven by the data currently available from the ONS. The data available also insights of the five Fair Work dimensions, namely: effective voice, opportunities, security and fulfilment (with respect to employment contract).

Current data from the ONS reveals that Fair Work in Scotland is stronger in some aspects of job quality than others.[70] As Figure 6.1 shows, about 50.7% of workers in Scotland reported feeling involved and represented in their employer's decision making (compared to 54.1% in the UK as a whole). Improvement is needed in this area given effective voice is a key feature

[65] Warhurst et al. (2017)

[66] Scottish Fair Work Convention (2016).

[67] Taylor et al. (2017), Zemanik (2020), ONS (2022a)

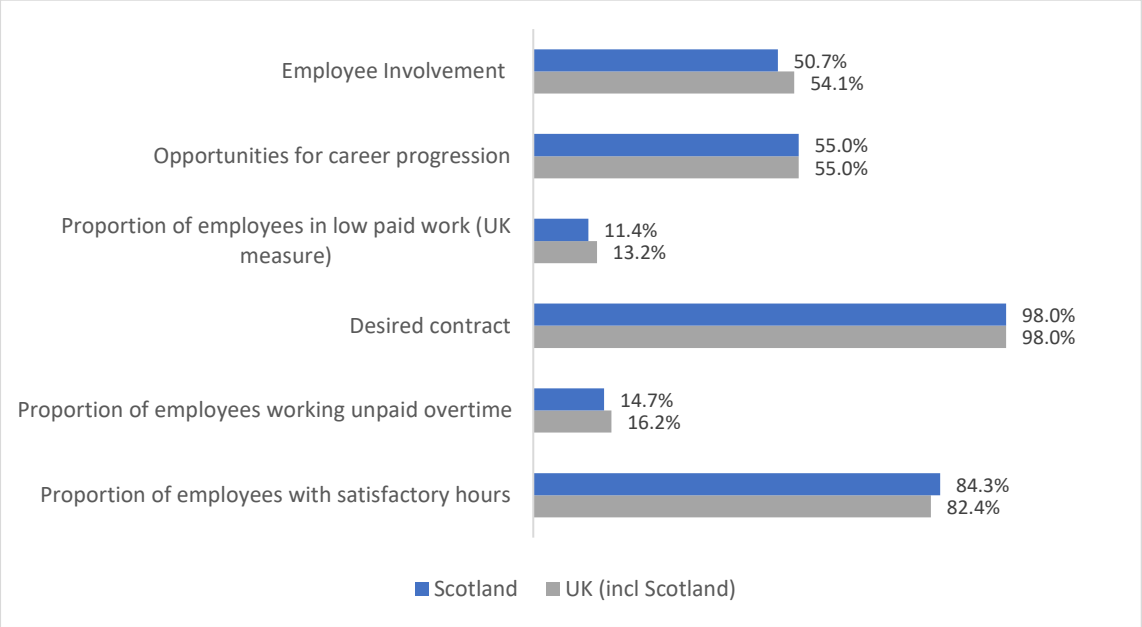
[68] Erickson et al. (2023f)

[69] https://www.gov.scot/policies/climate-change/just-transition/

[70] ONS (2022a).

of Fair Work in Scotland. Scotland performed relatively better compared to the UK as a whole in the proportion of people in low-paid work (11.4% in Scotland vs 13.2% in the UK), in the share working unpaid overtime (14.7% in Scotland vs 16.2% in the UK), and in the share of workers with satisfactory hours (84.3% in Scotland vs 82.4% in the UK).[71] These measures tie in with aspects of opportunities and security under the Fair Work Dimensions. These indicators suggest a good baseline, but cross-group analysis indicates disparities across types of workers. For example, across the UK sample, disabled workers are less likely to report good employee engagement. Older workers are on average more likely to report satisfaction with working hours compared to younger workers, with 16-20-year-olds twice as likely to be on zero hours contract than any other group.[72] Working unpaid overtime is highest in the 35–54 age group, with one fifth of employees aged 35-54 years reporting working unpaid overtime across the UK. Working unpaid overtime is also highest among workers with higher education (about 3/10). The share of workers on a desired contract is the same (98%) across both Scotland and the UK. Similarly, just over half of employees (55%) in all countries in UK believed they had good opportunities for career progression. A higher share of full-time vs part-time workers (59% vs 40%) report opportunities for career progression.

