

“green  
alliance...”

# Closing the UK's green skills gap



# Summary

The government has promised economic changes to improve living standards, with a focus on addressing the imbalance between regions. Exactly how this will be achieved, however, remains unclear. In broad terms, ‘levelling up’, as a priority, is supposed to be the vehicle to do this by boosting regional economies and improving individual life chances, through a new offering on skills.

The government is also committed to delivering a net zero economy by 2050, and often highlights its potential to spread economic benefits across the country. Yet, the two agendas, levelling up and net zero, remain distant from each other in policy terms and, without greater integration, there is a strong chance that each will fail to realise its potential.

The transition to net zero creates new economic opportunities that can be harnessed to level up the country. To do so will require new skills in the UK’s workforce.

Building on our previous research into job creation in nature and the circular economy, here we look at the future needs of the green economy and map some of the industries and regions that will require support in creating and sustaining green jobs. We identify specific gaps in skills, and where there are opportunities and challenges to retrain and equip people with skills to fulfil future job requirements. We recommend the development of an integrated green skills programme that delivers for individuals, institutions and industry, marrying the government’s environmental ambitions with its economic and social aims.

## Our findings

1. Every major sector in the UK needs to close a significant skills gap to enable them to reach net zero.
2. The sectors with the most pressing emissions reductions by 2030 face the most immediate skills shortages, including housing and transport. Along with land use, these sectors already face shortages to deliver the status quo, let alone progress on net zero.
3. Eighty per cent of the current workforce will still be active in 2030. As well as attracting new green entrants there should be a focus on transferring existing skills and retraining for the green economy.

## Our recommendations

Green skills are central to both levelling up and economic growth, so the government must start from a point of integration. Current and forthcoming legislation on lifetime skills and the UK Infrastructure Bank (UKIB) must give due regard to environmental goals, while environmental legislation must do the same for skills.

However, to ensure the economy does not return to sluggish growth after the recovery, and green jobs do not only stay in the south east but spread across the country, ministers should design and implement a new comprehensive green skills programme, supported in three ways:

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### Industry

- A UK-wide body and framework for green jobs, to match supply and demand regionally and across sectors.
- Local skills plans that link businesses with universities and colleges and reflect local dynamics.
- A requirement for sector boards to collect frequent, granular labour market intelligence for the green transition.
- A super-deduction for training, providing 130 per cent tax relief for investment in employees' green skills.

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## Institutions

- New green courses, using the new framework to understand the landscape of the future workforce.
- Environmental modules in other courses as the new skill requirements are not confined to green jobs.

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## Individuals

- A public facing campaign to increase knowledge about green skills and their benefits, complementing efforts by industry.
- Support for workers while they retrain, in the form of loans, grants or maintenance payments.
- Use existing programmes to boost green skills, such as Kickstart and the digital skills bootcamp model.

# Introduction

“If not acted on now, the UK will have a job market that lacks the skills for its green economy to develop.”

“A high wage, high skill, high productivity economy”, that is what Prime Minister Boris Johnson promised in his October 2021 conference speech. As part of the government’s levelling up vision, this will be implemented across the country, not just in particular regions, and it will be, to a great extent, delivered via a new skills and education agenda.

The UK economy is also undergoing another transformation, to net zero carbon and a healthier environment. Last year, Business Secretary Kwasi Kwarteng and COP26 President Alok Sharma outlined ambitions to create two million skilled green jobs by 2030. The spending review in October 2021 pledged £20 billion of investment in net zero infrastructure which the government hopes will drive that job creation.

Our previous research has shown that there is huge potential for green jobs across the country to deliver on the government’s levelling up vision.<sup>1,2</sup> However, whilst the public are supportive of that agenda, there is scepticism over green jobs which can be seen as a political tool, intangible and a potentially risky move.

There is not yet a comprehensive view of what the green jobs will be, or in which sectors and regions they will be found. As Education Secretary Nadim Zahawi has said, there are “skills gaps in our economy that we need to fill”, but the lead time to help the right number of people develop the right skills to fill green job requirements is long. The more complex jobs will require many years of training to meet the standards needed.

If not acted on now, the UK will have a job market that lacks the skills for its green economy to develop. And it would make it harder to achieve net zero, levelling up and a more productive economy.

## What are green skills?

Green jobs are notoriously hard to define.<sup>3</sup> International definitions range from those working in environmental goods and services, climate mitigation and adaption, or any role required in a net zero, resource efficient society. The government uses a narrower definition of low carbon jobs as those involved in lowering greenhouse gas emissions.

