



Characteristics of Workers in Green Jobs

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Introduction

A growing body of research has highlighted the importance of promoting green jobs for moves towards more sustainable practices. In this context, policymakers and wider society should examine existing employment to discern characteristics. This could be significant both to identify likely requirements for green jobs and to identify problem areas of relevance to policy.

This report builds upon accompanying research (NERI Report 30) which uses various methodologies to quantify green jobs. Specifically, we use the green occupations method aligned with the commonly used O*NET framework and examine the characteristics of these workers. This report highlights some of the key differences that emerge when focusing on the characteristics of workers in green jobs, specifically the Age, Gender, Education Level, location, and Employment Status of the people who work in these occupations. Several interesting variations emerge when reviewing the people employed in the various types of green roles (Green New & Emerging, Green Enhanced Skills and Green Increased Demand), and how some occupations have an outsized weight in the resulting data.



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The O*NET framework for green jobs

The O*NET system classifies green jobs according to the “greenness” of their content to produce [a list of green occupations](#). This results in a relatively expansive definition of green jobs broken into three subcategories.

“Green Increased Demand” – These are green jobs that are not subject to any significant change in their work/working environments but are now in increased demand due to the overall greening of the economy. (e.g. Chemical scientists, Electricians, Bus & Train Drivers).

“Green Enhanced Skills” – These are green jobs that *are* subject to work/working environments. This may be due to demand change also. The purpose of the role remains the same, but specific requirements such as skills, knowledge or credentials are altered. (e.g. Farmers, Engineers, and most construction trades).

“Green New and Emerging” – These are occupations that are created due to the fact that the economy as a whole is greening, causing the need for new, unique work/working environments. (E.g. Environmental Consultants, Energy Plant Operatives, Waste Management and Disposal occupations).

Age

We first examine age. The average age of workers in occupations within the Green New and Emerging (GNE), Green Increased Demand (GID) and Green Enhanced Skills (GES) categories shows considerable variation in Ireland. This is an important characteristic to remember when discussing the green transition.

Higher age profiles may imply more difficulty transitioning into these ‘green’ occupations. [As a study from 2004 found, while skill was the second most common reason for changing jobs for younger people \(20s-40s\), this decreased as people aged.](#) This decrease can in part be explained by the fact [that those in older age brackets were less likely to receive work-related training by their employers](#). Overall, those in older age brackets (55 and over) accounted for 19% of the Irish workforce, making age increasingly important within the green transition, as older workers comprise a significant percentage of the working population.

Similarly, occupations with lower average ages may indicate a need for educational qualifications – as younger cohorts tend to have higher levels of educational attainment -, a high rate of growth or potentially, job churn.

Table 1: Average, Upper And Lower Ages For Each Green Job Classification (2016)

Green Job Classification	Average	Upper	Lower
GNE	40.9	49.4	35.9
GID	41.1	51.3	34.4
GES	46	54.2	37.6
GES without Farmers	42.9	48.6	37.6

Source: Census 2016 (Central Statistics Office)

Note: Dataset code used: EB068

Table 1 shows the average, upper and lower age average bounds in the three green job categories, defined as the average age for the group, and the respective average ages for the youngest and oldest occupation within the green job category. Interestingly, the highest results for all three is in the *Green Enhanced Skills* classification who on average were 46 years old, 54.2 as the upper and 37.6 as the lower average bounds.

This result¹ can be explained by the inclusion of *farmers* in GES jobs, which brings the average up. The last row shows the same data for GES but excludes *farmers*, which brings the average down to 42.9 and the upper bound to 48.6 years. This is because the average age for *farmers* was 54.2, which is more than 10 years older than the averages for GNE and GID jobs.

Table 2: Five Highest And Five Lowest Average Ages Per Occupation (2016)

Green Code	Occupational Title	Average Age
GES	Farmers	54.2
GID	Bus and coach drivers	51.3
GNE	Public services associate professionals	49.4
GES	Inspectors of standards and regulations	48.6
GES	Production managers and directors in manufacturing	47.5
GID	Programmers and software development professionals	37.2
GID	Chemical scientists	37.1
GNE	Actuaries, economists, and statisticians	36.6
GNE	Marketing associate professionals	35.9
GID	Customer service occupations n.e.c.	34.4
	Green Job Average	42.2

Source: Census 2016 (Central Statistics Office)

Note: Dataset code used: EB068

¹ Out of the 257,991 workers in the GES category, farmers make up 69,375, or nearly 27%. This can in part explain the higher age average bound and average age, but not the lower age average bound.

