



Green Jobs and Skills in South London

Final report

A WPI Economics and Institute for Employment Studies Report for South London Partnership

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About South London Partnership

The South London Partnership is a cross-political party sub-regional collaboration of five London boroughs: Croydon, Kingston upon Thames, Merton, Richmond upon Thames and Sutton.

Working together and with partners in and beyond our area, SLP champions and seeks to build on the many strengths of South London as a place for people to live, work and thrive. We are ambitious for our future – for the opportunities it can offer people and businesses and for the contribution we can make to London and the whole of the UK. Building on many years of collaborative working, SLP focuses on issues where working together can add value to what individual boroughs could achieve on their own.

Acknowledgments

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Executive Summary

This report examines the potential scale and nature of green jobs across the South London sub-region. This report is accompanied by the cross-London reportⁱ as well as reports for each of London's three other sub-regional partnerships.

Councils in South London will play a vital part in helping to deliver net zero. Based on extensive stakeholder engagement, Boroughs across South London are engaged in a number of crucial activities in relation to decarbonising the energy supply, homes and buildings and working with businesses. These activities, as well as the wider drivers in South London, are helping to drive the green economy of the future in the capital.

Modelling for this report takes a mission-based approach to defining the green economy and identifying green jobs in South London, building on the Green Jobs Taskforce definition. This was applied to Low Carbon and Environmental Goods and Services (LCEGS) data from kMatrix (a consultancy) and Data City's guided machine learning tool in order to provide an estimate of the number of green jobs in South London. This was then combined with a number of assumptions and use of datasets including research from the Climate Change Committee (CCC) and ONS (Office for National Statistics) labour force and business surveys to create a series of projections for future numbers of jobs, as well as to provide additional skills analysis.

Green jobs in South London today

South London has just over 1 in 7 of the capital's green jobs, totalling 19,200 green jobs in 2020. This represents 4.2% of the sub-region's total jobs.

- Power accounts for over 2 in 5 (41.1%) green jobs in South London, and for 1.5% of total employment in the sub-region. South London concentrates almost 1 in 10 green jobs in Power in the capital.
- Homes and Buildings represent almost 1 in 3 (32.4%) green jobs in South London, and 1.3% of total employment in the sub-region. Just over 1 in 10 of London's green Homes and Buildings jobs are in South London.
- Despite its relatively small size, representing 5.2% of green jobs in the sub-region, Climate adaptation, green infrastructure and reducing localised pollution is the green sector whose employment is most concentrated in South London, which hosts almost 1 in 5 (17.5%) of all London jobs in this industry.

At a borough level:

- Green jobs are a higher proportion of overall employment in Richmond upon Thames (7.3%) than any other borough, having the highest number of jobs in almost all green sectors.
- Sutton, the borough with the highest level of green jobs, in absolute figures and as a proportion of overall employment, stands out for its relatively high concentration of Reduce, Reuse and Recycle jobs.
- Croydon has a relatively higher number and concentration of Low Carbon Transport jobs, in comparison to the rest of South London.
- In general terms, the biggest sources of green employment across the boroughs are Homes and Buildings and Power, relatively consistently.

Overall, we estimate the green economy in South London was worth £2.9 billion in terms of sales in 2020.

Green skills in South London today

Workers in green jobs in South London are predominantly in higher level managerial, professional and associate professional occupations¹ – 61% are in these three occupational groups, which compares with 53% of green workers across the country as a whole, but below the proportion of green workers across the whole of London (70%). Skilled craft manual workers (e.g. electricians and plumbers) are over-represented in green jobs in South London in comparison with the whole of London. There is variation by sector, with jobs in Power and Green Finance/Consultancy sectors being predominantly professional and associate professional, while the largest group in sectors related to Homes, Buildings and Infrastructure, and Reduce, Reuse, Recycle is skilled craft workers.

More than half (54%) of South London residents in green jobs have degrees (above the proportion of graduates in all jobs in South London of 52%, and the proportion of graduates in green jobs across the UK as a whole of 38%). The vast majority of workers in Power and Green Finance/Consultancy sectors are graduates, although in Homes, Buildings and Infrastructure and Reduce, Reuse, Recycle the proportions of graduates are lower, at around 25%.

There are higher than average proportions of male workers, and white workers, in green jobs compared with all jobs in South London. Furthermore, the green workforce has an older than average age profile, in comparison with all workers in South London.

Analysis at the national level shows that green business tend to draw relatively few workers straight from education, and rely more on workers from other sectors. In South London, the pool of workers likely to have green-related skills but working in other sectors is around four times as large as the number of green workers, although this potential supply is only twice as large as the workforce in the Power and Homes, Buildings and Infrastructure sectors.

There are around 6,000 learners in Further Education (19+) and in apprenticeships (all ages) in relevant subject areas to green jobs. These represent nearly 30% of the current green workforce, higher than the level across the whole of London (18%), indicating a relatively large education and training pipeline at Further Education (FE) level within South London. The Higher Education (HE) institutions serving South London produce a relatively large number of business/finance and maths/computing graduates in relation to the numbers of graduate workers in green jobs with degrees in these subjects, although much smaller numbers of graduates in engineering and physical/environmental sciences in relation to the size of the graduate workforce with these degrees in green jobs.

Green jobs in South London in the future

This report sets out projections for the number of green jobs in the future, using three scenarios (low, central, high) to account for uncertainty of future activity to meet net zero and its impact on the growth of the green economy (such as the speed of innovation in low carbon technology, the rate of uptake and behaviour change, and how far future Government policy encourages change). The total number of jobs in the central scenario is projected to rise from 19,000 in 2020 to 65,000 in 2050,

¹ Example green occupations by occupational group for key green economy sectors in South London can be found in the annex of this report. For examples in further sectors, please refer to Chapter 3 the [cross-London report](#).

representing a 3-fold increase. Overall, these figures represent very fast growth of South London's green economy over the next three decades. With regard to individual sectors:

- Power remains the sector with the largest employment in the sub-region's green economy throughout the projected period, albeit concentrating a decreasing share of total employment (from just above 40% in 2020 to just over one third in 2050). This is a result of a relatively modest growth, just above 50%, from 2020 until 2030 and from the latter until 2050.
- Homes and Buildings remains the second largest sector in the sub-region, with a share of total employment that, despite remaining just below one third between 2020 and 2030, falls to 24.9% by 2050. This is a result of a more intensive growth rate during the first decade of our projections, doubling its employment numbers between 2020 and 2030, which only increase by a further 30% between 2030 and 2050.
- Low Carbon Transport is projected to become more prominent in the sub-region's green economy, increasing its share of green employment from 5.8% to 16% in 2050. In 2030, Low Carbon Transport is projected to employ 5,500 people, 5 times more than in 2020, further increasing to 10,400 by 2050 (9 times more than in 2020).
- Starting from a very small level in 2020, Industrial Decarbonisation, Hydrogen and Carbon Capture is the sector with the highest predicted growth, increasing its employment 8 times between 2020 and 2030, and almost 30 times by 2050. Growth rates are even more impressive in the high scenario, which predicts an 18-fold increase by 2030.

Other smaller sectors are also projected to experience very large growth rates until 2050, with Climate Change Research and Development; Climate Change Strategy, Policy, Monitoring and Planning; and Green Finance employing between 7 and 8 times more people in 2050 than in 2020. There will be a small positive impact of a change to net zero policies in South London, increasing overall net employment by around 3,900 jobs in 2030 and around 1,700 jobs in 2050.

Future skills projections

Under the central scenario, the fastest growth rate is projected for skilled craft workers (118% increase to 2030), and this occupation group is also projected to experience the largest increase in numbers of workers (5,600 increase). Under the high growth scenario, skilled craft workers will increase by nearly 13,000, or 270%.

In addition to the growth in numbers, there will be a need to replace workers who retire or leave the labour market. It is estimated that this replacement demand represents one third of the current employment level, with only minor variation across the occupational groups.

These projected total demands for workers in green jobs in the central scenario are large in relation to the outputs from Further Education and Higher Education, and especially so for skilled craft workers. The annual increase in consultancy-based jobs represents around one seventh (14%) of the annual output from education and training, while the annual increase in craft-based job is almost as large as the total education and training output in craft-based subjects (accounting for 90% of the annual education and training output).

Jobs at risk of decarbonisation in South London

We identify 40,000 of South London's 441,000 jobs are in sectors likely to undergo significant change in the green transition, representing 9% of employment in the sub-region (within the range of 4-12% for the rest of the capital).

For South London the key findings are:

- Construction and Land Transport are the largest exposed sectors, respectively accounting for over half and over a quarter of jobs in South London's exposed industries.
- Construction has a lower proportion of non-white workers than compared to all industries across London (24% versus 36%), and the national data suggests it is male dominated (14% of workers are women, compared to an average of 48% across all industries). The sector also tends to employ fewer younger workers and a greater number of older workers than other industries.
- Land Transport is part of the Transport and Storage industrial sector. This sector has a much higher proportion of non-white workers than compared to all industries across London (55% versus 36%). Sector data broken down by gender at a London level is only available in the combined Transport and Communication grouping, in which 39% of workers identified as female. This is higher than the Transport and Storage average across Great Britain, but below the all-industry average. The Transport and Storage sector also employs fewer younger workers (under 25), but also fewer older workers (over 50) than the average of all industries.

Recommendations

The analysis in this report highlights a few areas where there is a potential for central, London, and local Government to work with stakeholders to fully realise the benefits of the net zero transition

- **Long term policy certainty and clarity:** This has been identified as a key contributor towards green jobs and growth, by providing the long-term signals needed by firms, workers and providers. The Net Zero strategy goes some way to creating this through the high-level signals and intentions, but the CCC has highlighted a range of areas where more concrete actions are required to translate this into delivery.ⁱⁱ **Local authorities, together with the Mayor and London Councils**, have a role in making the case to Central Government to deliver on the CCC's recommendation.
- **Shape skills provision to equip London's future green workforce: Employers, sector bodies and skills providers** need to work together to help shape skills provision, including adult education, so that a pipeline of skilled individuals is available to support delivery plans for net zero and other environmental goals, including reskilling opportunities for existing workers.
- **Promote the opportunities of the green economy:** Shaping skills provision needs to be supported by careers information, advice and guidance to promote opportunities in green sectors to learners and increase progression rates to employment within green sectors. **Skills providers, schools, employers and industry bodies** have a role in delivering this.
- **Monitor the growth of the green economy:** **London government** should measure the growth of the green economy over the coming years using a consistent framework, and identify areas

where there are challenges in meeting skills needs which are holding back growth and limiting our ability to tackle emissions.

1. Introduction

Policymakers and stakeholders across London have a critical opportunity to put meeting net zero targets at the heart of the capital's economic recovery from the pandemic. Delivering this is a necessity in order to meet the ambitious target of net zero across the capital by 2030.

Analysis in the Green jobs and skills Cross London report suggests that this presents real economic potential for the city; a green economy could provide over a million jobs by 2050 based on a net zero policy pathway.ⁱⁱⁱ This would be reflective of a growth rate for the green economy that is bigger than previously identified growth rates for the digital economy. Furthermore, London would see an overall net increase in jobs.

Seizing this agenda is vital not just for the Capital itself, but also for the whole of the UK. London has a major contribution to make in driving a strong economic recovery across the UK, and in growing and strengthening the industries that will underpin the green economy of the future.

The green recovery in South London

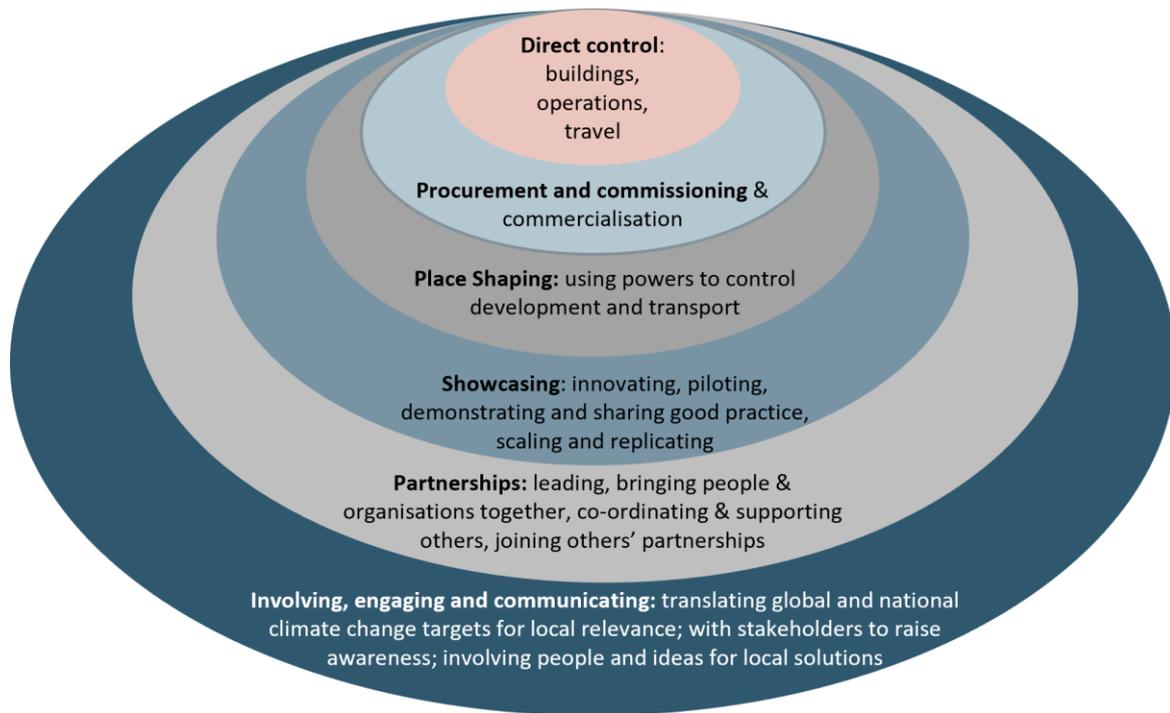
The South London Partnership is the sub-regional partnership for South London, made up of member boroughs Croydon, Kingston, Merton, Richmond and Sutton. Throughout this report, unless otherwise stated, 'South London' refers to this collection of boroughs. This area has a population of 1.2 million, and key sectors in the South London economy include wholesale, retail, human health and social work, professional services, admin and support services and education.