We take the same view as the Green Jobs Taskforce, that green jobs directly or indirectly contribute to reaching climate and environmental goals. Crucially, this includes both nature restoration and the circular economy. Green skills are the competencies that workers need to deliver in all these areas.

In this report, we scan the UK’s green skills landscape, mapping the industries that require the most support in filling positions in the future, and where investment may be needed to boost skills. We identify those gaps by clarifying which industries are sufficiently prepared to retrain, upskill and educate people to fulfil job requirements, and which are not.

Anticipating skills gaps helps to match the needs of the labour market and the capacity to fill them which is vital to boost economic growth across the country and achieve levelling up.

# The UK labour market and the green economy

“Poor productivity is underpinned by a lack of investment in workers and their skills.”

The UK has a productivity problem, falling behind its OECD peers over the past two decades. This is a problem that affects all sectors and has worsened since the global financial crash of 2008, with the economy growing by only 0.4 per cent a year in the 12 years since.

Poor productivity is underpinned by a lack of investment in workers and their skills, as well as an indifference to the importance of resource productivity. British firms report skills shortages when trying to recruit, especially in construction and manufacturing, and there has been a long term lack of skilled tradespeople.<sup>4</sup> The labour market has been less flexible since the UK's departure from the European Union and the government has implored businesses to hire and train British workers instead of relying on “cheap, foreign labour”. However, there are barriers causing businesses to underinvest in staff.

Companies often fail to invest in staff training because of the risk that newly trained employees will move jobs, taking their skills (and that investment) with them, even though the newly skilled worker will retain a productivity advantage for the whole economy. Training generates positives that might not always be fully captured by the employer but, due to its effect on the wider economy, it is rational for the government to provide incentives to invest in it. The government must make sure, however, that it strategically drives investment in skills fit for the future green economy, to maximise the benefits of the primary drivers of change in the 2020s.

The UK economy is entering a period of turbulence that brings both risk and opportunity. Decarbonisation will bring a rapid shift in the skills profile required across most sectors, from manufacturing and construction to procurement and financial services. As large swathes of the economy transition to low carbon, there is a risk that businesses will not be able to find staff with the necessary skills, and this could act as a drag on growth. In some cases, such as installing home insulation, this could slow down the pace of business activity and decarbonisation. In other cases, such as electric vehicle assembly, it could mean that businesses are forced to source vehicles from abroad, offshoring jobs to countries that invested early in the relevant skills.

Alternatively, equipped with a highly skilled workforce, UK firms could get ahead of the competition and begin to benefit earlier from the productivity gains associated with a low carbon economy.<sup>5</sup> Developing comparative advantage in green technology relies on early investment in the production capability and skills needed for new green products and services. Without thinking ahead and planning carefully for the economy it wants, the UK risks missing the boat in the global race to dominate these new markets.

## Policy tools

To ease the pain caused by an economic slowdown or policy change, the government has often turned to grants or tax relief to spur businesses to invest and adapt. The super-deduction, announced in the 2021 spring budget, is one such example, granting businesses tax relief of 130 per cent on any investments made in plants and machinery until the end of March 2023. This was a missed opportunity to stimulate investment in skilling up staff and apply a net zero test as well.

In another example, the Farming Investment Fund offers grants to farmers to improve their productivity and the environment. Again, this policy only awards

“Clusters of high carbon industrial activity mean that green skills policy could form part of a specific levelling up transition package.”

money for physical assets, despite persistent low productivity in the sector, low levels of formal training and widescale reshaping of agricultural policy. These are all challenges which will require new skillsets.

Both examples show a persistent undervaluing of staff skills and competencies relative to physical capital like machinery. The government may hope that businesses can buy their way to success but, without the right skills, the UK will continue along the same path of the past 20 years, with poor productivity and slow growth, lagging behind other comparable countries.

### Regional patterns

Low productivity is not a feature of every region in the country. The national average is £33.50 gross value added (GVA) per hour worked. In the South East each hour worked returns £38.40 and, in London, it is £46.40. All other regions are below the national mean, with Northern Ireland returning just £28.70 GVA for every hour worked.<sup>6</sup> As well as better transport infrastructure, London and the South East benefit from a concentration of highly skilled workers, pulling them in from other parts of the country. Higher skill levels explain around two thirds of the difference in productivity between London and the rest of the country.<sup>7</sup>

Many of the least productive regions, such as the West Midlands, North East and East Midlands, also have large proportions of people employed in high carbon industries and are, therefore, more vulnerable to job losses if workers are not helped to retrain.<sup>8</sup> Of the people who will be employed in 2030, 80 per cent are already in the workforce, so training existing staff is of critical importance to a green and just transition.