Table 2 shows the five highest and lowest age averages for the different green occupations in 2016, with *farmers* being the highest at 54.2 and *customer service occupations n.e.c.* being the lowest at 34.4 years. Out of the five highest, *farmers*, *inspectors of standards and regulations* and *production managers and directors in manufacturing* are in GES, *public services associate professionals* are in GNE, and *bus and coach drivers* are in GID. On the other hand, for the five lowest, *programmers and software development professionals*, *chemical scientists*, and *customer service occupations n.e.c.* are in GID, while *actuaries*, *economists and statisticians* and *marketing associate professionals* are in GNE.

Gender

Table 3: Distribution Of Women In Each Green Job Occupation

% of Women	GNE	GID	GES
0-24	12	25	19
25-49	8	5	8
50-74	4	6	3
75-100	0	0	0
Total	24	36	30

Source: Census 2016 (Central Statistics Office)

Note: Dataset code used: EB065

Table 3 shows the number of occupations within each green subcategory with a given proportion of women. Out of a total of 24 occupations within GNE, 12 of them are made up of 0-24% women, 8 are 25-49% women and 4 are 50-74% women. In GID, 25 are 0-24% women, 5 are 25-49% and 6 are 50-74%. For GES, 19 are 0-24%, 8 are 25-49% and 3 are 50-74%. This means that in the vast majority, 77 occupations out of 90, men are in the majority, whereas only 13 are made up of a majority of women. It is also important to note that for 56 occupations men held a huge majority, between 75% and 100%, whereas for women that number is 0. Overall, 32.6% of workers in GNE are women, compared to 16.8% and 18.6% in GES and GID, respectively.

Breaking down Green Job employment data by category, we find that 47% of all jobs are in GES, 38% in GID and 15% in GNE. On the other hand, in terms of the gender breakdown, we find that GES is under-represented, making up 36% of total female employment in the green economy, and GNE is over-represented by 11%, making up 26% of all female employment rather than the 'expected' 15%, whereas GID showed no change. In total, there were 26,140 women in GNE, 37,043 in GES and 38,965 in GID compared to 80,282 total employment in GNE, 257,991 in GES and 209,552 in GID.

Table 4: Fifteen Occupations with the Highest Percentages of Women

Green Code	Occupational Title	Percentage of Women
GID	Biological scientists and biochemists	63.5%
GID	Customer service occupations n.e.c.	63.4%
GES	Public relations professionals	62.0%
GNE	Marketing associate professionals	59.5%
GID	Laboratory technicians	57.4%
GID	Communication operators	56.6%
GES	Vocational and industrial trainers and instructors	56.6%
GNE	Public services associate professionals	56.1%
GNE	Quality assurance and regulatory professionals	55.9%
GES	Buyers and procurement officers	52.9%
GID	Natural and social science professionals n.e.c.	52.5%
GID	Chemical scientists	50.7%
GNE	Conservation professionals	50.7%
GES	Routine inspectors and testers	49.9%
GNE	Research and development managers	48.9%

Source: Census 2016 (Central Statistics Office)

Note: Dataset code used: EB065

Table 4 shows the fifteen occupations with the highest percentage of women, going from 63.5% (the highest) to 48.9%. Of these fifteen, six are within GID, five within GNE and four within GES with the two highest (*biological scientists and biochemists*, *customer service occupations n.e.c.*) being in GID. From this table, we can see the previously mentioned occupations which are majority women, make up 13 out of 90 total occupations. Interestingly, when looking at the bottom fifteen occupations in terms of percentage of women, none are in GNE, rather, seven are in GID and eight in GES: with the lowest being *mobile machine drivers and operatives*, *pipe fitters*, and *carpenters and joiners* with 0.4% of employees being women.

Education

Table 5: Variations In Education For The Different Green Job Classifications

Level of Education	GNE	GES	GES (Ex. Farmers)	GID
Secondary or Lower	15.4%	41%	33.3%	38.2%
Tertiary or Higher	61.3%	27.8%	35.5%	25.2%