Figure 6.1: Job quality indicators (2021), Scotland and UK



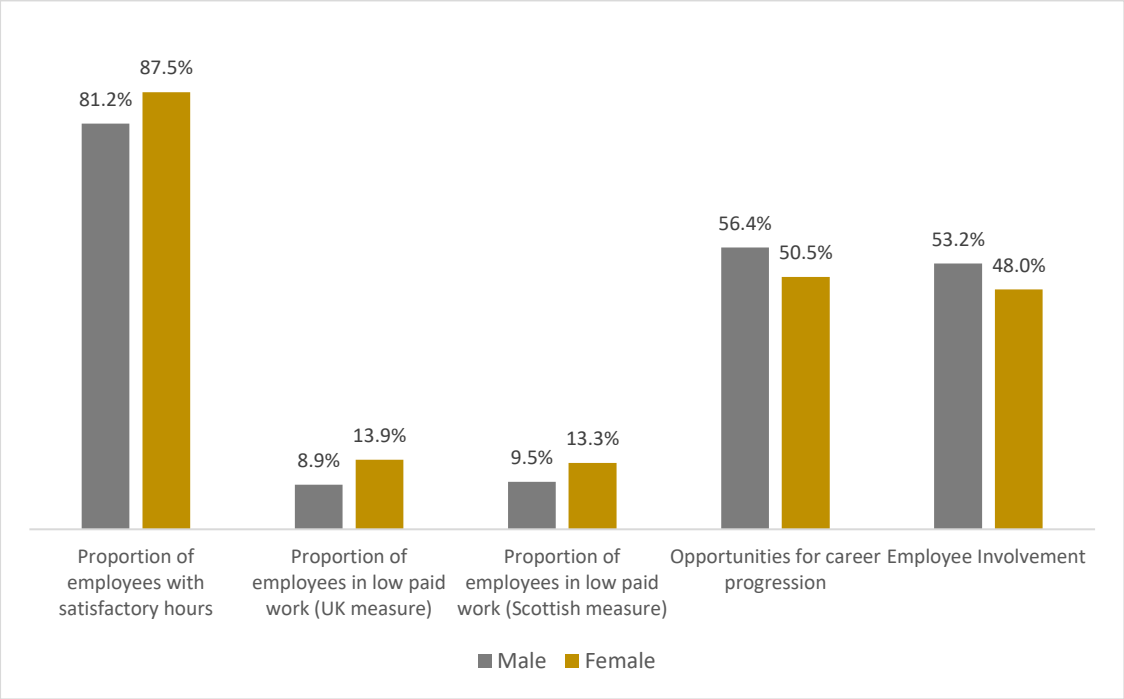
Source: ONS (2022a)

[71] Low paid is measured using two-thirds of the UK median hourly pay. Below this is considered low pay.

[72] ONS (2022a).

With respect to gender disaggregation for Scotland, the share of women reporting satisfactory hours was higher than that of men (87.5% vs 81.2%). However, women are more likely to report being in low-paid work, having fewer opportunities for career progression and having less employee involvement (see Figure 6.2). The data presented in Figure 6.2 suggest the need for addressing gender disparities in some aspects of job quality/Fair Work as part of a just transition. That said, there has been significant progress in closing the gender pay gap in Scotland: it was 3.7% in 2022, down from 18.4% in 1997 (see Figure 6.3). Scotland also recorded the seconded lowest gender pay gap and the second largest change in closing the gap (behind Northern Ireland) in the UK.

Figure 6.2: Job quality indicators (2021), Males vs Females in Scotland



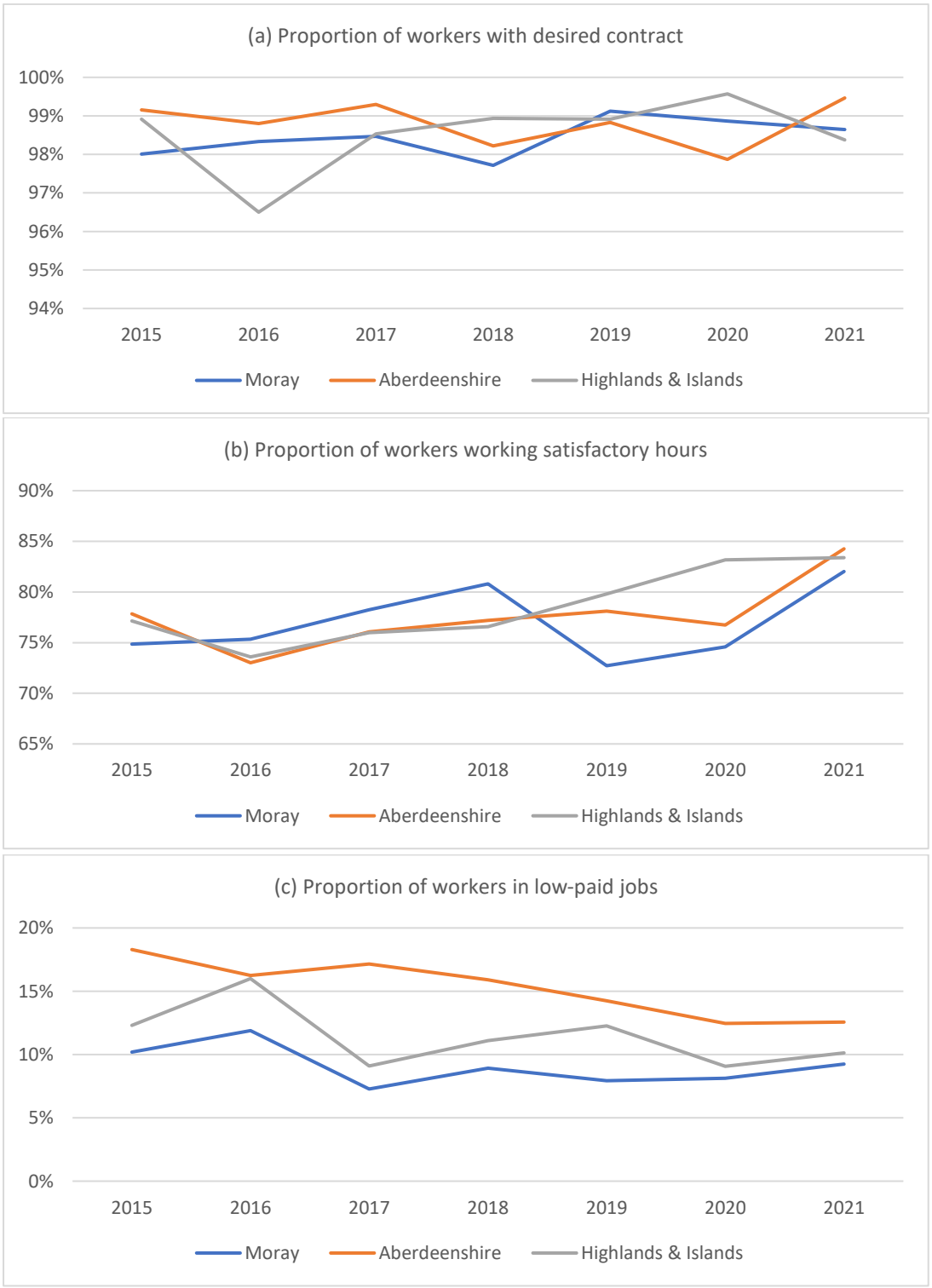
Source: ONS (2022a)