Where there are geographically concentrated risks, it will be even more important to target support to smooth the transition to low carbon practices, and ensure regions are benefiting from potential productivity gains and good quality work.

Clusters of high carbon industrial activity, in places such as Teesside, mean that green skills policy could form part of a specific levelling up transition package. For other sectors, such as energy efficiency building retrofits and the circular economy, jobs are dispersed around the country and their fragmented nature will require a different approach.



# Sector overviews

Here, we give an overview of the green skills gaps in major economic sectors: buildings, circular economy, transport, agriculture and land use, power and heavy industry. We assess the workforce expansion required in each to fill the jobs expected to be created by the government's net zero agenda.

# Buildings

## Current status

Buildings are responsible for 16 per cent of UK greenhouse gas emissions.

The sector currently employs 1.3 million people in the UK.<sup>9</sup> Most of these jobs are located in London (209,300), the South East (209,500) and the East of England (171,900). The North and Midlands, meanwhile, have comparatively few. Yorkshire and the Humber has 106,100 workers in the construction sector, the East Midlands has 91,100 and the North East just 43,100.

To meet the UK's climate target, almost all the UK's current housing stock needs to be retrofitted with energy efficiency measures and low carbon heating systems. The big challenge in this lies with a shortage of skilled workers.

Analysis by IPPR indicates that 750,000 construction workers could retire, or be on the verge of retirement, by 2035.<sup>10</sup> This coincides with the UK government's ambition to retrofit all homes to EPC band C energy rating and to phase out the sale of gas boilers. A skills shortage is also behind the postponement of the Future Homes Standard to 2025, with developers claiming they do not have the staff or skills to meet it earlier.

## Green jobs in the building sector

- **Installation** of low energy lighting and low carbon heating solutions, such as heat pumps or heat networks, and other energy efficiency measures in buildings.
- **Manufacturing** energy efficiency products such as insulation and low carbon heating equipment.
- **Maintenance** of low carbon home heating products and efficiency solutions.
- **Digital skills** for the roll out of smart meters and heating systems.<sup>11</sup>

## The future jobs market

Approximately 300,000 more skilled workers are required, comprising both new market entrants and upskilled existing workers.

The Heat Pump Association estimates that, in total, 12,400 installers will be needed by 2025 to install 300,000 heat pumps per year and 50,200 will be needed by 2030 to install one million heat pumps in total.<sup>12</sup> In building retrofit, 12,000 upskilled workers will be needed every year over the first four years, increasing to 30,000 per year up to ten years, culminating in an increase in the trained workforce of 230,000 by 2030.<sup>13</sup> By 2050, the heat network sector could create between 20,000 and 35,000 new direct jobs.<sup>14</sup> Growing UK manufacturing and the supply of heat pumps to 300,000 units a year by 2025 could create over 10,000 jobs in manufacturing.<sup>15</sup>

### Primary skills gaps

The heating sector is currently poorly equipped to respond to growth, potentially undermining the government's new heat and buildings strategy.<sup>16</sup> The primary skills gaps are:

- Domestic buildings: energy efficiency installers, retrofit co-ordinators, heat pump installers and digital professionals.
- Larger, commercial buildings: passive house designers.

### Regional case study

#### Low Carbon Academy, Greater Manchester

In July, Greater Manchester Combined Authority (GMCA) awarded funding to the Low Carbon Academy to launch a Retrofit Skills Hub that will train and upskill 1,140 people to retrofit homes.

The Low Carbon Academy will also deliver a 'Skills Bootcamp for Retrofit' programme, a 16-week flexible course to train over 200 people who are either unemployed or changing career in retrofitting skills. Those who receive training will be offered a guaranteed interview with a local employer.

Jointly, these retrofitting programmes form part of GMCA's strategy to retrofit 62,000 homes annually to reach their net zero goal of 2038.



# Circular economy

## Current status

The waste sector is responsible for six per cent of UK greenhouse gas emissions.