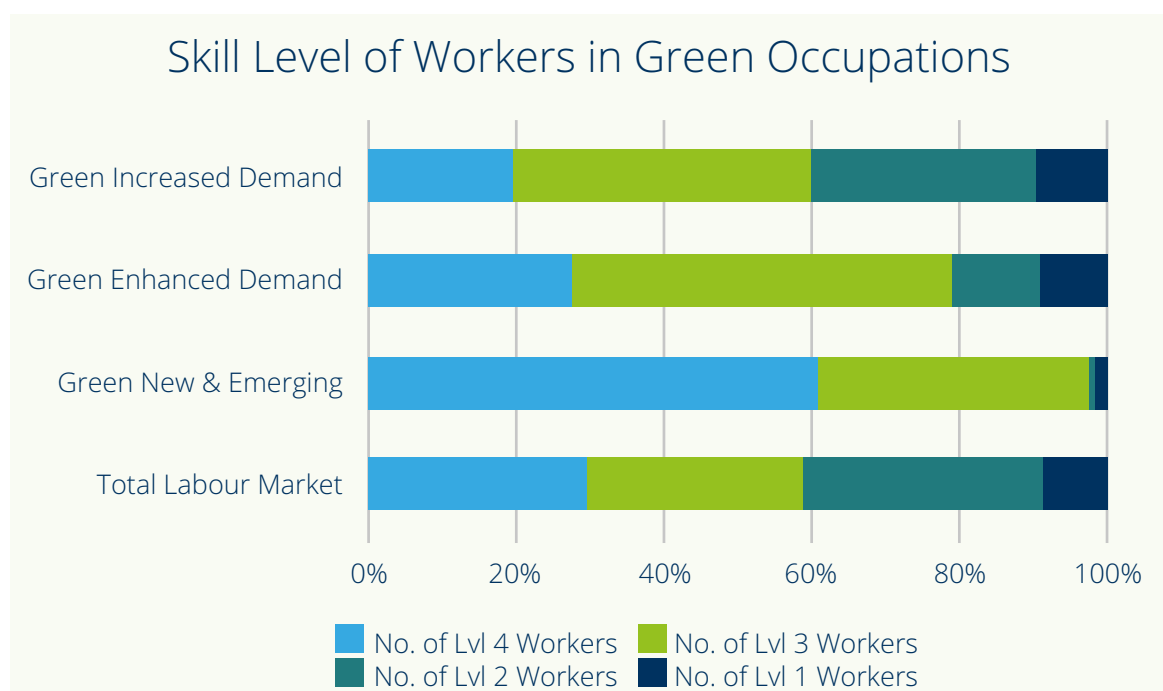
Source: Census 2016 (Central Statistics Office)

Note: Dataset code used: EB054

Table 5. shows that there are variations in the levels between the various categories of green jobs. New and Emerging occupations are significantly more likely to be held by those with a 3rd Level qualification. We can see that most green roles that do not require a 3rd level education are in the GES (41%), however, if we remove farmers from this category, then the GID sector is the lowest skilled (38% only have 2nd level or lower). There is a distinction to be made in the GES category due to the fact that farmers make up around 22% of all Enhanced Skills occupations, and these (often older) workers are much more likely to have only a primary/secondary level qualification. This highlights how essential re-skilling/up-skilling is going to be in the future if we aspire to achieve a sustainable, just economy.

One's education level may not always be appropriately matched with their job requirements, which can lead to overqualification, both in the green job market and also in the wider Irish labour market – showing a parallel between the two. We can see that the green economy in general is heavily skewed towards those who have a higher skillset. Table 6 and the Graph below shows the skill level that is required to obtain a certain job in each of the subsectors of the green economy.