Figure 6.3: Gender pay gap (2022)

Source: ONS (2022b)

Focusing on the job quality data for Moray, Aberdeenshire and the Highlands and Islands, more than 98% of workers hold desired contracts across all three regions. The share working satisfactory hours increased in all three regions and was above 82% in 2021. Similarly, there has been a decline in the share of workers in low-paid jobs between 2015 and 2021. This indicator was 12.6% in Aberdeenshire, 10.1% in the Highlands and Island and 9.2% in Moray in 2021. Moray had the lowest share of workers reporting being in low-paid work over the 2015-21 period.

Figure 6.4: Job quality indicators, Moray, Aberdeenshire, Highlands & Islands



Source: ONS (2022a)

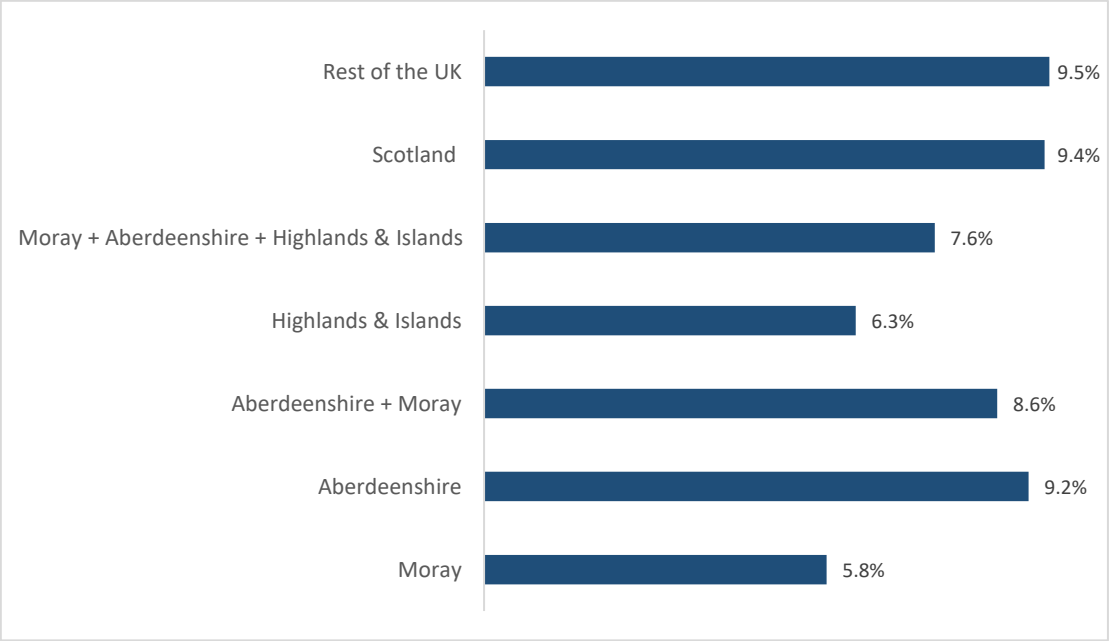
6.2. Job quality/Fair Work – Insights from the vacancy data

The vacancy data allows analysis of three aspects of job quality/Fair Work: working flexibility, temporary/fixed term employment and part-time working. With respect to flexibility, only 5.8%

of vacancies observed for Moray advertise teleworking as a feature of the job.[73] This share is the lowest compared to all other regions/geographies analysed (see Figure 6.5). It may be influenced by the nature of jobs in Moray. The main sectors of employment in Moray are in manufacturing, human health and social work, and wholesale and retail,[74] sectors which have some of the least possibility of teleworking. The share of vacancies that allow teleworking in Moray, Aberdeenshire and the Highlands and Islands combined (7.6%) is below that of Scotland (9.4%) and the rest of the UK (9.5%).

Vacancies in occupations classified as green have a higher share of teleworking opportunities (see Figure 6.6). As with all vacancies, the share of green vacancies advertised with teleworking opportunities for Moray, Aberdeenshire and the Highlands and Islands (8.7%) is below that of Scotland (10.9%) and the rest of the UK (11.5%).