As a whole, data on claimant counts suggest the employment outcomes of South London residents in the first months of the pandemic were less affected by the pandemic than those of London on the whole.^{iv} However, this masks some variation within South London boroughs; those with higher claimant rates at the onset of the pandemic, such as Croydon and Merton, were most affected by the ensuing rise in unemployment.^v There was a more significant detrimental impact on GVA as a result of the coronavirus pandemic, with a 12.1% drop in GVA in 2020 marking a sharper drop than the London and UK average drops of 10.4% and 11.4% respectively.^{vi}

Delivering a green economy at a borough level

Councils in South London will play a vital part in helping to deliver net zero and a green recovery. Although as organisations themselves they are only generally responsible for 2-5% of the emissions of a local area they are well placed to play an additional role in a variety of ways. These are summarised by the below diagram (figure 1), which was reproduced by the Climate Change Committee (CCC) in a document to support the Sixth Carbon budget.

Figure 1: How local authorities control and influence emissions



Source: CCC Sixth Carbon Budget^{vii}

Our engagement with South London Partnership's member boroughs shows that local authorities are ambitious in their aims, taking on a range of actions under various strands outlined in the above diagram. For example, among other activities, boroughs are encouraging residents to adopt changes to reduce their carbon footprint, incorporating requirements of construction and other contractors to align with carbon reductions, and coordinating a range of local actors – including businesses and academia – to collaborate to address the climate crisis.

Activity from the private sector is also critical for reaching net zero. The sub-region is the location for a number of company HQs, including ones with a focus on decarbonisation, such as Dearman, which has developed zero emission refrigerated road transport, and Mott Macdonald, a consultancy which integrates sustainability consulting across its areas of activity.

South London faces a number of challenges. Its population is on the whole highly qualified, with over half of the population holding qualifications of NVQ 4 equivalent or higher.^{viii} However, alongside this high level of qualified residents are pockets of skills deprivation (with 80,000 residents holding no or low skills), and many residents commute out of the sub-region for work. In addition, GVA lagged behind the London average prior to the pandemic, which has itself had a particularly detrimental impact on GVA – the 12.1% drop in GVA for 2020 was sharper than the London and UK average reductions of 10.4% and 11.4% respectively.^{ix} In our consultation with stakeholders, we also heard about various challenges specific to meeting net zero, such as resource not matching ambitions, challenges of retrofit in different types of property and specialist skills required to deliver net zero activity.

However, the green economy offers considerable opportunity for the subregion and builds on its existing assets; a highly qualified population, existing hubs of major company HQs (such as those of Subsea7, Mott MacDonald, eBay and the National Physical Laboratory), natural capital in locations such as Richmond Park and the London Wetlands, a number of local universities and a higher than average number of start-ups (which experience better survival rates than the London average).^x

A range of local activities supporting net zero and the foundations for a green economy are outlined below.

The built environment: New and existing buildings

The built environment is an area where local authorities can flex their place-shaping powers to align activity with net zero ambitions and promote the development of green skills and jobs. For example, Merton Council has reviewed its draft Local plan policies and set ambitious climate change targets for new developments. As well as supporting net zero, this will also stimulate demand for green jobs and skills.

Box 1: Passivhaus schools in Sutton

Sutton is home to the UK's first 'true net zero carbon' school and its first secondary Passivhaus school.

Harris Academy Sutton, located on the London Cancer Hub campus, has been built to an ultra-high energy efficient standard, with very high levels of insulation and airtightness to achieve Passivhaus standards. The energy consumption of the building is 80% lower than for a standard building, while providing a good learning environment for pupils through fresh air circulation.^{xi} With a focus on scientific disciplines, the school is integrated into the campus both physically and as part of its education and skills remit, supplying a pipeline of skills to the London Cancer Hub.

Hackbridge Primary School is the UK's first true net zero carbon school and designed to the Passivhaus Plus standards.^{xii} The building has triple glazed windows, a highly efficient ground source heat pump system and sufficient photovoltaic coverage to offset 100% of annual energy demands.^{xiii}

Box 2: BedZED eco-village

The BedZED development is the UK's first large-scale, mixed use sustainable housing development. It comprises 100 homes, integrating high levels of insulation and passive solar heating design, as well as green roofs which contribute to a sustainable drainage system (SuD). The development was completed in 2002, and in addition to its existing built-in sustainability, it reduced its consumption of electricity and gas by 27% and 36% respectively between 2012 and 2015.^{xiv}

The energy it does require comes from renewable sources, some of which are generated on site, including 770m² of photovoltaic panels for solar energy produces 30,000kwh of zero-carbon electricity a year, and a wood-burning combined heat and power plant for further heat and electricity generation.^{xv} The site has its own district heating system supplied by a biomass boiler.

The development is further designed to encourage sustainable behaviour for residents. For example, it provides fewer parking spaces per property than usual suburban developments, while providing ample bike storage space both outdoors and in a number of the properties.^{xvi}

Decarbonising energy

A number of existing schemes are in place to provide low-carbon sources of energy in the sub-region. The London Borough of Sutton has a long-held vision to decarbonise the Borough. One of its flagship projects to achieve this is the Sutton Decentralised Energy Network (SDEN), which has been developed by its wholly owned ESCo subsidiary 'Sutton Decentralised Energy Network Ltd'. Phase 1 of the project began supplying low carbon heating and hot water in 2017. The purpose of SDEN is to

create heat networks across the borough to serve domestic and commercial premises, primarily using waste heat from the Viridor Energy Recovery Facility (ERF), and other future sources may be added.^{xvii}

Moreover, all of South London Partnership's member boroughs have registered for the Solar Together group buying scheme, aimed at take-up of solar energy by individuals and SMEs. Sutton has also installed solar panels on its own buildings, generating 190,000 kWh of electricity and cutting CO₂ emissions by 97,000kg annually.^{xviii} Merton has installed solar panels on 44 council-owned buildings, including 27 schools, and the Council is finalising the appointment of a solar PV and design company, with plans to install and expand systems wherever feasible across its building portfolio.^{xix}

Boroughs are also in the scoping and planning processes for developing new heating schemes. For example, Kingston Council and Thames Water are planning the first scheme in the UK using excess heat from the sewage treatment process to power over 2000 homes.^{xx} Croydon has commenced a ground-source heat pump pilot in an estate in New Addington, while Merton has investigated opportunities for developing a heat network in the borough.^{xxi}

Convening stakeholders and harnessing local expertise

Boroughs have highlighted the need for a multi-stakeholder approach to tackling the climate crisis, and their role in convening partners to drive this forward. Kingston has been developing the Transition to a Green Economy Working Group, focused on greening local businesses and developing a skills action plan with neighbouring boroughs, the Greater London Authority and other local partners. Meanwhile, Croydon Council in partnership with the New Economics Foundation has formed the Croydon Crisis Commission, comprised of councillors and other local stakeholders such as Croydon Friends of the Earth, Croydon TUC and Croydon Citizens' Assembly. A key recommendation from its final report was for the promotion of partnership working between local stakeholders, including the education, business and voluntary sectors and the council, to deliver the scale of change needed to meet climate ambitions.

Box 3: South London Knowledge Exchange/BIG

The South London Knowledge Exchange/BIG is a network of knowledge hubs, fostering collaboration between Small and Medium Enterprises (SMEs) and universities with the aim of supporting growth, high quality jobs and provide an innovation pathway. BIG is the result of a partnership between South London Partnership, its member councils, education providers (including London South Bank University (LSBU), Wimbledon College of Art, Kingston University, University of Roehampton, South Thames College Group), and other local bodies such as chambers of commerce, business innovation districts and innovation centres. Through its activities, it aims to attract investment to the sub-region, provide flexible workspace for start-ups, foster more collaboration between its institutions and address its relatively low productivity.^{xxii}

Among the Exchange's aims is to provide a platform for research and innovation in environmental sustainability; for example, the Science and Innovation Centre in Croydon, managed by LSBU, supports growth of the low-carbon built environment, bringing in the university's expertise in photovoltaic and battery technology, carbon capture and imaging.^{xxiii}

The role of local businesses in the green economy

Recognising the role of the private sector in achieving a net zero transition and expanding the green economy, there is a range of activities led both by councils and businesses themselves. For example,

in partnership with Sustainable Merton and Merton's Climate Action Group (a community-led group launched by the Council in January 2021 to foster community action on climate change), the Council is supporting the development of a circular economy hub in Merton. The Croydon Reuse Organisation advocates for the reuse of materials, and supports residents in learning new skills to be able to reuse materials to avoid their disposal.^{xxiv} To support small and micro businesses to improve their environmental sustainability, Kingston Council has launched the Green Business Challenge, a pilot scheme where 15 local micro and small businesses can receive free environmental audits in addition to funding to implement environmental improvements.^{xxv} Participating businesses will be accredited and can achieve a Green Mark certificate.^{xxvi} Other activity from the Council to engage businesses to transition to the green economy includes a series of Think Green events in 2021 in partnership with the Kingston Chamber of Commerce and the RAISE fund, which will offer grants of up to £25,000 for local businesses' proposals to recover from the impacts of the pandemic and take advantage of the green economy.^{xxvii}

Bridging business and council activity, councils are also adapting their procurement approaches and requirements to align with net zero goals. For example, Merton reviewed the procurement of its school meals to ensure appointed contractors were ambitious in addressing climate change, and has developed a new Social Value Charter which captures environmental and wider social benefits; this provides a mechanism for considering the impact of climate change mitigation for relevant contracts. Richmond's Sustainable Procurement Strategy will embed circular economy principles to the council's procurement approach and implement a framework with measurable aims.^{xxviii}

We also heard that councils are considering how they may be able to facilitate the expansion of the local green economy. Kingston Council is planning to increase light industrial space by 67km² (gross) in response to demand currently outstripping supply, with hopes this will pave the way for green industries to be located there.^{xxix} Similarly, Sutton's successful bid for the Mayor's High Streets for All funding, aimed at boosting the economic recovery of local high streets, was centred on the role for high street businesses in tackling the climate emergency.^{xxx}

Green and blue spaces

As well as areas of development and regeneration, boroughs are also considering how green and blue spaces can contribute to the achievement of net zero targets and wider environmental goals. South London has a significant amount of green and blue space – Merton has 28% tree cover, one of the highest proportions of all London boroughs,^{xxxi} while Richmond is home to the London Wetlands Centre and Sites of Special Scientific Interest (as designated by Natural England) and a National Nature Reserve in Richmond Park. Both boroughs have ambitions to build upon these assets; Merton is currently in the process of developing a Tree Strategy to establish clear aims, policies, and an action plan to improve the management of Council owned tree assets, and will be collaborating with the National Trust to train people in using drones and repairing equipment to manage green spaces.^{xxxii} Richmond has stated an ambition to become the greenest borough in London.^{xxxiii} A third of Croydon is green belt, and the borough is home to 74 Sites of Nature Conservation importance.^{xxxiv} Croydon has developed action plans for its major ecological habitats such as its woodlands, while Kingston council has piloted the Wildways Strategy, adapting mowing regimes on highway verges to improve biodiversity.^{xxxv} Kingston has launched the Social Spaces project, a public realm initiative which will deliver three temporary planting and seating schemes across many sites. As well as additional spaces to sit, the schemes will increase greenery in the sites and support biodiversity, while at the same time enabling local businesses to expand outdoor eating space.^{xxxvi}

The London Borough of Sutton, identifying high risk areas for surface water flooding, has been delivering sustainable urban drainage systems (SuDS) in a number of local schools, alleviating flooding risk for over 100 properties and supporting climate resilience in the local area; the projects have disconnected over 4.5 hectares of land from the surface water drainage system.^{xxxvii}

Definition and methodology

As discussed in more detail in the [cross-London report](#), to develop a common definition of ‘green jobs’ for London, we conducted a review of existing definitions of ‘green jobs’ – and related concepts, such as the green economy and sectors – from UK statistics, research- or mission-specific uses and academia, and held roundtables and interviews with a range of stakeholders to gather feedback on the potential approaches. With practicality, applicability and political salience in mind, we have adapted the approach employed by the Green Jobs Taskforce to better reflect London’s labour market and business makeup, informed by our literature review and stakeholder engagement. This definition comprises the following sectors, adapted from those of the Green Jobs Taskforce to reflect London’s economy.