It currently employs 144,185 people.<sup>17</sup> For the purposes of this report, the existing circular economy jobs count is zero; jobs in the repair and rental industry are currently counted under the industries they serve, eg car rental services sit under transport.

Expanding the circular economy could create hundreds of thousands of new jobs in the UK. With a few focused policies from the Treasury, valuable products and the resources they are made of could be reused, repaired, remanufactured and recycled. Existing manufacturing skills could be drawn upon to deliver some of the new jobs required. New skills could be cultivated in declining sub-sectors, like switching from manufacturing to remanufacturing.

## Green jobs in the circular economy

- **Reuse:** resale retail staff, second hand buyers and sellers.
- **Repair:** technical engineers: electrical and mechanical.
- **Remanufacturing:** mechanical and technology engineers.
- **Recycling:** scrap collectors and waste operatives.

## The future jobs market

Growth of the circular economy and waste sectors will support between 40,000 (in a low ambition scenario) and 472,000 (in a high ambition scenario) jobs by 2035 across the UK.<sup>18</sup>

## Primary skills gaps

Gaps exist in waste sorting and reprocessing, repair and manufacturing, circular economy business planning and the material sciences.<sup>19</sup>

## Regional case study

### Renew Shops and Renew Hub, Greater Manchester

The waste and resources company Suez has partnered with Greater Manchester Combined Authority (GMCA) to open three Renew Shops in Oldham, Salford and Trafford. The shops sell pre-loved household items including furniture, hand tools and sports equipment, donated by residents at fifteen recycling sites across the region.

A Renew Hub is also being developed in Trafford Park. This will include 'repair pods' for items to be repaired and upcycled, such as bikes, electrical and white goods. The hub will employ and train local people and volunteers, and enhance skills and opportunities related to the green economy. It will also supply the Renew Shops with goods and provide a space for online sales. SUEZ will be working with charities and other businesses to run the pods. The shops and hub have created ten jobs so far, with more anticipated.



# Transport

## Current status

Transport is responsible for 31 per cent of UK greenhouse gas emissions.

The sector currently employs 1.4 million people in the UK.<sup>20</sup>

Transport is the highest emitting sector in the UK, and its emissions have risen since 1990, unlike most other industries. The challenge to decarbonise transport is not simple. There are multiple travel modes that require their own strategies. It will impact a huge number of jobs in various subsectors and supply chains that overlap with other areas of the economy, such as recycling facilities for batteries or hydrogen supply for alternative fuels.

## Green jobs in the transport sector

- **Sustainable aviation:** green aerospace engineers, alternative fuel experts and green hydrogen electrolysis engineers.
- **Electric vehicles:** charging infrastructure designers, manufacturers and operators, battery development experts, micromobility manufacturers and regulators.
- **Active travel:** urban designers and city planners.
- **Public transport:** green bus and coach manufacturers, and rail electrical engineers.

## The future jobs market

The transport sector is estimated to need an additional 175,000 employees by 2035. Automotive manufacturing will require 50,000 people to be reskilled by 2025, increasing to 100,000 by 2035-2040.<sup>21</sup> Between 7,500 and 10,000 workers could be needed in battery cell manufacturing in 2030.<sup>22</sup> There could be up to 45,000 new jobs in the aviation sector by 2035.<sup>23</sup> The rail sector will need between 7,000 and 12,000 additional workers per year over the next five to ten years, for up to 120,000 additional travellers.<sup>24</sup> And the prime minister's *The ten point plan for a green industrial revolution* reported that up to 3,000 jobs could be created by 2025 through decarbonising the transport sector.<sup>25</sup>

## Primary skills gaps

The main skills gaps in transport are in chargepoint installers and operators, vehicle scrappage and recycling experts, battery manufacturers and operators, and electrification engineers.

## Regional case study

### The West Midlands Gigafactory

The West Midlands Gigafactory is a public-private venture jointly devised by Coventry City Council and Coventry Airport. It aims to become the UK's largest gigafactory of electric vehicle batteries. The project intends that £2.5 billion of investment will help to create 6,000 local highly skilled jobs in the region, thus creating “crucial new skills for the country”.<sup>26</sup> The Faraday Institute has made recommendations to the government about the gigafactory boom, stating that efforts should be made into “the development of the requisite EV battery skills and training infrastructure required”.<sup>27</sup>

The institute is part of a group that has developed a skills framework for battery manufacturing in the UK.<sup>28</sup> Sixty three per cent of the existing automotive manufacturing workforce is subject to significant change as the transition to electric vehicles takes place.<sup>29</sup> And as the historical home of the automotive industry, the West Midlands region can be at the forefront of this revolution.