Figure 6.5: Share of teleworking vacancies, February 2019 to July 2023

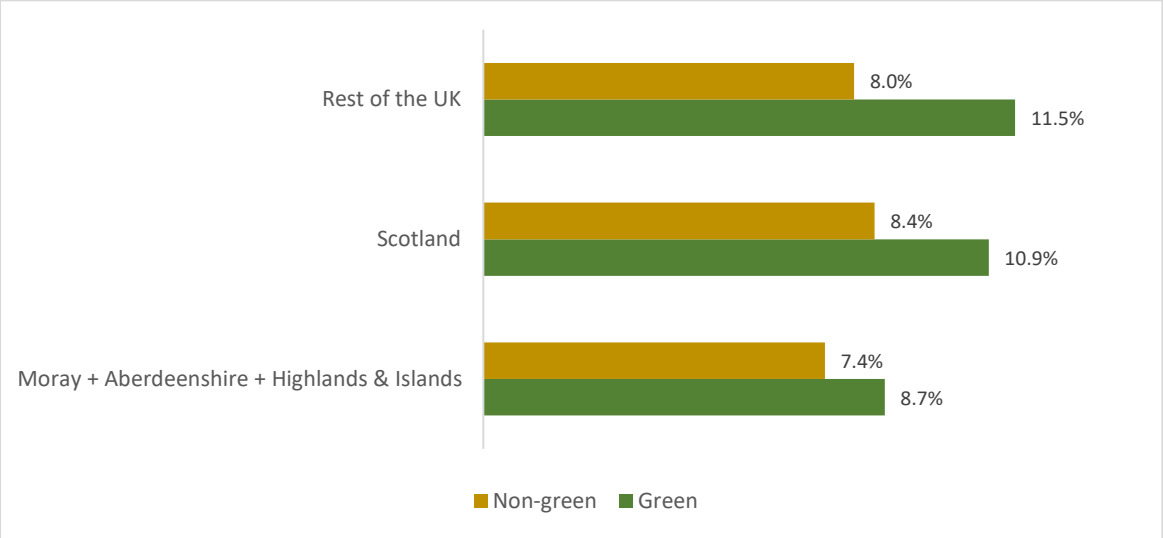


Source: IER - LMI for All vacancy dataset

[73] Terms such as teleworking, remote working, and hybrid working were grouped and used to conduct this part of the analysis..

[74] HIE (2020).

Figure 6.6: Share of teleworking vacancies by green vs non-green job, February 2019 to July 2023



Source: IER - LMI for All vacancy dataset

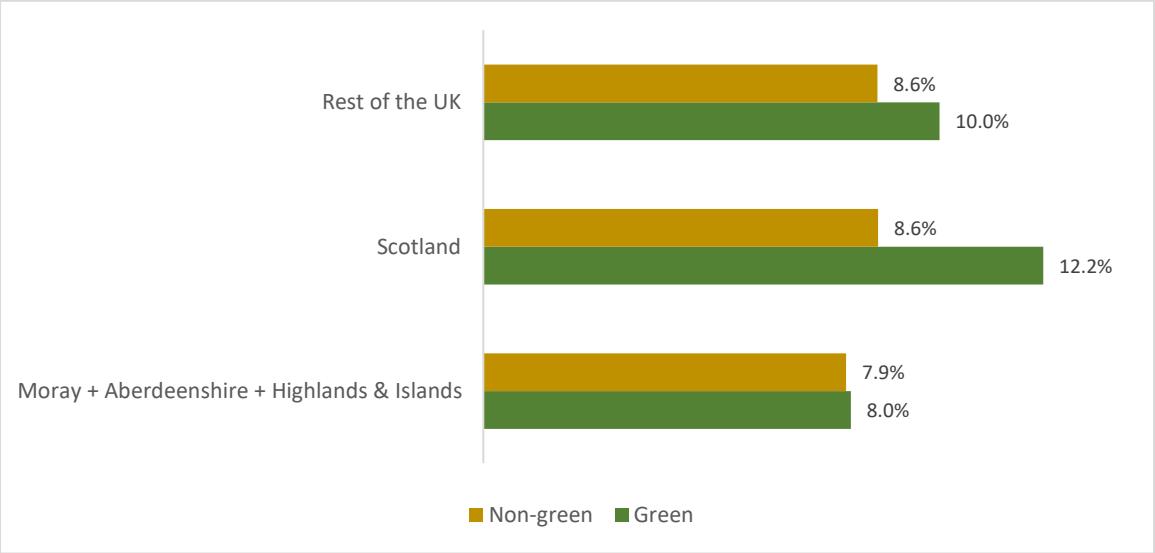
The type of contract is often an indicator of job security. Of all vacancies in Moray, only 7.8% are temporary/fixed term vacancies (see Figure 6.7). This figure is 8.2% for Moray, Aberdeenshire and the Highlands and Islands, compared to 9.9% and 9.1% for Scotland and the rest of the UK, respectively.

Figure 6.7: Share of temporary/fixed term vacancies, February 2019 to July 2023

Source: IER - LMI for All vacancy dataset

Analysing by vacancies for occupations classified as green vs non-green in Figure 6.8, there is little difference in the share of green and non-green vacancies that are temporary/fixed term (7.9% vs 8%). The share of green vacancies that are temporary/fixed term are notably larger in both Scotland (12.2%) and the rest of the UK (10%).

Figure 6.8: Share of temporary/fixed term vacancies by green vs non-green job, February 2019 to July 2023