Mission-based definition: proposed sectors for a London based definition

Net zero focus

1. **Homes and buildings:** Including retrofit, building new energy-efficient homes, heat pumps, smart devices and controls, heat networks and hydrogen & electric boilers;
2. **Low carbon transport:** Including low or zero emission vehicles, aviation and maritime, rail, public transport and walking or cycling;
3. **Power:** Including renewables (such as wind, solar and hydropower), nuclear power, grid infrastructure, energy storage and smart systems technology;
4. **Business and industry:** including hydrogen production and industrial use, carbon capture, utilisation & storage (CCUS) and industrial decarbonisation;
5. **Green Finance:** The concentration of financial activity in London means that in our context Green Finance could be a key area to separately identify;
6. **Climate change research & development:** Including private sector, academic and public research;
7. **Climate change strategy, policy, monitoring and planning:** Including public, private and NGO sector strategy and policy, outreach to citizens, environmental monitoring and use of planning system to achieve net zero;
8. **Climate adaptation:** Including flood defences, retrofitting of buildings to be resilient to extreme weather/climate events, nature-based solutions to reduce climate impacts and civil and mechanical engineering for infrastructure adaptation;

Broader environmental goals (may have some impact on climate change goals)

9. **Reducing localised pollution:** Including air pollution, water pollution and noise; London has ambitious goals across all three of these areas;
10. **Reduce, reuse, recycle:** Including waste management and circular economy;
11. **Green and blue infrastructure:** Within a London context this will focus on urban green and blue infrastructure, and include activity aimed at increasing biodiversity directly or through offsetting;

Source: WPI Economics

Due to limitations of available data, we have combined three of the above sectors – climate adaptation, green and blue infrastructure and reducing localised pollution – for each of the sub-regional reports.

3. Green jobs in South London today

Overall, our analysis finds that this sub-region has just over 1 in 7 of the capital's green jobs, totalling 19,200 green jobs in 2020. This represents 4.2% of the sub-region's total jobs. Within these, the top sectors, also among the most prominent across London as a whole, are Power and Homes and Buildings. These two sectors account for almost 3 in 4 of the sub-region's green sector jobs. As with other analysis in this report, further detail on the data and methodology can be found in the earlier [cross-London report](#).

Table 1: Number of green jobs in South London, 2020

Sector	Definition	South London	
		Numbers of jobs	% of total employment
Power	Including renewables (such as wind, solar and hydropower), nuclear power, grid infrastructure, energy storage and smart systems technology	7,900	1.7%
Homes and Buildings	Retrofit, building new energy-efficient homes, heat pumps, smart devices and controls, heat networks and hydrogen boilers	6,200	1.3%
Reduce, reuse, recycle	Waste management and circular economy	1,900	0.4%
Low Carbon Transport	Low or zero emission vehicles, aviation and maritime, rail, public transport and walking or cycling	1,100	0.2%
Climate adaptation, green infrastructure and reducing localised pollution	Including flood defences, retrofitting of buildings to be resilient to extreme weather/climate events, nature-based solutions to reduce climate impacts and civil and mechanical engineering for infrastructure adaptation; Urban green infrastructure, including activity aimed at increasing biodiversity directly or through offsetting; Reduction of air pollution, water pollution and noise	1,000	0.2%
Climate change Research and Development	Including private sector, academic and public research	480	0.1%
Climate change strategy, policy, monitoring and planning	Including public, private and NGO sector strategy and policy, outreach to citizens, environmental monitoring and use of planning system to achieve net zero	410	0.1%
Industrial decarbonisation, hydrogen and carbon capture	Including hydrogen production and industrial use, carbon capture, utilisation & storage (CCUS) and industrial decarbonisation	110	0.0%
Green finance	Structured financial activity that's been created to ensure a better environmental outcome	100	0.0%
Total		19,200	4.2%

Source: WPI Economics calculations based on data supplied by kMatrix on their Low Carbon Environmental Goods and Services methodology and The Data City, and ONS Business Register and Employment Survey for total employment by sub-region

A few interesting data points to consider in relation to present day green jobs in South London:

- Power accounts for over 2 in 5 (41.1%) green jobs in South London, and for 1.5% of total employment in the sub-region. South London concentrates almost 1 in 10 green jobs in Power in the capital.
- Homes and Buildings represent almost 1 in 3 (32.4%) green jobs in South London, and 1.3% of total employment in the sub-region. Just over 1 in 10 of London's green Homes and Buildings jobs are in South London.
- Despite its relatively small size, representing 5.2% of green jobs in the sub-region, Climate adaptation, green infrastructure and reducing localised pollution is the green sector whose employment is most concentrated in South London, which hosts almost 1 in 5 (17.5%) of all London jobs in this industry.
- Compared to the cross-London picture, Green Finance, account for a considerably lower share of the sub-region's green employment (0.5%, compared with 21.6% in London).

Table 2 on the following page sets out these results further broken down on a borough level basis. In order to maintain the robustness and credibility of these figures, we have not represented the specific number in the table where it falls under 50. Broadly the sector specific numbers outside the larger sectors (such as Power and Homes and buildings) should be treated with some caution given their size.²

Some key insights to note in relation to the larger sectors include:

- Green jobs are a higher proportion of overall employment in Richmond upon Thames (7.3%) than any other borough, having the highest number of jobs in almost all green sectors.
- Sutton, the borough with the highest level of green jobs in absolute figures and as a proportion of overall employment stands out for its relatively high concentration of Reduce, Reuse and Recycle jobs.
- Croydon has a relatively higher number and concentration of Low Carbon Transport jobs, in comparison to the rest of South London.
- In general terms, the biggest sources of green employment across the boroughs are Homes and Buildings and Power, relatively consistently.

² As with any data analysis, there is a confidence level around the accuracy of the data. Much of our underlying data is supplied by kMatrix, who monitor the confidence level through a rigorous source selection process. Confidence levels vary by activity, geography and by forecast year. All borough level employment data has a confidence level of over 80%,

Table 2: Green jobs estimates by borough, South London Partnership, 2020

	Climate adaptation, green infrastructure and reducing localised pollution	Climate change Research and Development	Climate change strategy, policy, monitoring and planning	Green finance	Homes and Buildings	Industrial decarbonisation, hydrogen and CCUS	Low Carbon Transport	Power	Reduce, reuse, recycle	All Green Jobs
Croydon	50	90	70	<50	1,080	<50	350	1,590	360	3,600
Kingston upon Thames	<50	70	50	<50	810	<50	200	1,220	240	2,700
Merton	<50	60	50	<50	750	<50	170	1,030	260	2,400
Richmond upon Thames	650	140	140	<50	2,210	<50	190	2,280	440	6,100
Sutton	70	130	100	60	1,370	<50	160	1,770	620	4,300

Source: WPI Economics calculations based on data supplied by kMatrix on their Low Carbon Environmental Goods and Services methodology and The Data City

Table 3: Green jobs as a proportion of all employment; estimates by borough, South London Partnership, 2020

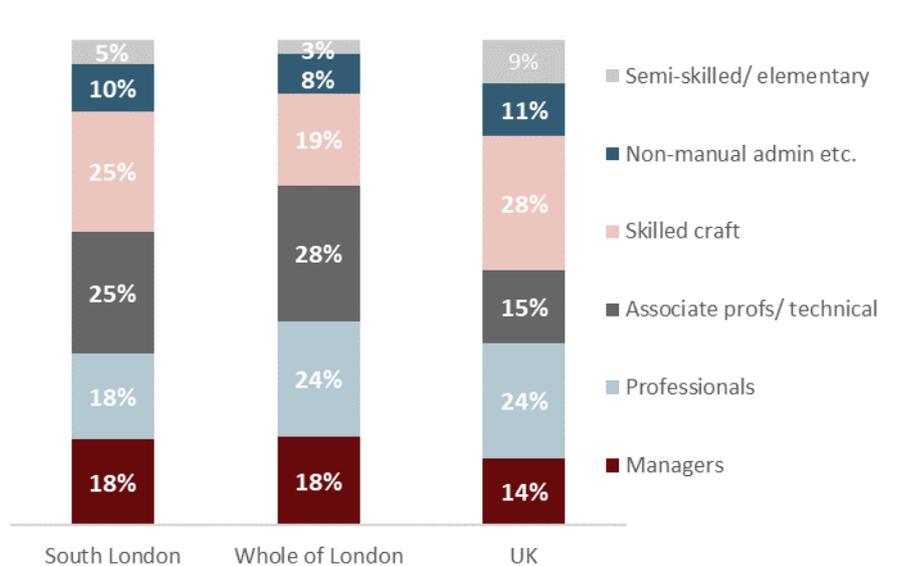
	Climate adaptation, green infrastructure and reducing localised pollution	Climate change Research and Development	Climate change strategy, policy, monitoring and planning	Green finance	Homes and Buildings	Industrial decarbonisation, hydrogen and CCUS	Low Carbon Transport	Power	Reduce, reuse, recycle	All Green Jobs
Croydon	0.0%	0.1%	0.1%	-	0.8%	-	0.3%	1.2%	0.3%	2.8%
Kingston upon Thames	-	0.1%	0.1%	-	0.9%	-	0.2%	1.4%	0.3%	3.0%
Merton	-	0.1%	0.1%	-	0.9%	-	0.2%	1.2%	0.3%	2.8%
Richmond upon Thames	0.8%	0.2%	0.2%	-	2.6%	-	0.2%	2.7%	0.5%	7.3%
Sutton	0.1%	0.2%	0.1%	0.1%	1.9%	-	0.2%	2.4%	0.8%	5.8%

Source: WPI Economics calculations based on data supplied by kMatrix on their Low Carbon Environmental Goods and Services methodology and The Data City

Occupational patterns of employment

In comparison with green jobs across the whole of London, green jobs in South London are over-represented among skilled craft occupations, and under-represented among professional occupations. One in four South London residents who work in green jobs (25%) are in skilled craft roles, compared with 19% across the whole of London (but below the national proportion of 28%). Meanwhile, 18% of green workers in South London are in professional occupations, below the pan-London proportion of 24%. The proportions in managerial occupations, and in associate professional/technical occupations, are similar to those across the whole of London.

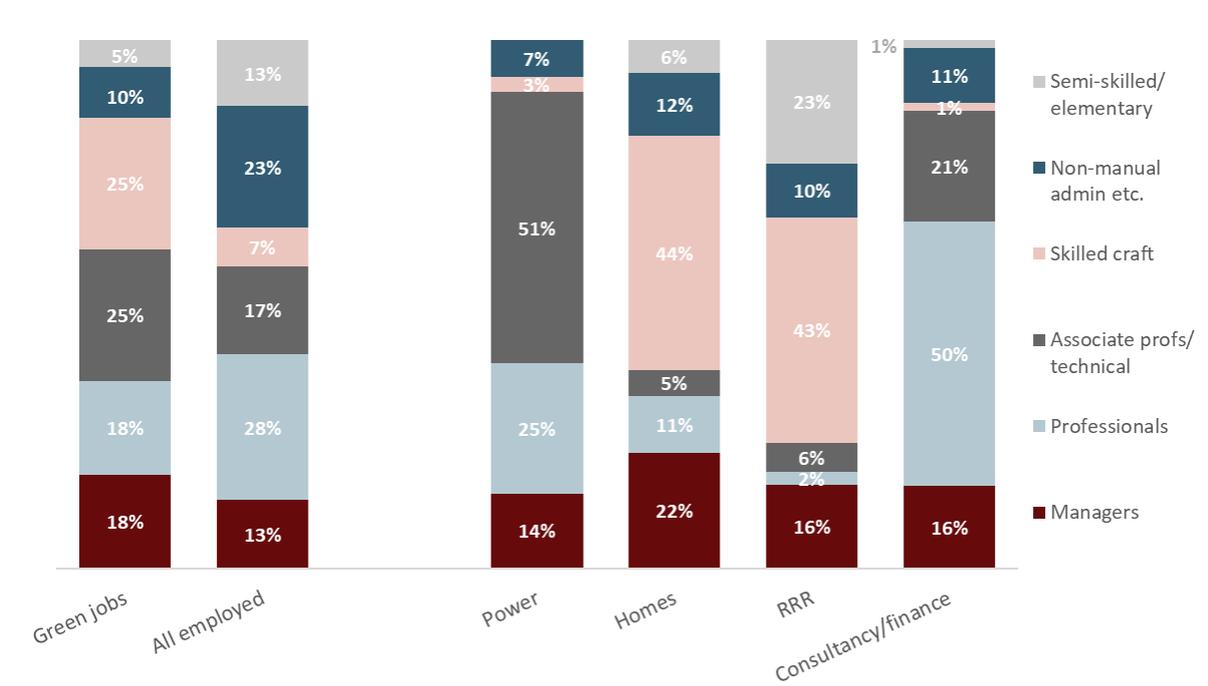
Figure 2: Green workers by major occupational group, South London, whole of London, and UK



Source: Quarterly Labour Force Survey, Jan-Mar 2020 to Oct-Dec 2020 combined

Figure 3 shows the occupational breakdown of green jobs in South London in comparison with all jobs pan-London and in the UK. Managerial and associate professional jobs are over-represented in green sectors, although the proportion of professional occupations in green sectors is below the overall proportion (18% and 28% respectively). There are more than three times as many skilled craft jobs in green sectors compared with all sectors (25% and 7% respectively). Figure 3 also shows the breakdown within each of the four broad sectors within green jobs. Within the power sector, half of all jobs are in associate professional or technical occupations, while in consultancy and finance, 50% of jobs are in professional occupations. Within the Homes, Buildings and Infrastructure, and Reduce, Reuse, Recycle (RRR) sectors, the largest occupational group is skilled craft workers, and while these sectors have low proportions of professional and associate professional occupations, there are large proportions in managerial occupations.