By proactively ensuring green economy requirements are met, thousands of workers in the region can develop new critical skills, such as battery system diagnostics and electrode cell assembly technicians, currently absent from the UK workforce. The gigafactory, and its plans to bring the existing workforce along in the transition, is supported by local leaders.



# Agriculture and land use

## Current status

Agriculture and land use is responsible for 12 per cent of UK greenhouse gas emissions.

The sector employs around 475,000 people in the UK with the majority in agriculture and supporting industries.<sup>30</sup> It also supports a further 30,000 jobs through procurement activity, benefiting other sectors of the UK economy.<sup>31</sup> The workforce is skilled but has a higher proportion than other sectors of workers with no formal qualifications. The future jobs market will be affected by changing agricultural and trade policy in the UK. The withdrawal of the Basic Payment Scheme and increased competition from trading partners may mean the consolidation of farm businesses.<sup>32</sup>

Forestry employs a further 16,000 people.<sup>33</sup>

The sector's contribution to the UK's carbon emissions is small, at 1.6 per cent, but it is the dominant source of the potent greenhouse gases nitrous oxide and methane, at 70 and 50 per cent respectively. Livestock and manure are responsible for over half of these emissions, while the use of fuel, machinery and farm inputs, like synthetic fertilisers, are the source of a further 40 per cent.<sup>34</sup>

## Green jobs in agriculture and land use

- **Sustainable farming** according to ecological farming principles.
- **Agroforestry and agroecology**
- **Farming advisory** for farmlands and landowners that want to change their practices.
- **Nature restoration**

As well as needing to cut its own emissions to as close to zero as possible by the middle of the century, agriculture is crucial to the net zero transition because it is one of the few sectors that can generate negative emissions. Expanding forestry and developing bioenergy with carbon capture and storage (BECCS) has the potential to draw down carbon dioxide from the atmosphere, while good husbandry can change soils from being sources of emissions to carbon sinks.

## The future jobs market

Sustainable food systems, conservation, planning, natural environment restoration and forestry offer most of the green jobs potential in this sector. Improving woodland, peatland and urban parks could create 16,000 jobs in areas experiencing the most severe unemployment challenges.<sup>35</sup> Farm advisers could be required to help farmers draw up farm management plans, including a mix of 1,200 scheme officers, generalist independent advisers and specialists.<sup>36</sup>

However, the entire agriculture and land use sector needs upskilling in some areas. To tackle nitrous oxide and methane emissions, farmers will need training to use fertilisers and manure more efficiently to reduce nitrogen loss. Shifting agriculture towards sustainable energy might require farmers to generate on-farm renewable energy or grow crops suitable for bioenergy. Analysing the sector's progress is likely to require carbon audits and planning. Providing incentives for environmental improvements will need a new set of skills, including ecological and management capabilities.<sup>37</sup>



## Primary skills gaps

The main skills gaps in agriculture are soil husbandry, carbon auditing and advice, tree and biomass management, conservation, and biodiversity expertise. In land use, wider skills are needed by land managers, surveyors and farmers to plan woodlands, plant and manage trees, and manage peatland and other habitat restoration. Forestry requires skills in remote sensing, forest carbon modelling and forest climate adaptation.<sup>38</sup> Businesses anticipate the need for more skills in agroforestry and silviculture, machine operation and digital, geographic information systems (GIS) in particular.<sup>39</sup>

### Regional case study

#### Yorkshire Peat Partnership

Yorkshire contains 27 per cent of the UK's blanket bog, a rich wildlife habitat and important store of carbon. The Yorkshire Peat Partnership works to restore degraded bogs and is a leading innovator in remote sensing techniques to monitor restoration. NASA Landsat and Copernicus Sentinel satellites are used to assess how large areas of peatland are recovering, while drone pilots capture high resolution imagery to inform future restoration. Jobs on this project are highly skilled, especially in digital and high tech manufacturing along a growing supply chain.



# Power

## Current status

The power sector is responsible for 11 per cent of UK greenhouse gas emissions.