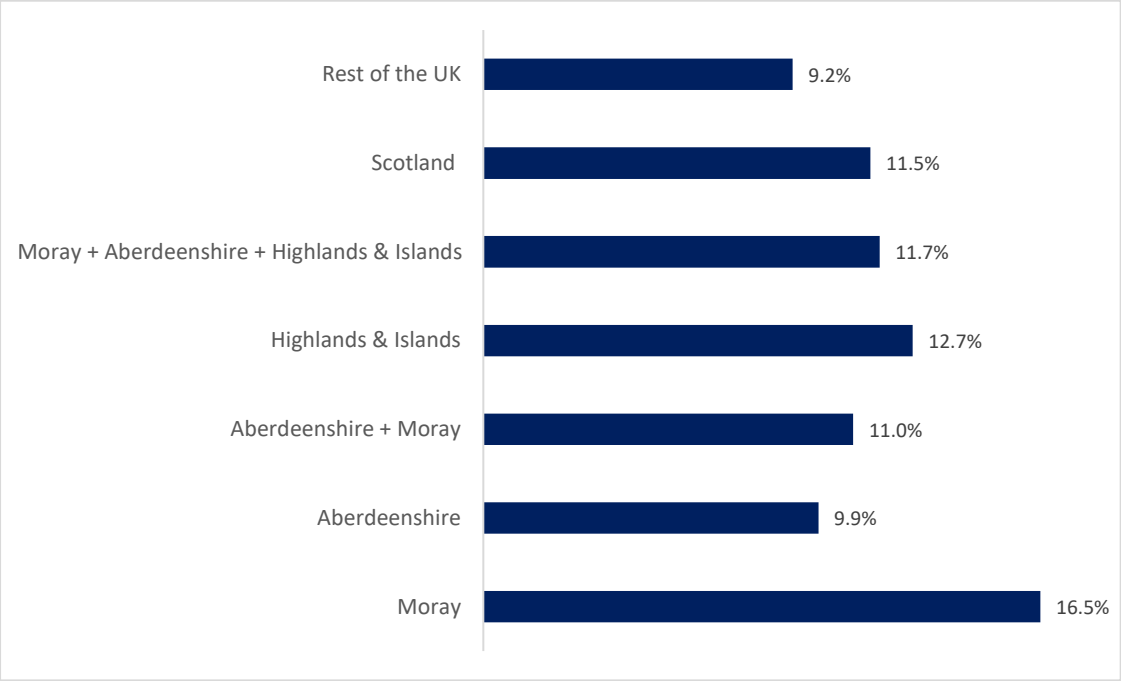


Source: IER - LMI for All vacancy dataset

There is, however, a relatively large share of part-time vacancies in Moray (16.5%). This figure is notably lower in Aberdeenshire (9.9%) and the Highlands and Islands (12.7%), resulting in a collective average of 11.7% across the three regions. This average for Moray, Aberdeenshire and the Highlands and Islands is larger than the share for Scotland (11.5%) and the rest of the UK (9.2%). Despite the relatively large share of part-time contracts being advertised, it should be noted that the vast majority of workers in Moray, Aberdeenshire and the Highlands and Islands are satisfied with their working hours and type of employment contract according to the ONS data (see Figure 6.4). Based on the vacancy data across 2019-23, vacancies in occupations considered green are less likely to be part-time (see Figure 6.10). This is true in Moray, Aberdeenshire and the Highlands and Islands, Scotland and the rest of the UK, where the share of part-time green vacancies ranges around 6%.

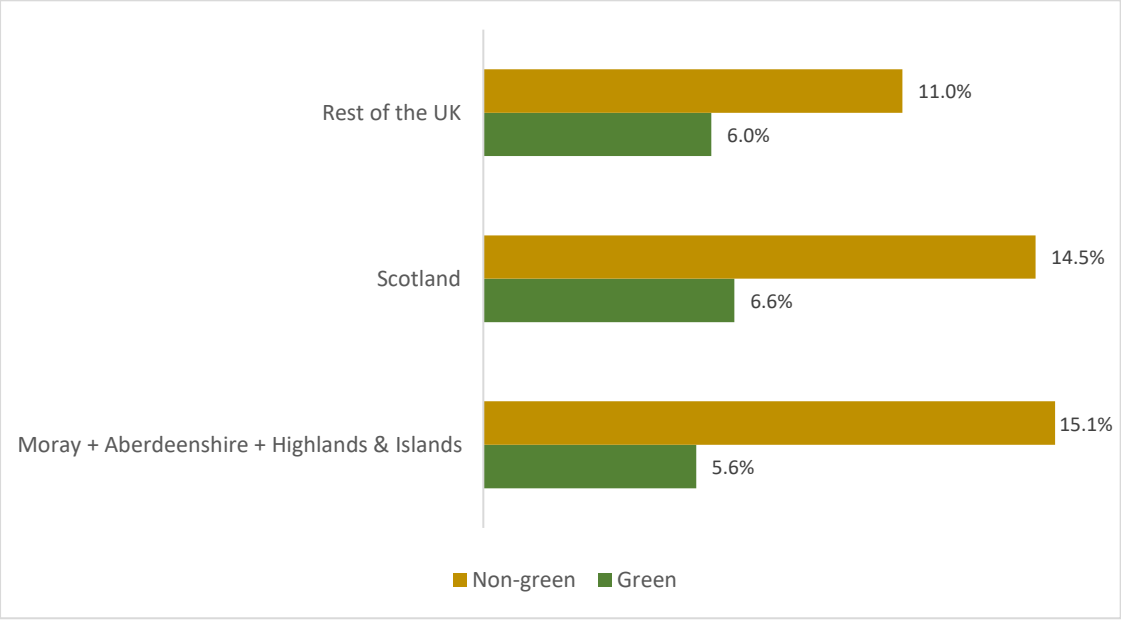
All three indicators of job quality/Fair Work fluctuated over the period, mostly reflecting changes due to the Covid-19 pandemic. As shown in Figure 6.11 measures of all three indicators increased during the pandemic and have mostly returned to pre-pandemic levels as of 2023.