Figure 3: Green workers by major occupational group in comparison with all workers, and by green sub-sector, South London, 2020



Source: Quarterly Labour Force Survey, Jan-Mar 2020 to Oct-Dec 2020 combined

Detailed occupations

The sample size for the power sector in outer London in the Labour Force Survey is below the recommended threshold for reliable estimates, and so it would not be safe to draw conclusions for this sector in the outer London sub-regions from the Labour Force Survey data. The pan-London profile has therefore been used for the power sector and so the main detailed occupations in this sector in South London will be the same as those presented for the whole of London in the pan-London report.

Within the **homes, buildings and landscape** sector in South London, electricians and electrical fitters are the largest group (15% of all jobs in this sector in South London, compared with 14% in UK), followed by production managers and directors in construction (9%, compared with 4% in UK), gardeners and landscape gardeners (9%, compared with 17% in UK), and plumbers and heating and ventilation engineers (8%, compared with 14% in UK).

Within the **reduce, reuse, recycle** sector in South London, electricians and electrical fitters are the largest group (15% of all jobs in this sector in South London, compared with 4% in UK), followed by vehicle valeters and cleaners (10% compared with 3% in UK), managers and proprietors in other service sector (8%, compared with 1% in UK), metal working production and maintenance fitters (6%, the same proportion as in the UK as a whole) and refuse and salvage occupations (5%).

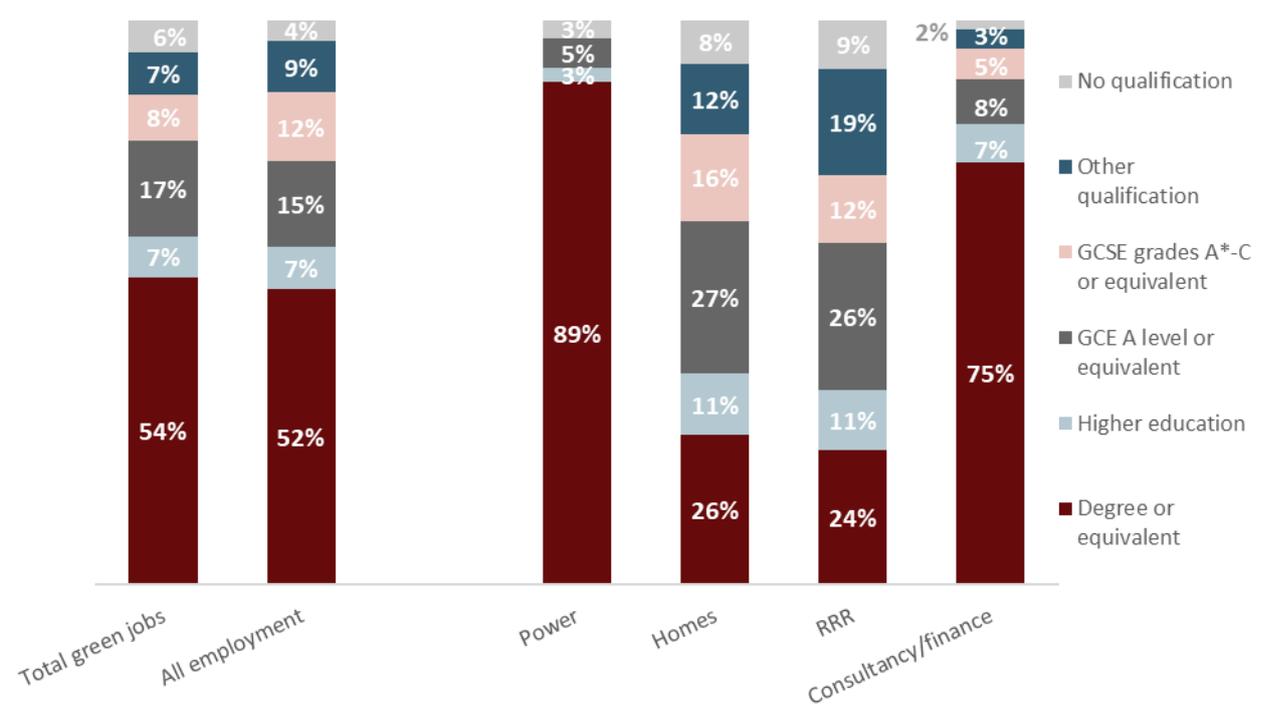
Within the **consultancy and finance sector** in South London, management consultants and business analysts are the largest group (16% of all jobs in this sector in South London, compared with 8% across the country as a whole), followed by programmers and software development professionals (4%), sales accounts and business development managers (4%), general administrative occupations (4%) and chartered surveyors (3%)

Qualifications

Residents in South London who work in green jobs are highly qualified. Just over half (54%) of workers in green jobs in South London hold first³ degrees or equivalent or higher qualifications, slightly higher than the proportion of all South London workers with qualifications at this level (52%), although it is below the proportion of green workers across the whole of London with at least a first degree or equivalent (65%). Across the UK, 38% of green workers have first degrees or equivalent or higher qualifications, 8% had HE qualifications below degree level, and 26% had A-levels/Level 3 qualifications as their highest qualifications.

The vast majority of workers in the power sector are graduates (89%), as are three quarters of workers in consultancy/finance. Around one in four workers in homes, buildings and landscape, and reduce, reuse, recycle, are graduates, and similar proportions have qualifications at NVQ level 3/A-levels or equivalent.

Figure 4: Highest qualification level of green workers in comparison with all workers, and by green sub-sector, South London, 2020



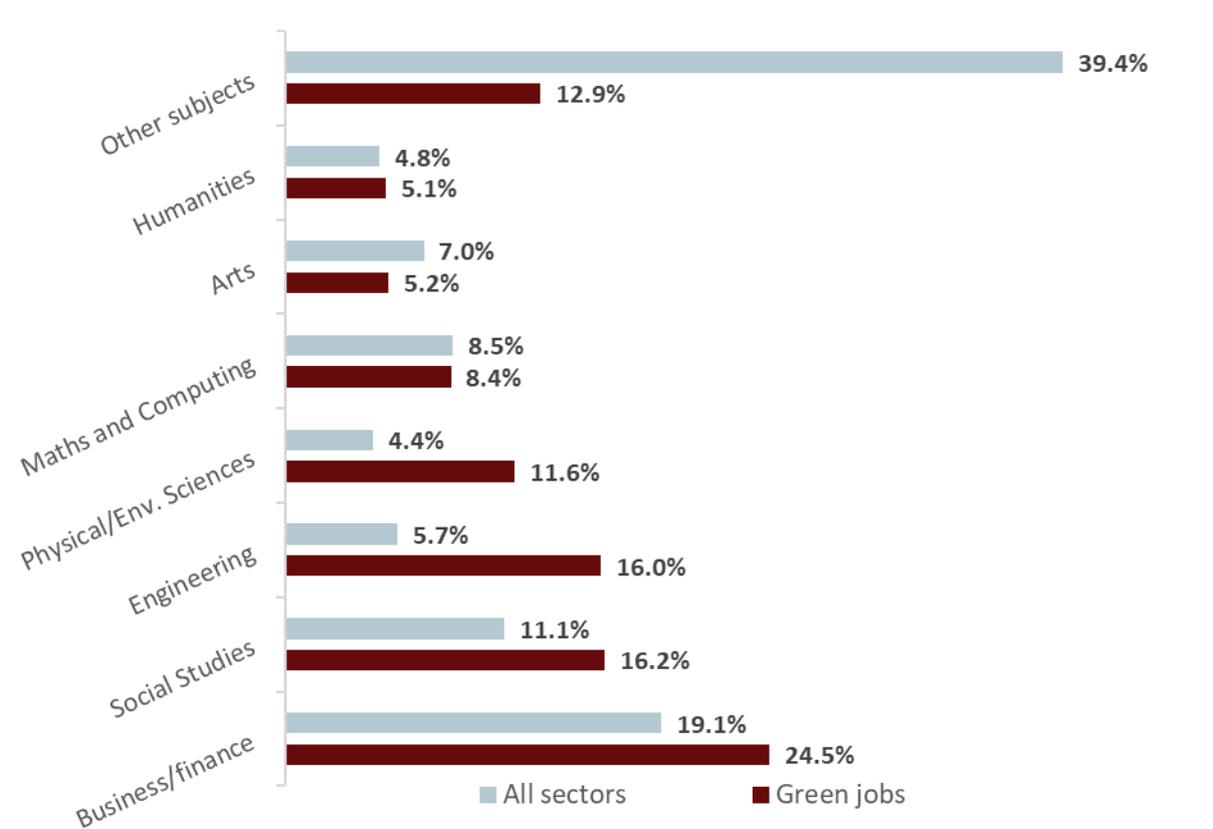
Source: Quarterly Labour Force Survey, Jan-Mar 2020 to Oct-Dec 2020 combined

The most common degree subjects among graduate workers in green jobs in South London are business/finance, and social studies, accounting for 25% and 16% of all graduate green workers respectively. Both groups are over-represented in green jobs compared with all sectors. The proportion of graduate workers with degrees in engineering is nearly three times as high among green sectors compared with all sectors (16% compared with 6%) and there the over-representation

³ “First degrees” in this report refer to the first degree obtained (e.g. BA, BSc) rather than the grade achieved.

of physical/environmental science graduates is slightly higher, at 12% of green workers compared with 4% of all graduate workers.

Figure 5: Graduate workers in green jobs by degree subject in comparison with all graduates, South London, 2020



Source: Quarterly Labour Force Survey, Jan-Mar 2020 to Oct-Dec 2020 combined

In South London, the largest vocational subject areas among workers in green jobs were building and civil engineering, accounting for one in three workers, compared with 6% of workers with vocational qualifications across all sectors, and electricity and energy, accounting for 29% of green workers with vocational qualifications, compared with 3% across all sectors. On the business side, qualifications in finance, banking and insurance were held by 9% of green workers with vocational qualifications, and qualifications in statistics and broad business and administration programmes were over-represented among green workers.

Table 4: Proportion of workers in green jobs and in all sectors with vocational qualifications by subject area, South London

	Green jobs	All sectors
Building and civil engineering	33.1%	5.9%
Electricity and energy	28.9%	2.9%
Finance banking insurance	9.2%	4.9%
Engineering and manufacturing trades	5.5%	1.2%
Statistics	4.1%	0.4%
Broad programmes in business and admin	3.6%	2.3%
Proportion of all workers with one of the above	84.4%	17.5%

Source: Quarterly Labour Force Survey, Jan-Mar 2020 to Oct-Dec 2020 combined

Demographics

The green workforce in South London is very male-dominated, and with a much higher proportion of white workers than across all sectors. This is in line with the patterns for the whole of London. Just over three quarters of all green workers in South London are male, compared with just over half of workers across all sectors, although this proportion is much lower in Consultancy and Finance, at 57%, than in the other three broad sectors.

Nearly one in five green workers across all green sectors (19%) are from Black, Asian and Minority Ethnic backgrounds, half of the overall level across all sectors (38%). The proportion of workers from Black, Asian and Minority Ethnic backgrounds is highest in the Consultancy and Finance sector (40%) followed by the Reduce, Reuse, Recycle sector (32%).

Green workers in South London are older on average than all workers – just under one in three green workers (30%) are aged under 35, compared with 33% of all workers in South London and 33% of green workers across the UK, while 49% of green workers in South London are aged between 35 and 54, compared with 47% of all workers (and 45% of green workers in the UK). 21% of green workers are aged over 55, compared with 19% of all workers (and 22% of green workers in the UK).