The energy industry supports over 700,000 jobs with the renewable energy sector currently employing 67,000 people across the UK.<sup>40</sup>

Currently, the UK's offshore wind industry employs 26,000.<sup>41</sup> Onshore wind jobs peaked in 2016 with 21,000 employees, the solar sector peaked in 2014 with 20,000 employees and the nuclear energy sector currently employs just under 60,000 people.<sup>42,43,44</sup>

The UK's net zero transition hinges on the production of clean energy to power our homes, transportation systems and industries. To achieve the UK government's ambition of decarbonising the electricity grid by 2035, renewable energy capacity must be significantly increased. This requires skilled workers.

However, a significant barrier to both entry and lateral career shifts from the oil and gas sector to the renewable energy sector is the prohibitive cost of training and qualifications. A survey by Friends of the Earth Scotland found that 97 per cent of offshore workers were concerned about the cost of reskilling and that, on average, offshore workers spent £1,800 a year on training, often having to obtain overlapping qualifications or repeat past training.<sup>45</sup>

## Green jobs in the power sector

Green jobs in this sector span wind, solar, hydropower, hydrogen, nuclear, bioenergy, carbon capture utilisation and storage (CCUS) and tidal power. They fall into the following categories:

- **Manufacturing:** making renewable energy technologies, equipment and parts.
- **Construction and engineering:** building renewable energy infrastructure, such as offshore wind farms.
- **Maintenance:** repairing, refurbishing and upgrading existing renewable energy infrastructure.
- **Data analysts and digital specialists**

## The future jobs market

This sector is expected to increase by roughly 80,000 employees by 2040.

Offshore wind employment is expected to increase 170 per cent by 2026, to 70,000 employees.<sup>46</sup> Tidal power employment is expected to grow to 4,000 jobs by 2030

and 14,500 by 2040, in manufacturing, installation, operations and maintenance.<sup>47</sup>

For CCUS and hydrogen, the North Sea Transition Deal is expected to support up to 40,000 direct and indirect supply chain jobs in the sector.<sup>48</sup>

## Primary skills gaps

As both CCUS and hydrogen are emerging sectors, further research is required to understand the gaps in existing and new skills needed. The existing offshore oil and gas industry is expected to provide a large source of the skills needed for both areas, with some upskilling likely to be required.<sup>49</sup> There are no perceived skills gaps in the wind, tidal, nuclear or solar industries as these are well established in the UK.

## Regional case study

### Solar Skills, Greater London

The mayor of London and Solar Energy UK have formed a partnership to launch Solar Skills, a project that seeks to upgrade the solar supply chain in London.

The project, aimed at career switchers and secondary school leavers, will provide bootcamp-style introductory training workshops and online training, as well as a specialist placement programme that sets up apprenticeship schemes in London-based solar businesses. The project will also provide grants for these businesses, covering part of the cost of training courses to improve the skills of 100 installers in London. This partnership should help to achieve the mayor of London's target of 1GW of energy from solar by 2030.



# Heavy industry

## Current status

Heavy industry is responsible for 15 per cent of UK greenhouse gas emissions.

While still high, there has been significant progress in bringing down the level of emissions which has more than halved since 1990, due mainly to the changing structure of the UK's manufacturing sector, improved energy efficiency and a shift to low carbon fuels. However, the overall pace of reductions is now slowing.<sup>50</sup>

Around half of industrial emissions are concentrated in specific geographical areas with large concentrations of industry. This means that the high or very high emitting industries that will need to change are unevenly distributed, so some regions will be disproportionately impacted by the transition to net zero. These workforces need to be upskilled to ensure that communities reliant on high emitting industry are not dislocated by decarbonisation.

The UK's manufacturing and refining sector provides 2.5 million direct jobs across the country, as well as over five million indirectly such as in sales and logistics.

## Green jobs in the heavy industry sector

Green jobs in this sector will span existing industries in a more sustainable way, as well as new sectors, such as:

- **Green steel:** this includes electric arc furnace operators and developers, with CCUS.
- **Hydrogen production:** R&D, production, transportation, distribution and storage, various end uses in industry.<sup>51</sup>
- **Carbon capture and storage:** R&D, welders, pipe fitters, machine installers and technician.<sup>52</sup>
- **Green infrastructure:** digital broadband; port upgrades to facilitate the construction of offshore wind farms.