Figure 6.9: Share of part-time vacancies, February 2019 to July 2023



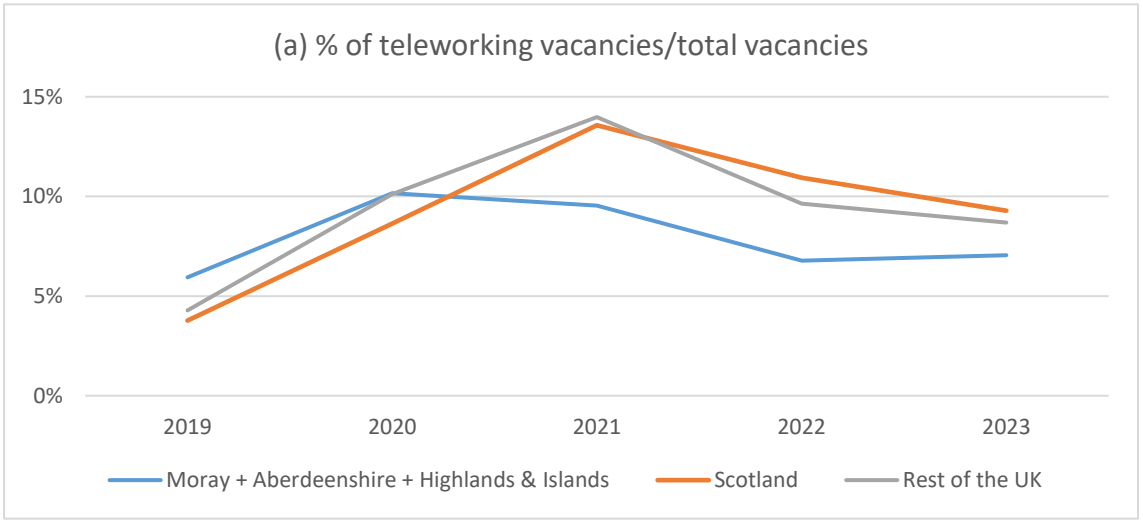
Source: IER - LMI for All vacancy dataset

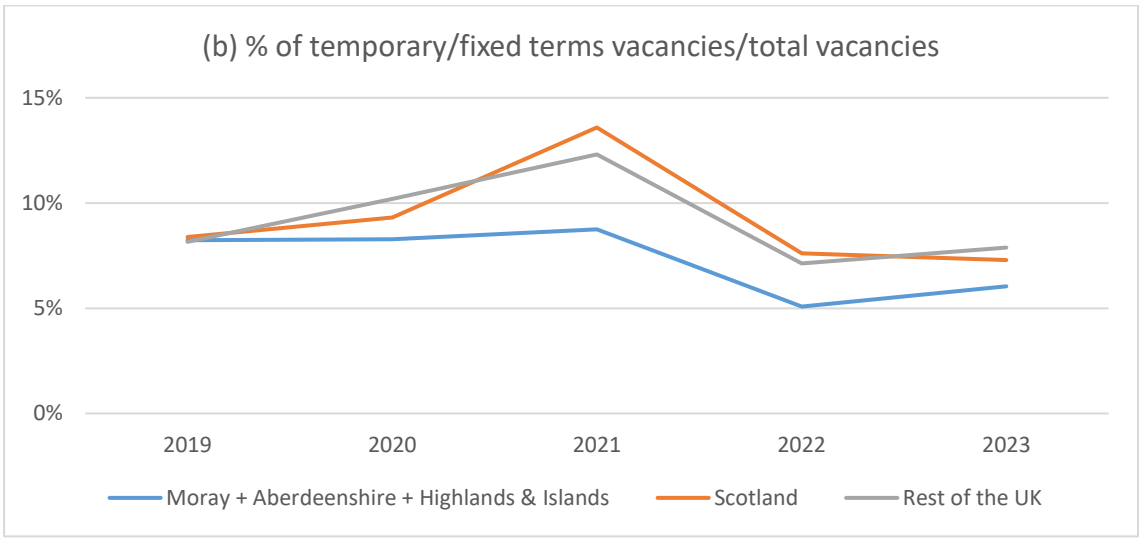
Figure 6.10: Share of part-time vacancies by green vs non-green job, February 2019 to July 2023

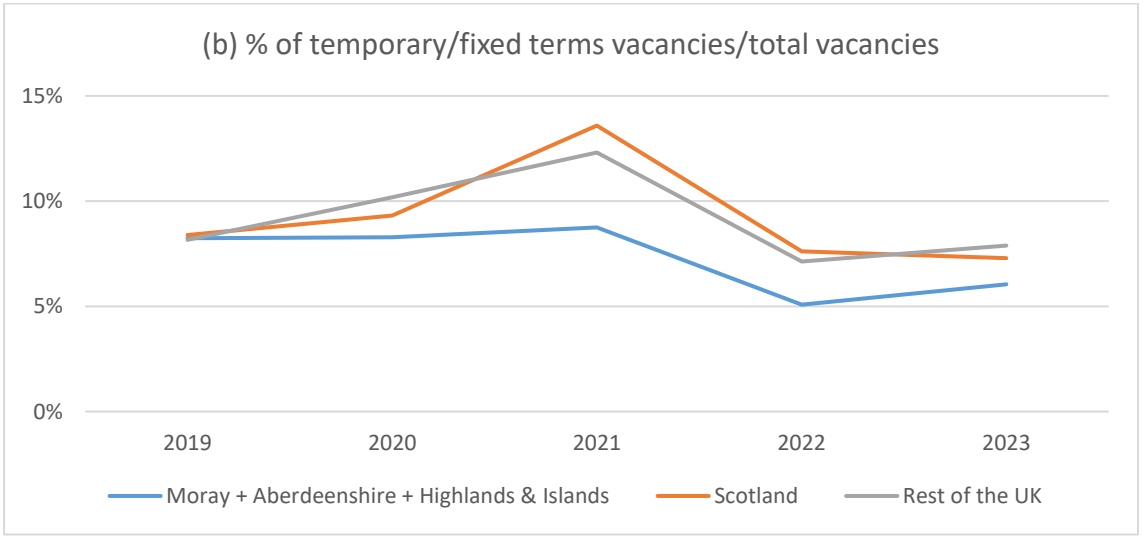


Source: IER - LMI for All vacancy dataset

Figure 6.11: Trend in the share of teleworking, temporary/fixed term, and part-time vacancies, February 2019 to July 2023