Table 5: Demographic breakdown of green jobs within our definition, South London

	All green jobs	All sectors	Power	Homes	Reduce, re-use and recycle	Consultancy/finance
Male	77%	53%	77%	81%	76%	57%
Female	23%	47%	23%	19%	24%	43%
White	81%	62%	94%	74%	68%	60%
Black, Asian and Minority Ethnic	19%	38%	6%	26%	32%	40%

Source: Quarterly Labour Force Survey, Jan-Mar 2020 to Oct-Dec 2020 combined

Skills supply

The investigation of skills supply for green sectors looked at three topics:

- The current flow of people into green jobs, allowing us to understand where these individuals have come from and the likely scale of future supply from these sources.
- The number of people in other sectors that have the requisite skills and could be attracted to green jobs in the future.
- Current provision of courses in further and higher education which could provide individuals with the requisite skills.

Flows of labour/skills into green sectors

This analysis, conducted at a national level rather than local level because of sample size issues in the Labour Force Survey, found that the bulk of new entrants to green jobs came from those working in other sectors, and that relatively few new entrants came straight from education. Of the total workforce in green jobs, only 1% had been in full-time education in the year before, compared with the average across all sectors of 3%. This suggests that green sectors tend to draw staff primarily from those already in employment, who may have developed appropriate transferable skills through their initial employment, rather than directly recruiting those straight from education. To meet the rapid growth projected in green jobs (presented below), it is likely that employers will continue to draw staff from other sectors, at least in the short term while the education and training sector and green employers forge closer links to meet employers' needs for green skills.

In terms of where new entrants from other sectors come from, entrants from manufacturing are a major source for all four broad sectors, while construction was a key source for homes, buildings and landscape, and ICT and professional services sectors were important for consultancy and finance. (Full details of the results are presented in the pan-London report.)

Workers with potential green skills outside of green sectors

The second of the skills supply topics examined is an investigation into the potential supply of skills that currently exist in the South London labour market, but are employed in non-green sectors. This analysis identifies the number of workers in the key occupations for each of the four broad green sectors who are working in non-green sectors, to quantify the number of people with potentially relevant skills for green jobs who are working in non-green jobs, and understand the potential pool of labour that green sector employers could draw on. So, for Homes, Buildings and Landscape, we estimate the numbers of workers in the key green occupations (such as electrical and plumbing trades and production managers in construction) who are working outside of the sub-sectors that make up the Homes, Buildings and Landscape sector, for example, in other non-green parts of Construction or in other sectors such as manufacturing – thus workers in green-related jobs but not working in green sectors. Given the finding above about the low level of entrants straight from full-time employment, in-flows from other sectors are the main source of new labour and skills for green sectors.

Table 6 shows that overall, the size of this potential supply is four times as large as the number of green jobs, although there is substantial variation between the four sectors. The potential supply for consultancy and finance is some 37 times the size of the workforce, while for power, and homes, buildings and landscape, the potential supply is around twice as large as the current workforce, and for reduce, reuse, recycle it is around four times as large. This suggests that skills shortages are much more likely to emerge within homes, buildings and landscape, and in power in South London, than in the other two broad sectors. Other research^{xxviii} has identified that there are current skills shortages for many of the key roles in some green sectors (electricians and plumbers in the homes, buildings and infrastructure sector, engineers and technicians in power), which combined with the relatively smaller pool of potential labour in these sectors, means that employers in these sectors face the “double whammy” of current shortages and a relatively small pool of skills to draw on. There is likely to be considerable value for Further Education apprenticeship providers in focusing their efforts on increasing provision in these areas given the size of likely increases in demands from employers.

Table 6: Number of green jobs and workers in key occupations for each sector that are currently working in other sectors, South London

	Power	Homes	RRR	Consultancy/ finance	Total green
Green jobs estimate	7,900	8,410	1,900	990	19,200
Workers in key occupations in other sectors	16,500	15,700	7,400	37,000	76,600
Potential supply / current jobs	209%	187%	389%	3737%	399%

Source: Quarterly Labour Force Survey, Jan-Mar 2020 to Oct-Dec 2020 combined

- In the power sector, the bulk of the potential supply is among associate professional occupations across a wide range of sectors, with the largest numbers in the financial services and ICT sectors, but also in manufacturing, and wholesale/retail.

- Skilled craft workers in other construction sectors outside of green sectors make up a quarter of the potential supply for the home, buildings and landscape sector, and there is also potential supply at managerial level elsewhere in construction, and in the real estate and administration/support services sectors.
- The main areas of potential supply for the reduce, reuse, recycle sector are skilled and semi-skilled manual workers in transport, and managers in manufacturing.
- The financial services sector is a major source of potential skills at managerial, professional and associate professional levels for the consultancy/finance sector, accounting for almost one third of the total potential supply, and three quarters of the potential supply of associate professional skills. Professional workers with relevant skills can also be found in the public administration and professional services sectors, while managers can be found across most service sectors, particularly ICT, professional services, administrative and support services, and wholesale and retail.

South London residents studying in Further Education (FE)

Table 7 shows trends in numbers of adult (19+)⁴ learners living in South London boroughs who were studying for qualifications at Level 2 and above in curriculum areas associated with green skills from 2014/15 to 2018/19 (the most recent full academic year for which data are available by location and subject area). The total number of learners has remained broadly stable at around 3,000, which represents 16% of the current employment level in green jobs in South London, above the average across the whole of London of around 10%.

Looking in more detail, the number of learners at Level 2 has remained stable, although the number of learners at Level 3 has fallen by nearly one fifth over the five-year period, from 700 in 2014/15 to just below 600 in 2018/19. At Level 2, there has been a decline in learners in the largest subject areas in 2014/15, of 80% in transport operations and management, and 18% in business management, although these have been offset by increases in the other subject areas, including the introduction of provision in environmental conservation in 2018/19.

The flows analysis of new entrants to the sector found that nationally, only 1% of workers in green sectors had entered from full-time education in the previous year into the sector. Applying that proportion to the South London workforce suggests that the sector recruits around 200 workers from full-time education, which is equivalent to 7% of the relevant provision in FE each year, below the proportion across the whole of London of around 10%. It should be also remembered that new entrants to green sectors from full-time education will include some people who studied subjects outside of these core areas in the definition of relevant provision.

⁴ The analysis in this report covers 19+ learners, as these are the data available that can be split by location / provider. In addition to these learners, there will be some 16-18 learners in FE colleges studying subjects relevant to green courses (and not on apprenticeships, where data is also presented). The size of this group (in terms of relevance for our analysis) will be relatively small, as it is likely that a high proportion will progress to study either at 19+ in FE, or in HE, for which we present the data. Thus, while our estimates will be a lower bound on the relevant FE learners, this will not fundamentally change our view of the mismatch between supply and demand.

Table 7: Numbers of Further Education learners in qualifications associated with green skills, South London

	2014/15	2015/16	2016/17	2017/18	2018/19	% change 2014/15- 2018/19
Level 2						
Accounting and Finance	151	193	181	353	398	163.6
Building and Construction	192	114	150	366	445	131.8
Business Management	811	1,208	836	790	625	-22.9
Engineering	97	114	150	282	392	304.1
Environmental Conservation	9	0	0	0	113	1155.6
Manufacturing Technologies	37	6	50	81	161	335.1
Transportation Operations and Maintenance	1,076	746	705	535	201	-81.3
Level 3						
Accounting and Finance	141	156	157	147	125	-11.3
Building and Construction	112	110	144	123	114	1.8
Business Management	264	259	295	308	192	-27.3
Engineering	129	153	101	76	98	-24.0
Environmental Conservation	0	0	0	0	0	-
Manufacturing Technologies	0	1	1	11	12	-
Transportation Operations and Maintenance	63	37	23	18	44	-30.2
Above Level 3						
Accounting and Finance	74	99	109	107	60	-18.9
Building and Construction	6	9	8	3	4	-33.3

Business Management	4	15	17	5	1	-75.0
Engineering	30	39	58	45	45	50.0
Environmental Conservation	0	0	0	0	0	-
Manufacturing Technologies	0	0	0	0	0	-
Transportation Operations and Maintenance	6	1	7	2	0	-100.0
Total	3,202	3,260	2,992	3,252	3,030	-5.4

Source: Department for Education, Education and Training by Sector Subject Area

Table 8 shows the proportion of total adult (19+) provision for South London residents in the largest publicly-funded Further Education providers. It should be noted that colleges do not fit neatly into sub-regional partnership footprints, and that provision for South London residents may be delivered by providers in other sub-regions, or even elsewhere in the country. Key points to note are:

- South Thames College is the largest provider for adult learners in the South London Partnership area, accounting for half of all building and construction provision, and one third of all engineering provision (including delivery of engineering provision from the Wandsworth campus). The college covers learners in Kingston, Merton and Sutton.
- Richmond upon Thames College accounts for one third of provision in accounting and finance, but also covers building and construction, engineering, and business management.
- Croydon College is the other major college within South London, and offers provision in building and construction, business management, engineering and transportation operations and maintenance.
- Richmond and Hillcroft Adult and Community College provision is mostly focused on accounting and finance, but is also slightly over-represented in engineering provision.

In addition to these providers, London Skills & Development Network offers adult provision in engineering, manufacturing technologies, and transport operations and maintenance in Croydon, with nearly 500 learners in 2018/19. Furthermore, some South London residents study green-related subjects at colleges located outside of the South London Partnership boundary, with some residents from Merton studying engineering at South Bank Colleges (Lambeth College), and some residents in Croydon and Kinston are enrolled on the Level 2 environmental conservation course at West London College.

Table 8: South London residents learning green-related qualifications at publicly-funded FE providers in South London, 2018/19

	Accounting and finance	Building and Construction	Business Management	Engineering	Manufacturing Technologies	Transportation Ops and Maintenance	All green-related subjects
South Thames Colleges Group	9.3	52.6	5.7	32.5	9.8	20.0	21.0
Richmond upon Thames College	31.9	3.6	1.5	2.1	0.0	0.0	7.6
Croydon College	0.0	6.0	4.9	4.1	0.0	3.7	3.5
Richmond And Hillcroft Adult and Community College	17.8	0.0	1.6	6.9	0.0	0.0	5.1
All providers above	61.6	62.2	13.7	45.6	9.8	23.7	37.1
Total learners (number)	583	563	818	535	173	245	3,030

Source: Department for Education, Education and Training by Sector Subject Area

Apprenticeships

In addition to the potential supply of new labour market entrants from the Further Education (FE) sector, there is a pool of apprenticeship learners combining on-the-job training with study in college. Table 9 shows the latest apprenticeship starts and achievements in sector subject areas that are relevant for green jobs in South London, based on borough of residence of learners.

Across the three relevant sector subject areas there were 2,700 starts in 2018/19, representing 14% of the current employment level in green jobs, above the pan-London figure of just over 8%, although slightly smaller than the number of adult learners in FE at Level 2 and above. The number of FE learners and apprenticeship learners combined represents 30% of the green workforce in South London, compared with 18% across the whole of London. Thus, green employers in South London have a relatively large pool of Further Education and apprenticeship learners to draw on to meet their current and rapidly growing future needs.

Apprenticeship starts in *construction, planning and the built environment* accounted for 4% of all apprenticeship starts (the same proportion as across the whole of London), although it accounts for a

slightly higher proportion of intermediate apprenticeships (i.e. at Level 2). The number of starts at intermediate level is substantially lower than the number of learners studying in Further Education at Level 2, while the number of starts at advanced level is slightly lower than the number of Level 3 learners, and the number of higher apprenticeship starts is substantially higher than the small number of Further Education learners above Level 3; thus provision above Level 3 is mostly in apprenticeships whilst provision at Levels 2 and 3 is mostly in Further Education. Starts in **engineering and manufacturing technologies** are higher than in construction, accounting for 10% of all apprenticeship starts, and 13% of all intermediate apprenticeship starts. By contrast, **business, administration and law** accounts for three fifths all higher apprenticeship starts, and just over one third of all starts.

The patterns of apprenticeship achievements by subject sector area and level are broadly in line with the patterns of starts. Overall, there were nearly 400 achievements in the skilled craft subject areas of construction and engineering (14% of total achievements in these subjects across the whole of London), and over 500 achievements in business subjects (12% of total achievements across London), in the 2018/19 academic year.

Table 9: Numbers of Apprenticeship starts and achievements in qualifications associated with green skills, South London, 2018/19

	Starts		Achievements	
	Number	% of total	Number	% of total
Construction, Planning and the Built Environment				
Intermediate Apprenticeship	100	6.8	70	8.4
Advanced Apprenticeship	80	4.0	20	1.8
Higher Apprenticeship	60	4.2	0	0.0
Total	240	4.4	90	4.1
Engineering and Manufacturing Technologies				
Intermediate Apprenticeship	190	12.8	150	18.1
Advanced Apprenticeship	330	7.5	130	11.4
Higher Apprenticeship	20	1.4	0	0.0
Total	540	9.9	280	12.8
Business, Administration and Law				
Intermediate Apprenticeship	250	16.9	190	22.9
Advanced Apprenticeship	820	9.9	280	24.6
Higher Apprenticeship	860	60.1	70	31.8
Total	1,930	35.5	540	24.8

Source: Department for Education, Apprenticeships Data Pack

Current provision in Higher Education (HE) in South London

Turning to *HE provision*, London has a large student population, and the two large universities covering South London – Kingston and Roehampton – teach around one in ten of all HE first degree students in London⁵, while London South Bank University and Greenwich University are located just outside the SLP area.