## The future jobs market

Close to half a million jobs could be created if the UK maximises its export capability through investment in green infrastructure. This could be in R&D for hydrogen and CCUS infrastructure, creating 43,000 jobs in the decarbonisation of industrial sectors, like steel and cement, reaching 221,000 if the UK becomes a major hydrogen exporter.<sup>53</sup> It could also be in green infrastructure like digital broadband. Port upgrades could create over 150,000 jobs.<sup>54</sup>

## Primary skills gaps

Creating green hydrogen (hydrogen produced through electrolysis from renewable energy) requires similar skillsets to those used in the chemical industry.<sup>55</sup> Minor upskilling could meet the demands of this sector, which is projected to account for nearly a third of UK hydrogen production by 2050.<sup>56</sup> Workers in oil, gas and fossil fuel electricity generation already possess many of the important skills needed for CCUS.<sup>57</sup> Switching from high carbon to clean steel production would require additional training to equip the workforce to operate electric arc furnaces.<sup>58</sup>

## Regional case study

### Decarbonising the Humber Cluster

Yorkshire and the Humber has the highest annual emissions per capita in the UK. There are more jobs in the high and very high emissions categories than the national average: 15 per cent compared to 12 per cent across the UK. There are 360,000 people working in the high or very high emitting jobs likely to be affected by the move to a low carbon economy, which is also likely to have a knock on effect on the thousands of indirect jobs associated with these industries.<sup>59</sup>

The Humber cluster is the UK's largest source of industrial emissions, so its decarbonisation is critical to the growth of the green economy. In 2019, Drax Group, Equinor and National Grid Ventures announced the Zero Carbon Humber partnership, a strategic partnership to explore how a large scale CCUS network and hydrogen production facility could be constructed in the Humber industrial cluster in the mid-2020s. Delivering this is expected to protect 55,000 existing jobs in the region and create 49,000 new roles, while supporting skills, apprenticeships and educational opportunities.<sup>60</sup>

This decarbonisation project would be underpinned by the deployment of CCUS to enable the decarbonisation of power and industry. The cluster is close to the southern North Sea, an ideal area for CO<sub>2</sub> storage, giving it an important regional advantage. It is estimated that, by 2030, 15MtCO<sub>2</sub> a year would be captured from the region, reaching 53MtCO<sub>2</sub> a year in 2050.<sup>61</sup>



# Existing green skills policy is too weak

“There is still no national skills plan for achieving net zero.”

To improve its understanding of how to prepare the workforce for net zero, the government announced the creation of the Green Jobs Taskforce in November 2020. This has made recommendations in three themes: driving investment, building pathways to green careers and a just transition for workers. The recommendations are strong, yet they lack an institution able to take them forward. Their focus is also too narrow, for example they overlook the important nature and circular economy sectors.

The 2021 Net zero strategy has built on the government’s ambitions to plug skills gaps in the British economy while working towards its environmental targets. The strategy committed to grow the taskforce’s work on post-16 training programmes to deliver a lifetime skills guarantee for green workers. It also pledged that a reformed skills system would be legislated to support green jobs and promised a sustainability and climate change strategy for education services. This will “equip children and young people with the knowledge and skills they need to contribute to the green economy”.<sup>62</sup>

However, several aspects of the government’s skills policy fail to embed the environment as a central tenet. It took the House of Lords to push for the Skills and Post-16 Education Bill to require environmental goals to be considered during the development of local skills strategies, and there is still no national skills plan for achieving net zero.<sup>63</sup> Similarly, the Department for Environment, Food and Rural Affairs (Defra) is collaborating with the Department for Education (DfE) on a skills gap plan that will identify the skills shortages that must be overcome to reach the government’s biodiversity targets, but there is currently no equivalent for meeting net zero emissions by 2050.<sup>64</sup>

# Recommendations

“The rapid evolution in green skills requires detailed monitoring and more granular labour market intelligence.”

The government needs to take an integrated approach to this challenge. First, it must ensure that the environment is embedded in new legislation, whether on skills or levelling up and, likewise, that skills are embedded in any forthcoming green legislation. This will avoid the need to retrofit proposed legislation, as has happened with the recent net zero amendments to the Post-16 Education Bill.

Beyond this, and to ensure that the necessary green skills are developed to underpin a thriving future economy, the government must focus on three areas: industry, institutions and individuals.