Source: IER - LMI for All vacancy dataset

7. Conclusions and recommendations

Scotland and its regions have embarked on a transition to Net Zero and having greener, more sustainable businesses and communities. This transition to a greener more sustainable economy is to be achieved in a just and fair manner. By estimating the demand for green jobs and the quality of jobs in Moray, Aberdeenshire and the Highlands and Islands, this research has provided a baseline from which progress towards these ambitions can be measured.

The research presented in this report is also the first to analyse green jobs at the 6-digit SOC level. This data is wholly new. As such, not only does the report provide a better understanding of green jobs in Moray, Aberdeenshire and the Highlands and Islands (and Scotland) but it also tests a new methodology applying the GreenSoc at a more granular level.

The rest of this section is organised around the four main objectives of the research:

1. Provide data on current and future green jobs and skills in the Moray region
2. Quantify green and non-green jobs in the Moray region at the 6-digit level of SOC
3. Categorises green jobs by type in the Moray region
4. Assess the extent of just and Fair Work through green jobs in the Moray region

In so doing, findings specific to each objective are summarised, main conclusions presented and recommendations offered.

7.1. Provide data on current and future green jobs and skills in the Moray region

The first objective of the project was to provide supporting data for an evidence base of the number and type of current and future green jobs and the skills needs for businesses in the Moray region. The task was undertaken by increasing the number of job portals scraped for Scotland and including region-specific job portals in consultation with researchers from UHI. Doing so allowed estimates of green jobs by green job type for Moray, and an understanding of the skills demanded for green jobs. Given the size of the Moray region, only 7035 vacancies were observed over February 2019 to July 2023 (see Table 5.1). As a consequence, the analysis was extended to include Aberdeenshire and the Highlands and Islands, with Scotland and the rest of the UK serving as benchmark comparators. Combining Moray, Aberdeenshire and the Highlands and Islands allowed the analysis of 79,826 vacancies between February 2019 to July 2023 (see Table 5.1). The types of skills demanded by employers was then analysed using these data.

Analysis of the vacancy data identified key technical and soft skills demanded by green occupations. The technical skills include energy management/energy solutions, electronics, control systems, mechanical engineering, electrical engineering, quality standards, Structured

Query Language (SQL) and JavaScript (Table 5.8). Transferable skills such communication skills and team working are also in demand. In helping to close the skills gap, continuous monitoring of vacancy data would usefully identify changes over time in the skills demanded by employers and support education and training systems remaining relevant. Furthermore, qualitative research with firms would enable a deep dive into understanding skills gaps faced by firms and the identification of firm strategies to address these challenges.[75]

The benefit of using web-scraped vacancy data is that the number of portals scraped can be easily increased. The main drawback is that vacancy data provides evidence on the demand side of the labour market only (that is, what firms are seeking) but not the supply side (what workers bring to the labour market) nor the stock of existing employment. The supply side is often estimated using data from the Labour Force Survey (LFS) but given the size of the regions analysed, sample sizes from the LFS are too small to conduct meaningful analyses.

One recommendation that follows from this data availability limitation is to explore the labour supply and employment side using Scottish census data. Such a project would require matching employment reported by households to the 2020 SOC, then matching this data to the GreenSOC to give an estimate of the existing stock of green employment, and the types of skills and qualifications that are most common among workers in these occupations.

7.2. Quantify green and non-green jobs in the Moray region at the 6-digit level of SOC

The second objective of the project was to quantify and categorise green vs non-green occupations in Moray at the 6-digit level of the SOC. As noted above, this project is the first to classify green jobs at the 6-digit SOC.

The vacancy data revealed that 31.7% of job vacancies in Moray were in green occupations (see Figure 5.1). This figure is higher than for the Highlands and Islands (30%) but lower than for Aberdeenshire (38.9%). Collectively, there are 34.4% vacancies in green occupations in Moray, Aberdeenshire and the Highlands and Islands combined, compared with 37.4% in Scotland overall. Green jobs are mainly in professional occupations, tend to require previous experience and are higher paid on average.

The lower share of green jobs in Moray in part reflects that nature of the regional economy. Nonetheless, opportunities for improvement exist. In other research, three quarters of businesses surveyed reported that they were well informed about their responsibilities in relation to climate change legislation and the green transition.[76] There is also high awareness

[75] The report by Anderson et al. (2023) under the UHI Moray Just Transition Project unpacks some of these issues.

[76] HIE (2023).

of green skills in Moray.[77] However, stakeholders pointed to a shortage of skilled workers in the Moray region, particularly in STEM and engineering related occupations.[78] Addressing these skills gaps is essential as green jobs are forecast to grow in the near future (see section 5.5). In the short term, companies may try to attract workers with these skills into the Moray region. These short-term efforts, however, must take account of the underlying tenets of a just transition – namely ensuring local communities are part of the process. To ensure that the local workforce benefits from the transition to Net Zero, education and training systems need to respond to shifting demands and plug the skills gaps in the region.