Table 10 presents data on the estimated numbers of workers in green jobs with degrees in the main subject areas related to green jobs in South London (based on the data presented above of qualifications of green workers), along with data on undergraduate student numbers in those same broad areas in the large South London HE institutions. One in four green workers (25%) have degrees in business and finance, very similar to the proportion of undergraduate provision (26%). The next largest subject areas are social studies and engineering (each accounting for 16% of graduate workers), and these subjects account for a much lower proportion of university provision in South London – 9% and 6% respectively. There is relatively little provision in physical/environmental sciences, while maths and computing accounts for 8% of all provision in South London universities, the same as the proportion of maths and computing graduates in green jobs.

The table also presents the size of the annual cohort in each subject area (assuming three years of first degree undergraduate study) in relation to the size of the graduate workforce with degrees in that subject area. This gives an indication of the ratio of new graduates to current green workers within each subject area, albeit bearing in mind that a large proportion of graduates in these subjects will not necessarily go into green jobs, and that green employers recruit relatively few staff straight from education. The annual flow of graduates with engineering degrees into the labour market is around one quarter of the size of the green workforce with engineering degrees, while in physical/environmental sciences, the flow of graduates is smaller in relation to the employed graduate population, representing just 12% of the employed workforce. In business and finance, and maths and computing, the annual supply of graduates is nearly three quarters of the employed workforce with degrees in these subjects. Thus, the flow of graduates from South London universities is much larger in relation to the number of graduate workers in green jobs in the subject areas of business and finance, and maths and computing, than for engineering, and physical/environmental sciences.

⁵ St Mary's University, Twickenham and Wimbledon College of the Arts also cover South London, but are smaller in terms of total student numbers and have very little provision in the subject areas closely related to green jobs.

Table 10: Undergraduate student enrolments in London Higher Education providers in relation to workforce size for selected broad subject areas, South London

	Green jobs		HE provision			HE Cohort as % of employment
	% of graduate workers	Estimated number	Total first degree enrolments	Estimated annual cohort	% of total	
Business / finance	24.5	2,600	5,600	1,900	25.2	73.0
Social Studies	16.2	1,700	1,900	600	8.5	37.3
Engineering	16.0	1,700	1,300	400	5.7	25.1
Physical / Env. Sciences	11.6	1,200	400	100	1.9	11.5
Maths and Computing	8.4	900	1,900	600	8.3	70.8

Source: Quarterly Labour Force Survey, Jan-Mar 2020 to Oct-Dec 2020 combined and HESA student numbers 2019/20

There is a split in the type of provision between the two universities, with Kingston being the sole provider for engineering, physical/environmental sciences, and maths, while Roehampton accounts for 70% of business and finance provision. Numbers of undergraduate students are very similar in social studies and in computing between the two universities.

The value of the green economy in South London

The green economy represents substantial value to the South London economy. Our mapping of the LCEGS dataset to the 11 green economy sectors we have identified allows us to report the total revenue each sector accounts for, in combination with our bespoke Data City company lists for the two sectors not covered by LCEGS. In total we estimate that the 11 green economy sectors accounted for around £2.9 billion in 2020/21, with Power and Homes and Buildings together accounting for over two thirds of this total. Estimates for each sector are presented below.

Table 11: Estimated value of green economy sales for 2020/21 by sector

Sector	Estimated sales
Power	£1.2 billion
Homes and Buildings	£1.0 billion
Reduce, reuse, recycle	£0.27 billion
Low Carbon Transport	£0.17 billion
Climate adaptation, green infrastructure and reducing localised pollution	£0.11 billion
Climate change Research and Development	£0.07 billion
Climate change strategy, policy, monitoring and planning	£0.06 billion
Green finance	£0.02 billion
Industrial decarbonisation, hydrogen and carbon capture	£0.02 billion
Total	£2.9 billion

Sources: WPI calculations based on kMatrix Low Carbon and Environmental Goods and Services estimates and Data City calculations for climate adaptation / green and blue infrastructure (allocated proportionately to job estimates in each sub-region).

Notes: We have had to project total sales from 2017/18 figures for LCEGS, as more up to date figures for London had not been published by the time of writing. We updated 2017/18 figures in line with national growth, as reported in kMatrix (2021) - <https://kmatrix.co/uk-lcegs/>. Numbers may not sum due to rounding.

4. Projecting green jobs and skills in South London in the future

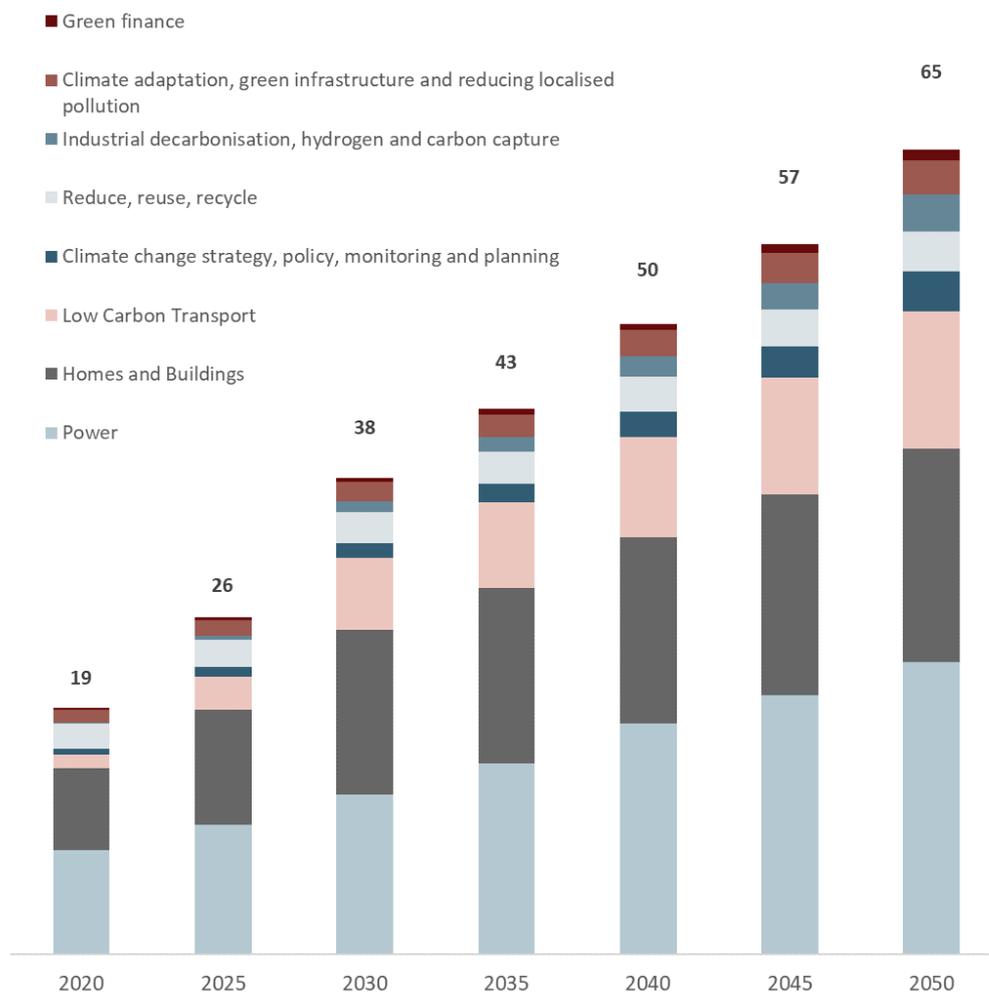
The methodology for projecting the number of green jobs in the coming decades combines a range of sources estimating the future growth of the green economy and specific sectors within it. We map the growth rate on the assumption that the fastest growth will occur in the next decade and somewhat slower approaching 2050 as net zero targets begin to be met and the green sector matures. Further details of our approach can be found in the cross-London report.

Sub-regional results

The total number of jobs in the central scenario is projected to rise from 19,000 in 2020 to 65,000 in 2050, representing a 3-fold increase. Within this scenario, three sectors account for 3 in 4 (75.1%) of South London’s total number of green jobs by 2050:

- Power (22,200), representing 34.1% of total green jobs.
- Homes and Buildings (16,200), representing 24.9% of total green jobs.
- Low Carbon Transport (10,400), representing 16% of total green jobs.

Figure 6: Projections of green jobs: central scenario (thousands)



Source: WPI Economics analysis: see cross-London report for methodology^{xxxix}

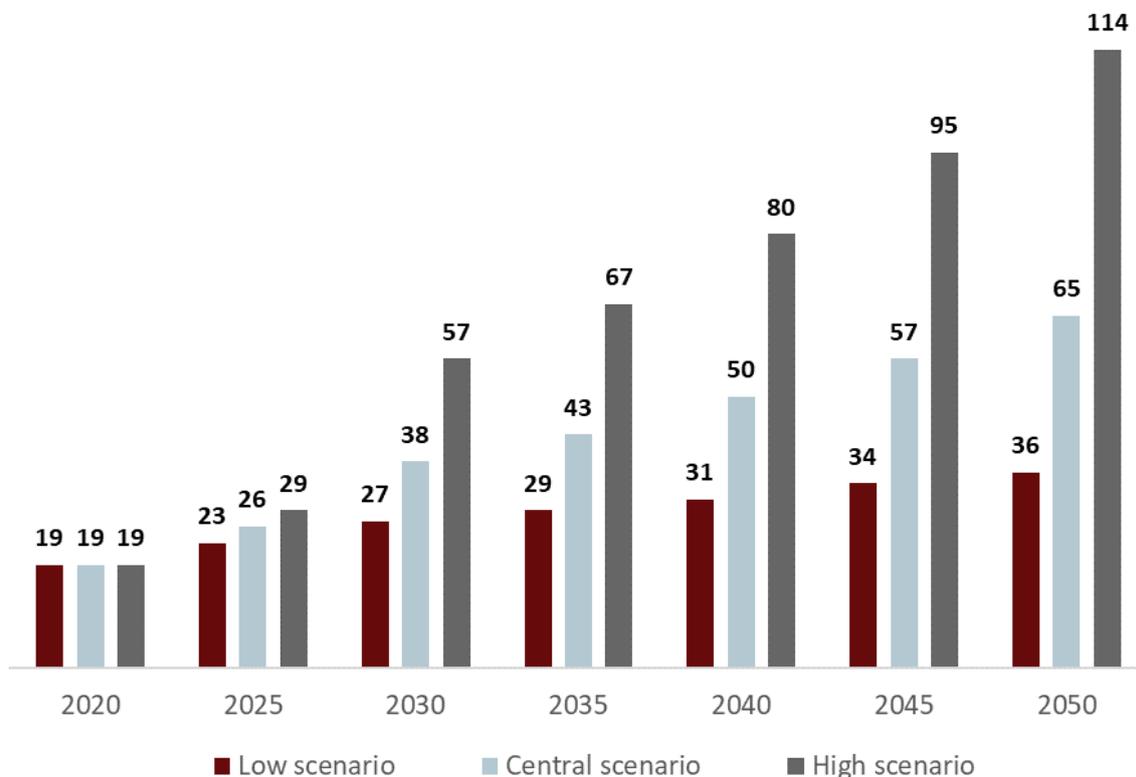
We present different scenarios (low, central, high) to account for uncertainty and different variations in policy and activity in the green economy. Whether scenarios are met in each sector will depend on a number of complex and interrelated factors, including policy action from national and local government around innovation, skills, trade and regulation. The Climate Change Committee considers the broad factors which could influence how the green economy evolves, and, taking a range of analyses into account, outline two key determinants:

- **Engagement and behaviour change** – to what extent do members of the public and businesses adopt low carbon options and behaviours (such as installing energy efficiency measures in homes)?
- **Innovation** – How does technology which helps to replace fossil fuels to reduce energy consumption evolve over the coming decades (such as through the scaling of heat pumps, hydrogen or CCUS)?

Government policy such as the £450 million Boiler Upgrade Scheme,^{xi} which intends to incentivise homeowners to install heat pumps with £5000 grants, is an example of how government policy – and consumer uptake – may influence the above.

The different scenarios are presented below. The low scenario for the number of green jobs by 2030 is 27,000, while the high scenario projects there to be 57,000. For 2050, the low scenario projects 36,000 jobs in the green economy, while the high scenario puts this figure at 114,000.