## Industry

Industry has two roles: it creates demand for skills but it can also help existing employees learn new skills as businesses change and adapt. But, to do this on green skills it needs support in the following four areas:

### 1. A framework for green jobs

The government should develop a national framework for green jobs that is regularly updated, outlining the skills required for the transition and where additional efforts are required to deliver environmental objectives. The Green Jobs Taskforce began this but it needs to be a continuing area of work not a single exercise. It should be integrated into government and not an external board. The government's view of the future economy and the jobs and skills required will be crucial to providing the necessary incentives for industry to recognise opportunities in the green economy, and the skills it needs or can supply. We support the Green Jobs Taskforce's recommendation that a UK-wide body should take this forward.

### 2. Local skills plans

With a national level view of the economy, the new UK-wide body should engage with, and empower, local authorities and regional mayoralities to deliver local skills plans that reflect the dynamics of local environments. This would secure long term labour market development away from sectors that will shrink as decarbonisation progresses. These partnerships would ideally involve universities and colleges.

### 3. Skills intelligence for individual sectors

The rapid evolution in green skills requires detailed monitoring and more granular labour market intelligence. The new national body should also support industry to encourage sector-led boards which bring together a range of stakeholders, employers, trade associations, unions and education providers to provide ongoing skills intelligence. The National Skills Academy for Rail is a model for such an organisation, as is the work of the Engineering Construction Industry Training Board.

#### **4. Create a super-deduction for skills**

The Treasury's super-deduction has proved a success in increasing business investment for a time limited period. However, the design of the tax relief was limited to physical capital, with no guidance around using the £24 billion to support the green transition. The Treasury should launch a new successor scheme which, if linked to the national framework, would provide relief to businesses investing in green skills training, and the necessary shift in business processes that will create the demand for them.

### **Institutions**

Educational institutions will deliver the skills required for the future economy, but currently they are in the dark about what is required and so cannot take the business opportunity to provide new courses and modules in green skills. There are two areas where assistance is needed:

#### **1. New green courses**

The new framework should be used to help education providers develop new courses in the green economy. Understanding the needs in their local area will help institutions provide skills over the long term. Where there is a particular dearth of skills, providers will need strategic funding to launch new courses, especially as demand grows. Education providers already engage in recruitment activities, such as careers fairs and employment advice. Understanding the landscape of a green workforce will be important to helping them match potential recruits with the right training programmes. There is a clear role for the Careers and Enterprise Company and university careers services. DfE should help integrate the framework into new careers guidance.

#### **2. Green modules in other courses**

Green skills are not confined to green jobs. As the Environmental Audit Committee recently recommended, all courses should contain environmental modules. Doctors will need to understand how to reduce waste on hospital wards, auditors should understand the emissions implications of investments and shop owners should be able to successfully identify sustainable products. The national board should work with these sectors to identify the modules that can support green skills in other roles.

### **Individuals**

Individuals need to acquire and use new skills in the green economy. To encourage them to take up the opportunities, the government should support them in three ways:

#### **1. Increase knowledge around green skills and their benefits**

Green Alliance's previous research with Public First found that 'green jobs' is still a term confined to Westminster. A public facing campaign should tackle the biggest barriers the public perceive, emphasising the long term and high quality nature of these jobs across the country. This would complement efforts by industry and new green courses at institutions.



“Support for the unemployed should increase the emphasis on and support for green skills.”

## **2. Increase financial security**

Whilst the majority of green skills will be delivered by those entering the labour market for the first time, some will need to be developed by existing workers, around techniques, technologies or materials, even if they remain working in the same industry. Information matters, but those learning new skills will also require loans, grants and maintenance support to reduce the financial risks of transferring jobs. In the oil and gas sector, retraining is currently prohibitively expensive. At a time of limited resources, the government should focus on addressing the biggest gaps in skills supply identified by its framework.

## **3. Use existing work programmes to boost green skills**

Support for the unemployed should increase the emphasis on and support for green skills, whether in widening job centre retraining to focus more on green skills or equipping work coaches with better knowledge of the green economy and regional variations.

Targeted schemes like Kickstart or new apprenticeships should be used to promote green skills. Just one per cent of Kickstart scheme jobs are in green sectors. The environment should be embedded in these from the outset. The government could also replicate its ‘bootcamp’ model for level 4+ training in digital skills for priority green skills.

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## **Closing the UK's green skills gap**

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### **Green Alliance**

Green Alliance is a charity and independent think tank, focused on ambitious leadership for the environment. With a track record of over 40 years, Green Alliance has worked with the most influential leaders from the NGO and business communities. Green Alliance's work generates new thinking and dialogue, and has increased political action and support for environmental solutions in the UK.

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