7.3. Categorises green jobs by type in the Moray region

The third objective of the project was to quantify and categorise green jobs into different types of green jobs. The analysis distinguished three types of green jobs – New and Emerging occupations or 'pure' green jobs=, Enhanced Skills and Knowledge occupations which capture changing worker requirements in some existing jobs, and Increased Demand occupations which result when green economy activities increase employment demand for some existing occupations.

New and Emerging green jobs account for 8.4% of green jobs in Moray, and 9.9% of green jobs in Moray, Aberdeenshire and the Highlands and Islands collectively (compared to 8.3% for Scotland). Enhanced Skills and Knowledge green jobs account for the largest share of green job vacancies across all geographies analysed, and is 64.5% in Moray. These types of green jobs are in occupations subject to significant changes to the skills and knowledge needed by workers to undertake these jobs. A large share in this category is thus a positive indication of the greening of occupations that may not be 'pure' green or existing solely in the green economy. 27.1% of vacancies in Moray are Increased Demand jobs suggesting green economic activities and technologies have increased employment demand for some existing occupations.

This presence of Enhanced Skills and Increased Demand job vacancies shows the possibility for non-green jobs to change to support the green economy. Encouraging more of this change is important. One way of encouraging this greening of jobs could be through the provision of training that delivers up-skilling and re-skilling enabled by new micro-credentials (that is, small specific training qualifications) to meet the demands of firms wishing to transition to greener activities.[79] Such a strategy might also support the drive to a more inclusive Net Zero economy

[77] Anderson et al. (2023).

[78] Anderson et al. (2023).

[79] See, for example, Karanovic et al. (2022).

by drawing in workers in non-green sectors. In addition, active dialogue with companies in the traditionally non-green sectors can help highlight to them the possibility of greening their jobs and steer such companies towards greener working practices were possible.

It is only recently that policy thinking has turned attention to the desirability of the greening of existing jobs and not just advocating the creation of new green jobs as part of attaining Net Zero economies. As such, policies intended to support the transition to Net Zero still tend to focus on either the promotion of the new 'green sectors' or supporting regions away from reliance on declining old brown industries. Examples of such policy development include those for Europe's wind energy and coal regions respectively. In this respect, a policy gap exists in terms of developing and pursuing a strategic approach to the greening of existing jobs. Given that these jobs are both prevalent and likely to remain so, and they are likely to make a significant contribution to a just transition.

7.4. Assess the extent of just and Fair Work through green jobs in the Moray region

The fourth and final objective of the project was to assess the extent to which green employment meets the aspirations of delivering just and Fair Work. In addressing this objective, a mix of ONS and vacancy data were analysed.

The ONS data reveal that Scotland is stronger in some aspects of job quality/Fair Work than others. There is (relatively) strong performance in indicators that measure workers having a desired contract, working satisfactory hours and low-paid work. However, Scotland is weaker on employee engagement, opportunities for career progression and unpaid overtime work. Though there are some differences in job quality/Fair Work indicators across gender, it should be noted than Scotland has performed remarkably well at narrowing the gender pay gap in recent years. Specific to Moray, Aberdeenshire and the Highlands and Islands, these regions all have high rates of workers having their desired contracts (above 98%) and working satisfactory hours (above 82%). Moray, Aberdeenshire and the Highlands and Islands also have low rates of low-paid work (12.6% or lower).

The vacancy data show that relative to Scotland and the rest of the UK, a small share of job vacancies mentioned teleworking (5.8% in Moray and 7.6% in Moray, Aberdeenshire and the Highlands and Islands) and temporary/fixed term contracts (7.8% in Moray and 8.2% in Moray, Aberdeenshire and the Highlands and Islands). By contrast, a relatively large share of vacancies are part-time (16.5% in Moray and 11.7% in Moray, Aberdeenshire and the Highlands and Islands). Vacancies in occupations classified as green jobs are more likely to mention teleworking and temporary/fixed contracts, but less likely to mention part-time working. On average, green jobs are higher paid.

A previous IER study of green jobs in Scotland showed that women and younger workers (ages 16-24) are under-represented in green jobs.[80] This pattern may, in part, be driven by the types of occupation that dominate these jobs. Given that the demand for green jobs is forecast to grow, ensuring that female and young workers benefit from these trends is key. Improvements in the number of younger and female workers in these jobs are possible – and necessary if a just transition is to be delivered as part of a green industrial revolution. Improving job quality is one way in which under-represented workers can be attracted to these jobs. For example, working conditions which enable flexible working and worker autonomy tend to attract young and female workers.[81] The evidence also shows that job quality is positively associated with innovation and productivity within companies as well as better employee health/wellbeing.[82] Hence, a strategy to encourage an increase in the number of good jobs might provide dual benefits: a more inclusive and healthier green workforce and better performing companies. With respect to younger workers specifically, these workers are usually less experienced. The data here show that green jobs have higher demands for experience and specialist skills. One way of ensuring that younger workers are included as part of a just transition is through apprenticeship schemes which foster on-the-job training and learning by doing.

In sum, this report has provided new region-specific data on green jobs for Moray, Aberdeenshire and the Highlands and Islands, and updated data for Scotland overall. Understanding the extent and types of green jobs and the associated skills required is critical as Scotland (and its regions) embark on the journey to Net Zero. It is through research (like what is presented here) ambitions of fair work and a just transition alongside a green industrial revolution can be realised.

[80] Cardenas-Rubio et al. (2022)

[81] Chung and van der Lippe (2020).

[82] Muñoz-de-Bustillo et al. (2022); Erickson et al. (2023f).

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