Figure 7: Scenarios for projections of total green jobs in South London (thousands)



Source: WPI Economics analysis: see cross-London report for methodology^{xi}

Table 12: Low, central and high projections of green jobs in South London in 2030 and 2050

Sector	2020	2030			2050		
		Low	Central	High	Low	Central	High
Climate adaptation, green infrastructure and reducing localised pollution	1,000	1,200	1,500	1,800	1,600	2,600	3,900
Climate change Research and Development	500	1,000	1,300	1,600	2,400	3,700	5,600
Climate change strategy, policy, monitoring and planning	400	900	1,100	1,400	2,100	3,100	4,700
Green finance	100	200	300	300	500	800	1,200
Homes and Buildings	6,200	8,900	12,500	20,900	10,100	16,200	16,200
Industrial decarbonisation, hydrogen and carbon capture	100	300	800	1,800	600	2,800	12,200
Low Carbon Transport	1,100	2,500	5,500	11,400	3,500	10,400	28,900
Power	7,900	9,800	12,100	14,800	13,300	22,200	36,600
Reduce, reuse, recycle	1,900	2,000	2,400	3,000	2,100	3,000	4,800
Total	19,000	27,000	38,000	57,000	36,000	65,000	114,000

Source: WPI Economics analysis: see cross-London report for methodology^{xiii}

Overall, these figures predict very fast growth of South London's green economy over the next three decades. The following discussion refers to the central scenario figures unless otherwise stated.

- Power remains the sector with the largest employment in the sub-region's green economy throughout the projected period, albeit concentrating a decreasing share of total employment (from just above 40% in 2020 to just over one third in 2050). This is a result of a relatively modest growth, just above 50%, from 2020 until 2030 and from the latter until 2050.
- Homes and Buildings remains the second largest sector in the sub-region, with a share of total employment that, despite remaining just below one third between 2020 and 2030, falls to 24.9% by 2050. This is a result of a more intensive growth rate during the first decade of our projections, doubling its employment numbers between 2020 and 2030, which only increase by a further 30% between 2030 and 2050.
- Low Carbon Transport is projected to become more prominent in the sub-region's green economy, increasing its share of green employment from 5.8% to 16% in 2050. In 2030, Low Carbon Transport is projected to employ 5,500 people, 5 times more than in 2020, further increasing to 10,400 by 2050 (9 times more than in 2020).
- Starting from a very small level in 2020, Industrial decarbonisation, hydrogen and carbon capture is the sector with the highest predicted growth, increasing its employment 8-fold between 2020 and 2030, and almost 30-fold until 2050. Growth rates are even more impressive in the high scenario, which predicts an 18-fold increase by 2030.
- Other smaller sectors are also projected to experience very large growth rates until 2050, with Climate change Research and Development; Climate change strategy, policy, monitoring and planning; and Green Finance employing between 7 and 8 times more people in 2050 than in 2020.

Implications of the scenario results for skills provision

In the context of this report, skills provision and associated policy responses are a vital part of getting that policy landscape right.

The central employment projections suggest an increase in the green-jobs workforce of around 1,800 per year to 2030. Overall, this represents an increase in the total green workforce of 95% from its current level. The key issues are how this increase compares with the current level of skills provision, how easy it will be for green businesses to meet their future skills needs, and how skills providers can best help meet these needs.

The first thing to note is that there are markedly different rates of increase across the different sub-sectors. The increases are broadly similar to those projected for the whole of London, with reduce, reuse, recycle increasing by 26%, power increasing by 53%, homes, buildings and landscape increasing by just over 140%, and consultancy and finance increasing by 170%.

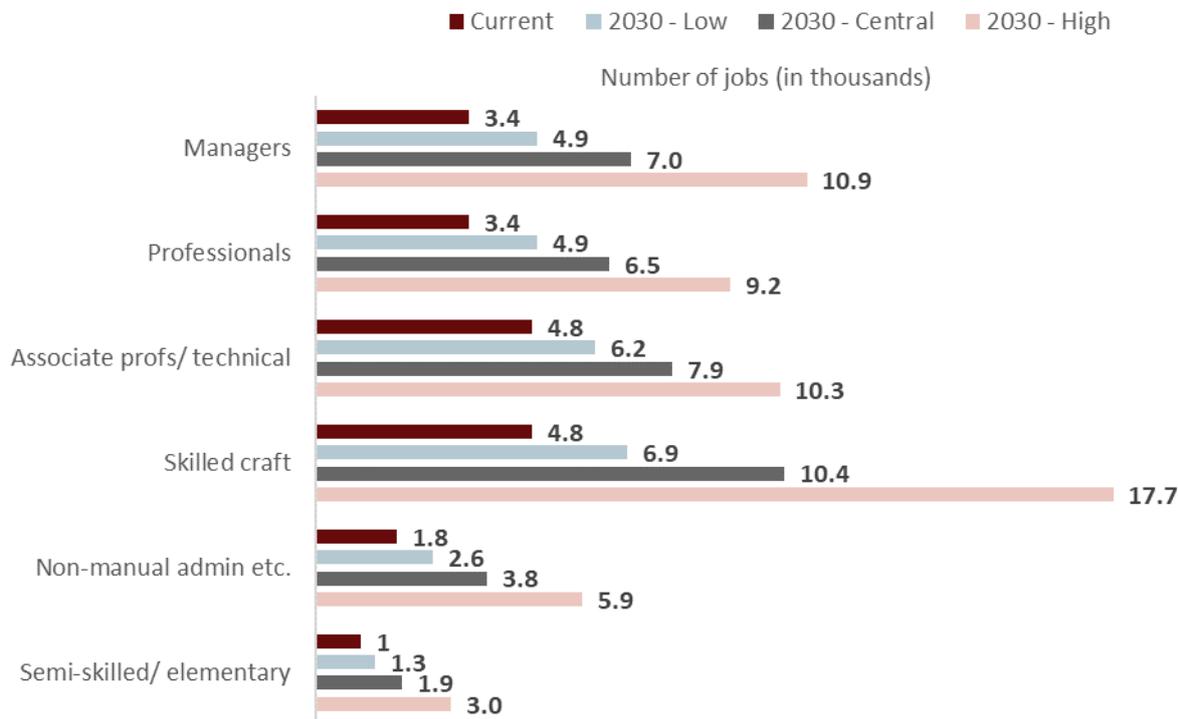
The key questions from a skills point of view are:

- What are the likely occupational changes over this period; and
- How this increase compares with the current level of skills provision, and how easy it will be for green businesses to meet their future skills needs.

Figure 8 shows the projected changes by occupational group to 2030, while Table 13 shows the detail behind the figure. The projections are calculated by applying the growth rate in each of the four broad sectors to the estimated number of current workers in each occupation in that sector, to forecast the number of workers in that sub-sector and occupation in 2030 under the different scenarios. These are then summed to give totals for green jobs in the different occupational groups. This method assumes that the skills mix within each of the four broad sub-sectors will be the same in 2030 as it is now, but the mix across all green jobs will change as some sectors are forecast to grow much faster than others.

Considering the central forecast first, the largest increase, in numeric and percentage terms, is predicted among skilled craft workers, whose numbers are projected to increase by almost 6,000 to reach 10,400 in 2030, an increase of 118%. In 2030, skilled craft workers are projected to be the largest occupational group, as the growth rate for associate professional workers is set to be much lower, at 65%, with numbers rising by 3,000 to almost 8,000 in 2030. The projected increases for managerial and professional workers are 104% and 93%, respectively.

Figure 8: Future occupational employment levels for scenarios for projections of total green jobs in South London (thousands)



Source: IES calculations from WPI Economics analysis and Quarterly Labour Force Survey data

Under the low jobs forecast, the total number of jobs is projected to rise by 800 per year to 2030. Skilled workers are projected to experience the largest increase in numeric terms, at 2,100, with the percentage increase similar to that for managerial and professional workers, at 44%. The increase in associate professional workers is projected to be 30%, with numbers increasing by 1,400, slightly smaller than the 1,500 increases the number of managerial and professional workers.

Table 13: Change in employment by occupational major group, South London

Occupational group	Current	2030	Change	% change
Central forecast				
Managers	3,400	7,000	3,600	104
Professionals	3,400	6,500	3,100	93
Associate profs/ technical	4,800	7,900	3,100	65
Skilled craft	4,800	10,400	5,600	118
Non-manual admin etc.	1,800	3,800	2,000	105
Semi-skilled/ elementary	1,000	1,900	900	90
Low forecast				
Managers	3,400	4,900	1,500	42
Professionals	3,400	4,900	1,500	44
Associate profs/ technical	4,800	6,200	1,400	30
Skilled craft	4,800	6,900	2,100	44
Non-manual admin etc.	1,800	2,600	800	43
Semi-skilled/ elementary	1,000	1,300	300	33
High forecast				
Managers	3,400	10,900	7,500	220
Professionals	3,400	9,200	5,800	172
Associate profs/ technical	4,800	10,300	5,500	114
Skilled craft	4,800	17,700	12,900	270
Non-manual admin etc.	1,800	5,900	4,100	221
Semi-skilled/ elementary	1,000	3,000	2,000	205

Source: IES calculations from WPI Economics analysis and Quarterly Labour Force Survey data

The high jobs forecast projects that there will be an average increase of 3,800 workers per year across all green sectors to 2030, with the number of skilled craft workers increasing by nearly 13,000 (270% increase), and the number of managerial workers increasing by 7,500 (220% increase). The projected increases for professional and associate professional workers are smaller, at 172% and 114% respectively.

In addition to the need for workers to meet the expansion demands of the sector to meet the policy goals, there will be a need to replace leavers from the sector, for retirement or other career breaks.

Estimates of these replacement demands are taken from the Working Futures employment projections for London for the period 2017 to 2027, for the major occupational groups, and it is assumed that green workers in each major occupational group will experience the same replacement rates as all workers in that occupational group.⁶ Table 14 shows the estimates of the replacement demands for green workers in South London in the major occupations. In total, it is estimated that green sectors will need to recruit 6,300 workers over the coming 10 years to replace leavers – this is around one third of the expansion demand under the central scenario of 18,300, although four fifths (82%) of the expansion demand under the low growth scenario. Thus, the need to replace leavers makes a substantial contribution to the total expansion requirement predicted for employers in green sectors in South London.

Table 14: Estimated replacement demand by occupational major group, South London

	Current	10 yr replacement demand rate %	Replacement demand
Managers	3,400	38.5	1,300
Professionals	3,400	34.8	1,200
Associate profs/ technical	4,800	32.8	1,600
Skilled craft	4,800	27.6	1,300
Non-manual admin etc.	1,800	33.0	600
Semi-skilled/ elementary	1,000	32.8	300
Total	19,200		6,300

Source: IES calculations from Quarterly Labour Force Survey data and IER Working Futures projections

Table 15 shows the detailed occupational unit groups with the largest projected increase in numbers to 2030. The number of business and related associate professionals not elsewhere classified (business systems analysts, data analysts, project coordinators etc.) is projected to increase by 2,100, accounting for 11% of the total increase, although this is the lowest growth rate among the occupations with the largest increases in numbers, at 56%. There are large projected increases for electricians (1,700, increase of 122%), gardeners and landscape gardeners (1,200, 142%) and plumbers (1,000, 142%), reflecting the large projected increase for homes, buildings and landscape. The other occupations with large projected increases in numbers are production managers in construction, and other miscellaneous construction trades.

Table 15: Occupations with the largest projected increases in employment to 2030 under central forecast, South London

	Current	2030	Change	% change	% of total increase
3539 'Business and related associate professionals n.e.c.'	3,700	5,800	2,100	56.1	11.4

⁶ Data are available at <https://warwick.ac.uk/fac/soc/ier/wf7downloads/>

5241 'Electricians and electrical fitters'	1,400	3,100	1,700	121.6	9.3
5113 'Gardeners and landscape gardeners'	900	2,100	1,200	141.7	6.7
5314 'Plumbers and heating and ventilating engineers'	700	1,600	1,000	141.8	5.2
1122 'Production mngrs and directors in construction'	700	1,600	1,000	141.8	5.2
5319 'Construction and building trades n.e.c.'	600	1,400	800	131.3	4.2
1132 'Marketing and sales directors'	800	1,300	600	75.0	3.1
2136 'Programmers and software development professionals'	900	1,500	500	58.1	3.0
1131 'Financial mngrs and directors'	400	900	500	142.8	2.8
1251 'Property, housing and estate mngrs'	400	900	500	142.1	2.7

Source: IES calculations from WPI Economics analysis and Quarterly Labour Force Survey data

Note: "n.e.c" here stands for "not elsewhere classified".

Having looked at the likely occupational changes over the coming decade, we turn to comparing the future increases in demand with the size of the output from education and training provision to provide insights into how easy it may be for employers to meet their future skill needs. It should be remembered that green sectors currently draw very few workers directly from full-time education, with most new entrants coming in from other sectors, although with the rapid projected growth over the coming decade, employers will need to both increase the number of workers attracted from other sectors and draw more new workers straight from education. Under the central scenario, the expansion demand of 1,830 and replacement demand of 630 gives rise to a total annual requirement of 2,500 workers.

The current data on skills provision show that across London there are around 5,000 learners per year in Further Education (FE) and in apprenticeships in relevant subject areas, and around 3,500 Higher Education (HE) leavers each year in relevant subjects, giving an annual output from FE and HE of around 8,500 students.

Thus, if the projected expansion of the sector were to be met solely by new entrants from full-time education (and given the current in-flows from education this is a rather unlikely assumption), green employers would need to attract nearly one third (30%) of all education leavers with potentially relevant skills, and this proportion would need to be higher if FE leavers progress to HE rather than entering the labour market. The current analysis of flows suggests that the sector recruits around 200 education leavers per year, so this suggests businesses would need to recruit 12 times as many workers straight from education than they currently do, if the growth in demand was met solely from education leavers and not from those switching sectors/occupations.