Figure 1: Variations in Required Education levels for each Green Category



Source: Office of National Statistics (ONS) SOC2010 Manual | Census 2022

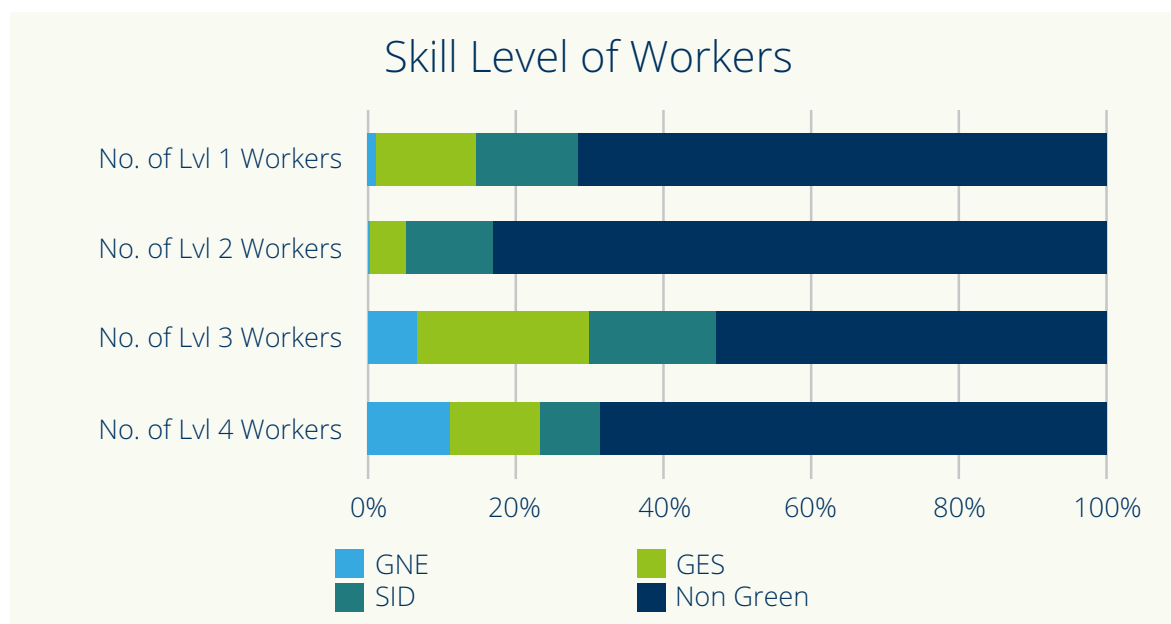
Note: Dataset used: EB054

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Using the ONS's SOC2010 skill level guidelines (with Level 1 being the lowest and 4 the highest), combined with figures from the 2022 Irish Census, we can see that 61% of "New and Emerging" jobs, 27% of "Enhanced Skills" jobs, and 19% of "Increased Demand" occupations require a highly skilled workforce (Level 4). This compares with the labour market in general at 29%. The distinction is not so substantial in the "Increased Demand" sector – 41% are Level 3 and 31% are Level 2. This is intuitive as these are the jobs that already exist but will be in greater demand as we shift to a greener economy.

We can see that all the green subcategories have a larger proportion of higher-skilled workers than the market in total. This suggests that to transition to a greener economy, there will need to be a large-scale upskilling of the Irish labour force. Using this data, we can identify the occupations that provide an easier and more efficient path for workers who require up/reskilling. We can see that "New & Emerging" occupations require the highest skill levels (61% are in Level 4). The other green categories - "Enhanced Skills" (27%) and "Increased Demand" (19%) are closer to the average labour market figures.

Figure 2: Percentage of Green Workers in Skill Categories



Source: Office of National Statistics (ONS) SOC2010 Guideline Census 2022

Note: Dataset used: EB054

From Figure 2 we can see that level 3 workers are most likely to work in a sustainable occupation (47% are counted as "green"). Levels 4 & 1 also have significant minorities of "green" jobs in each (31% and 28% respectively). This ties into the theme from the previous graph that higher-skilled jobs are more likely to be sustainable than those at the lower end of the spectrum. Level 1 is somewhat of an outlier, and this is because low-skilled construction and warehousing staff are considered "green", and these two occupations alone account for the high percentage of this Level.

Location

Another key factor of the Green Transition is the location, or geographical spread of those in Green Jobs, and will likely shape future policy and considerations especially if certain jobs are overwhelmingly concentrated in one area.

Table 6: Percentage of Green Jobs that are in Dublin and the Greater Dublin Area (2016)

Green Job Classification	Dublin	Greater Dublin Area
GNE	39%	52%
GID	24%	36%
GES	28%	42%

Source: *Census 2016* (Central Statistics Office)

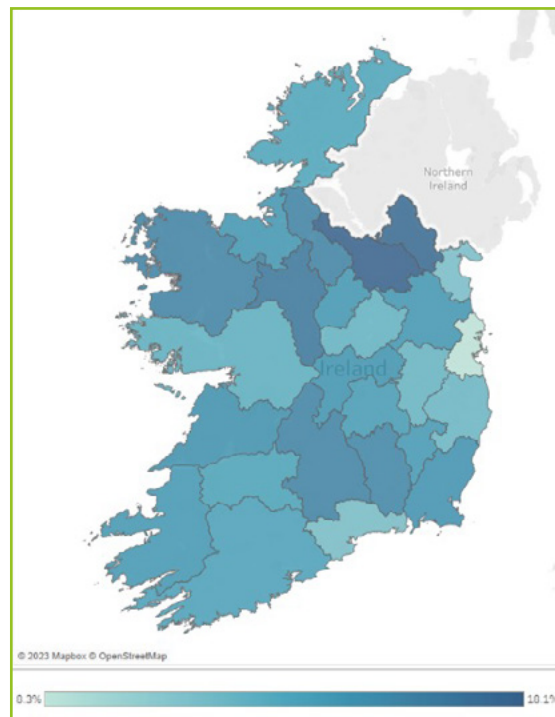
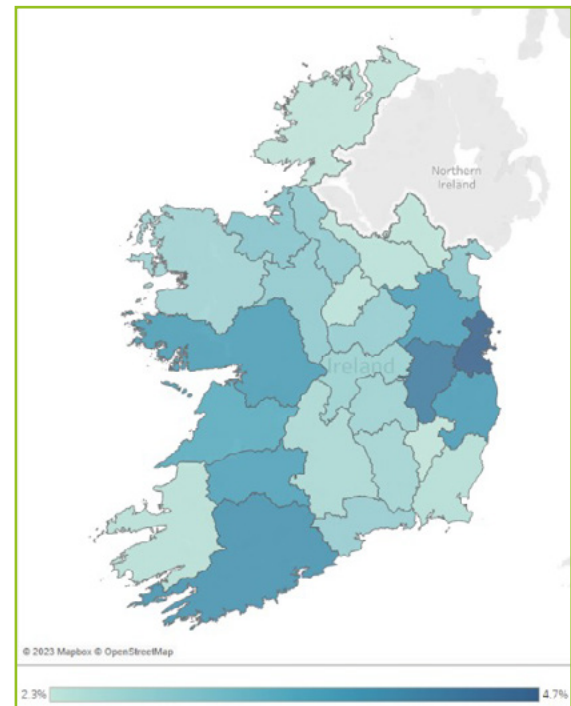
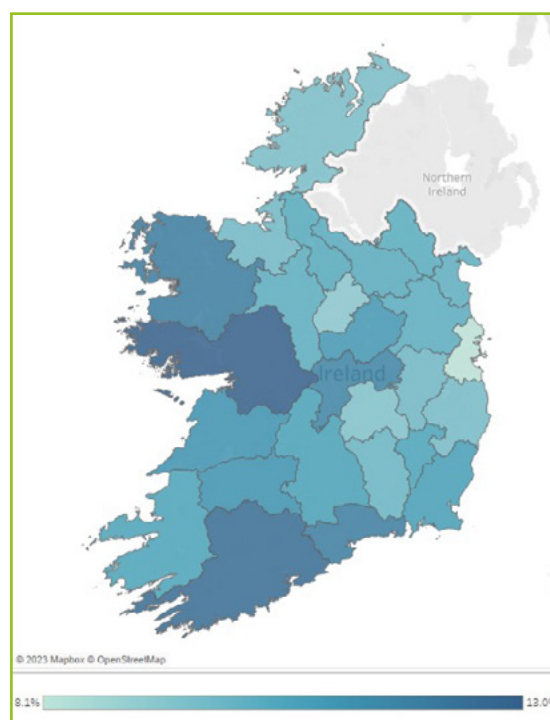
Note: Dataset code used: EB049

Table 6 shows the percentage of employees for each green job classification that work in either Dublin or the Greater Dublin Area (GDA). Across all three classification categories, there is a clear concentration around the capital, with the highest being GNE at 39%, GES at 28% and GID with 24% of workers in Dublin.

In terms of the Greater Dublin Area, the majority of workers (52%) in GNE are located in Dublin, Meath, Kildare and Wicklow, and a near majority (42%) for GES. On the other hand, GID workers are more spread throughout the Island, with only 36% being in the Greater Dublin Area. Dublin and the Greater Dublin Area make up 30.2% and 41.9% of the total job market share, respectively.

Therefore, we can compare the expected number of Green Jobs in each category to the actual number, showing that GNE jobs are over-represented in Dublin and the GDA. On the other hand, GID jobs are under-represented in both Dublin and the GDA, while GES jobs are only under-represented in the GDA.

Furthermore, when taking into consideration the entire job market, not just green jobs, the percentage of workers in Dublin is 30%, and in the GDA it is 42%. This shows that GNE is especially concentrated in Dublin and the GDA compared to both the other green categories and non-green jobs.

Figure 3: Green Occupations as a Proportion of the Total Labour Force (2016)**Figure 3.1 GES occupations as a proportion of the total labour force****Figure 3.2 GNE occupations as a proportion of the total labour force****Figure 3.3 GID occupations as a proportion of the total labour force**

Figures 3.1 to 3.3 show the three different green job occupations as a percentage of the total labour force in each county in 2016. A start difference arises in the distribution of GES and GID jobs (figures 3.1 and 3.3) and GNE jobs (figure 3.2).

The first map shows that GNE jobs are highly concentrated in Dublin and the Greater Dublin Area when considering green jobs as a percentage of the total labour force. There are also some concentrations on the west coast, mainly in counties Cork, Limerick, Clare, and Galway.

On the other hand, GES and GID jobs are much less concentrated in Dublin but are more evenly spread throughout the Island. For GES, the highest proportion is in county Cavan, and for GID it is in Galway. For both GES and GID, the lowest proportion of green jobs to total workforce is in Dublin.

Table 7: Five Occupations With The Highest & Lowest Percentage Of Workers In Dublin (2016)

Category	Occupational Title	Percentage in Dublin
GES	Public relations professionals	67%
GNE	Management consultants and business analysts	59%
GNE	Actuaries, economists, and statisticians	56%
GNE	Marketing associate professionals	55%
GES	Marketing and sales directors	53%
GID	Metal working machine operatives	6%
GID	Assemblers (vehicles and metal goods)	5%
GID	Forestry workers	3%
GES	Quarry workers and related operatives	2%
GES	Farmers	1%

Source: Census 2016 (Central Statistics Office)

Note: Dataset code used: EB049

Table 7 shows the five occupations with the highest percentage of workers in Dublin and the five with the lowest percentage, ranging from 67% - public relations professionals to 1% for farmers. Overall, there are 9 occupations which have a majority of workers working in Dublin, with the top five being in GES and GNE only as seen in Table 7. On the other hand, the bottom five are split only between GID and GES but not GNE. This is in line with Table 6 and the previous findings which showed that GNE has the highest share of workers in Dublin.

Employment Status

The Green Transition will require the up-skilling and re-skilling of workers in order to teach them skills that more closely align with green tasks and occupations. Therefore, looking at employment status is important as employers may give up-skilling and re-skilling opportunities to their workers – increasing job security and prospects.

Table 8: Change In Proportion Of Employed Persons As Employees In Green Job Classifications (2011-2016)

Year	GNE	GID	GES	Entire Workforce
2011	88.9%	83.6%	76.9%	82.7%
2016	89.1%	85.4%	77.6%	84.1%

Source: Census 2011 & 2016 (Central Statistics Office)

Note: Dataset code used: EB065

Table 8 shows the percentage of workers in each Green Category that are employees for the years 2011 and 2016. In terms of change between the years, all categories increased between 2011 and 2016, meaning that there were more employees in 2016 than in 2011. GNE increased by 0.2%, being the lowest increase, GID increased by 1.8% being the highest and GES increased by 0.7%. On the other hand, GNE has the highest mean of workers as employees, whereas GES has the lowest with more than 10% less.

The nationwide employment in 2011 was 82.7%, more than the employment for GES jobs but less than GNE and GID. Similarly, in 2016 it was 84.1% which was more than GES and less than GNE and GID. In this case, a higher green job employment status rate for GNE may prove attractive for potential workers transitioning either between non-green or even GES, as it stands to be roughly 10% less than GNE and GID.

Furthermore, the way in which policy will be shaped may depend on whether one is an employee, and thus may receive skills training from the company, or whether one is self-employed and thus would require additional help in skills training from the government.

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Conclusion

There have undoubtedly been worries about how the transition towards a greener economy will happen justly, and who it will affect especially in the wake of the deindustrialisation that the United Kingdom went through in the 1970s and 80s. But as Broome, et al have stated, the just transition does not have to be this way. This report aimed to identify key characteristics within green jobs, which can aid policymakers in how and what kind of structural change can happen to achieve our climate goals.

We have seen how those in GNE jobs tend to be younger, most likely in Dublin or the Greater Dublin Area and have a third-level degree or higher than other green sectors. This provides different challenges to policymakers; if the aim is to increase those in GNE jobs, their education level must be considered, as well as their location and job opportunities that are not evenly spread throughout the island.

What all Green Jobs have in common is that they tend to be dominated by men, with only a handful of occupations being made up of a majority of women. This too will be a key factor in the Green Transition, especially relating it to gender equity in workplaces. Data has also shown that green jobs differ in their level of employment, with GNE leading the charge and GID following, but GES trailing behind and lower than the national average.

Whether green workers are considered employees is significant, as it may provide an incentive for non-green workers to move to a more secure job, especially since employment growth has not increased for the whole economy but has for green occupations.



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