The relationships between subject areas and broad sector are such that it is only advisable to look at the balance between future labour demand and current skills provision at a broad level of consultancy-based jobs and skills, and craft-based jobs and skills. The former cover the consultancy and finance sector, and the majority of the power sector, while the latter cover the homes, buildings

and landscape, reduce, reuse, recycle, and the rest of the power sector. The balance of future demand and current supply under the central scenario in South London are as follows:

- The number of consultancy-based jobs is projected to increase by around 500 per year over the coming decade, and with replacement demand of 170, giving a total annual requirement of 650. Current FE and HE provision is around 4,600 students per year, so future demand equals 14% of the annual output from education.
- The increase in craft-based jobs is projected to be much higher, at around 1,350 per year, which with replacement demand of 450, gives a total requirement of 1,800 per year. Provision is around 2,000, so future demand equals 90% of the annual output from education.

This analysis shows that to meet the rapid expansion of the sector over the coming decade there is an urgent need to:

- increase education provision in subjects and courses that are relevant for green jobs;
- increase the proportion of those taking relevant courses who progress to employment within green sectors; and
- increase the flows from other, non-green, sectors into green sectors, including through re-skilling training.

Additionally, in the short-term while education and training providers increase their provision, green employers could look to make increasing use of migrant labour to meet their skills needs, although it is recognised that this would be more difficult than in the past due to the tightening of migration rules as a result of the UK's departure from the EU.

While these are priorities across green sectors as a whole, there is an urgent need for action in the craft-based sectors – homes, buildings and landscape, and reduce, reuse, recycle – as the projected increases are much larger in relation to the size of the education pipeline than is the case for consultancy-based roles. Roles in these sectors/occupations in London have been increasingly filled by EU nationals in recent decades, and so are vulnerable to shortages as a result of reduced in-migration and increased out-migration post-Brexit. South London stakeholders need to ensure that provision is expanded to at least meet the likely needs of the sector, as there will be competition from employers in neighbouring parts of London and surrounding counties for this limited pool of skills, and wage rates on offer may be higher elsewhere, for example in central London. This highlights the need for concerted action across London, e.g., between various players in London government (local authorities, sub-regional partnerships, London Councils and the GLA) and other stakeholders.

The green sector currently recruits a far higher proportion of new entrants from other sectors than directly from education, but the skills pipeline also needs to supply replacements for these workers, as well as expand to increase supply directly to the green sector. In summary, the green sector in London will experience large increases in employment, even under the low growth scenario, and employers will face challenges recruiting the skills to meet future needs. They currently source a far higher proportion of new entrants from other sectors than straight from education, and this is unlikely to change in the short term. However, over the medium term, employers and education providers will need to work together to increase provision in current and emerging green areas, and a growing awareness of and interest in sustainability among young people should support this expansion of provision, with a clear steer from government and the funding systems. Consultancy and finance based green sectors may find it easier to meet future needs from the large professional

services sector in the capital, and the large output from education providers in these subject areas; however, employers of skilled craft labour may find it much harder to recruit the skills they need, given a much smaller supply in other sectors, much smaller numbers of students taking these courses, and current skills shortages in these occupations (potentially exacerbated by Brexit and the ending of freedom of movement). This presents an opportunity for the FE sector and apprenticeship providers to expand provision to meet these increased demands, and this is already happening with, for example, Kingston Adult Education offering courses to help promote the green economy. Across all green sub-sectors there is a need to widen access to groups that are currently under-represented, to maximise the potential skills supply and to reduce existing labour market inequalities.

Barriers, challenges and issues in green skills provision

Interviews were conducted with a range of FE and HE providers across London, including in South London, to explore their perspectives on barriers and challenges to offering (more) green skills provision, and wider issues.

Recruiting FE teachers – mismatches in remuneration between working in construction, engineering and STEM trades, and the salaries of teachers in FE, make it difficult to attract and retain teachers in these subject areas with sufficient industry expertise and experience. This has been exacerbated in the short-term by the impacts of a surge in activity following lockdowns and staff shortages as a result of Brexit. This has led to large increases in demand for construction courses, but had negative impacts on the ability to get teaching staff. More education-business partnership activity, where employers commit some of their staff to work with providers and deliver training, could be a potential solution to the sector-wide issues.

Cost of facilities and equipment – equipment and facilities for practical courses, e.g. in construction, engineering and STEM, need to be maintained which is a considerable expense for colleges. This could lead to this provision being consolidated in the larger colleges, as many colleges that are financially strapped, or do not have the volumes going through on these courses, will not be able to support these facilities. Industry sponsorship can help, but there is still a large outlay for colleges. Other possible solutions are to share facilities across colleges.

Lack of confidence in future demand due to a lack of a long-term strategy for green, and previous short-lived green initiatives – the lack of a clear steer from central government in terms of green/low carbon priorities was raised in the initial scoping stage of the research and again when asking providers about barriers and challenges to provision – “*what are the strategic priorities in the UK? Hydrogen, solar? Where is the investment going to be?*”. This lack of clarity means that the typical ‘demand-led’ skills system – where employers know what their skills needs are and providers/potential learners deliver/take courses that will give employers the skills required – does not function effectively; learners do not necessarily know about future career options within green sectors. Some providers gave examples where they invested in facilities to use on courses related to green priorities, prompted by local boroughs highlighting their need to undertake retrofit work, but had no subsequent take-up for these courses. There was a feeling that the responsibility was falling between the stools of providers, funders and Government, without co-ordination to ensure that where provision was provided it was successful. As one respondent said – “*Throwing a bunch of green qualifications at this isn't the right solution because every time we've had green-type qualifications, nobody wants to do them. So just supplying qualifications and saying if we build it, they will come, is not true*”. Another highlighted that the future ban on gas boilers will drive demand for air/ground

source heat pumps and insulation, but that there was little articulation of how the funding and qualifications will come together to meet this need. An awarding body commented that there were three necessary conditions for green provision to gain traction – solid demand from employers for staff/consumers for green products; ability of the supply side to respond in a timely way which feeds into the academic cycle in the case of publicly-funded provision; and engagement from awarding organisations to unlock the state funding mechanism. In some cases this does not need to be new courses, but updating or adding to existing courses to make them more related/relevant to green jobs and skills. One provider mentioned that there was a Level 2 qualification and a Level 5 qualification related to retrofit, but nothing in between, and so a clear gap in the qualifications currently available. The changes to funding introduced by the GLA has helped more adults enter courses, including construction and engineering.

There is a clear role for central government in setting out a clear policy framework which gives businesses certainty, and the net zero strategy and homes and buildings strategy should help boost business confidence in investing in green skills. With increased confidence, employers and sector bodies can work together with education and training providers to articulate more clearly their likely future skills needs so that the training sector can respond appropriately, and together with employers/sector bodies can promote opportunities in green jobs via careers information, advice and guidance to young people and adults looking for new opportunities. Ideally, this would be delivered through local specialist careers advice related to local needs supplementing national campaigns such as the [Job Help](#) page. One respondent felt that discussion of ‘green jobs’ often made them sound more complicated than they really were, and that there was a lack of clarity around ‘green skills’ and a lack of awareness of ‘green careers’, which could be overcome by better information, advice and guidance.

One respondent raised the idea of local authorities building up their direct labour departments in construction/engineering workforces, as the high proportion of self-employment and micro-businesses who take on the work as sub-contractors do not have the capacity to take on trainees. Glasgow was cited as an example of this, with the council employing over 2,000 workers with around 60 apprentices a year. Joint initiatives between local authorities and training providers should improve the supply of skills through the training pipeline, as the current system with developers or lead contractors building up the labour force on developments through sub-contracting rather than being directly-employed labour makes engagement with the training sector more difficult.

Addressing diversity imbalances – women remain under-represented in engineering, construction and STEM subjects, including much of current green skills provision, and there are long-standing and recognised issues about encouraging female students into craft-based courses. Providers are looking to actively address this through initiatives to promote female enrolment, such as awareness campaigns or mentoring programmes jointly delivered with industry partners. For example one respondent reported that they introduced short courses (e.g., a 6-week evening course) with “Women” in the title (e.g., “Women in construction”), which were very successful at attracting female students and giving them the confidence to go on to longer courses and gain qualification. In terms of imbalances by ethnicity, the profile of learners was felt to generally reflect that of local populations, so it is hoped that as these learners enter the labour market, and older workers (more likely to be white and male) retire, the ethnic diversity imbalances in the workforce should lessen over time.

Specific provision vs embedding environmentalism – respondents mentioned the idea of interweaving sustainability and green issues into all of their qualifications and delivery, although it was not as straightforward as having a generic module on ‘sustainability’ - the input would have to be related to

the sector/occupation of the qualification. However, gaining the appropriate understanding of how sustainability influences the different sectors was still a work in progress. One respondent felt that embedding climate and energy literacy into Level 2 courses could be a good springboard to getting learners onto green-specific Level 3 courses or apprenticeships. As part of this “whole-system” approach, providers mentioned the need to ‘intervene early’ – that is, learners should begin to develop an awareness of environmental and sustainability issues as early as primary school. This creates a coherent programme of learning that progresses fluidly across different levels of education.

5. Impact on net jobs

The previous chapter considered the impact of transition to net zero on total jobs in South London. However, not all of these will be additional jobs to the South London economy because:

- i. A non-green job may have become a green job; for example, a fossil-fuel based energy job becoming a renewable energy job; and
- ii. Some jobs may cease to exist.

The Committee on Climate Change (CCC) commissioned modelling to look at the impact of the sixth carbon budget on the UK economy,^{xliii} which included the policy changes necessary to reach net zero. This analysis modelled the impact on net jobs – i.e. how will overall employment levels be affected by the transition to net zero.

The modelling found that **there will be an increase in the net number of jobs over the next three decades in the UK due to the change to a net-zero carbon economy by 2050, alongside increases in both GDP and incomes.** This is because:

- i. The transition to a low carbon economy requires that investment is brought forward into capital-intensive technologies, stimulating economic demand;
- ii. The decarbonisation of power reduces the imports of oil and gas, which in turn increases domestic production, leading to increases in GDP and employment; and
- iii. Electricity prices are expected to fall, as economies of scale for low carbon energy technologies are substantial. Low electricity prices boost GDP and employment and also reduce consumer prices across the economy.

Table 16 shows our estimate of the impact of net zero on net jobs in the South London economy, based on the methodology set out in the cross London report. The estimates suggest that there will be a small positive impact of a change to net zero policies on South London, increasing net employment by around 3,900 jobs in 2030 and around 1,700 jobs in 2050.

Table 16: Estimated impact of net zero policies on net employment in South London

Sector	Jobs in South London, 2019	Estimated jobs in South London, 2030			Estimated jobs in South London 2050		
	Latest data	Based on current policies	With net zero policies	Change due to net zero policies	Based on current policies	With net zero policies	Change due to net zero policies
Agriculture	300	300	300	0	200	200	0
Mining and refinery	0	0	0	0	0	0	0
Utilities	2,000	1,800	1,900	100	1,400	1,900	500
Manufacturing and construction	34,800	35,300	35,700	400	34,800	35,000	200
Distribution, retail, hotel and catering	98,500	102,000	103,900	1,900	102,100	103,000	900
Transport and communications	44,300	47,200	48,100	900	50,200	50,300	100
Services	261,200	291,500	292,100	600	332,300	332,300	0
Total - South London	441,000	478,000	482,000	3,900	521,000	523,000	1,700
Whole of London	5,368,000	5,853,000	5,900,000	47,200	6,443,000	6,462,000	19,400

Source: WPI Economics calculations based on Climate Change Committee (2020) and ONS Business Register and Employment Survey

6. Equality implications of decarbonisation in South London

London's high degree of service sector jobs means that it is somewhat less susceptible to the effects of decarbonisation than other parts of the country. Some key sectors for the South London sub-region, such as Healthcare and Retail, are mostly non-exposed to decarbonisation (97% and 91% respectively according to analysis by the LSE).^{xliv} However, the sub-region has a higher level of employment in at-risk sectors than Central London.

To understand the potential implications of the findings in this report, we have assessed eleven carbon intensive industrial activities as a proxy for those areas likely to undergo the most substantial change in the coming decades. The eleven sectors we look at follow the report Greening the Giants (Onward, 2021)^{xlv} which identifies sectors that either have emissions above 100tCO₂e per job or which contribute more than 2% of annual total UK emissions as carbon intensive (with the exception of retail as a recent LSE study that shows the sector is 91% non-exposed to the transition).^{xlvi}

We identify 40,000 of South London's 441,000 jobs are in sectors likely to undergo significant change in the green transition (see table 17 below), representing 9% of employment in the sub-region (within the range of 4-12% for the rest of the capital).

Table 17: Jobs (employments) in carbon intensive sectors – South London Partnership sub-region

	SIC code section	Employment, 2019 South London Partnership	Proportion of employees that identify as an ethnicity other than "White"		Proportion of people in employment that identify as female		Proportion of people in employment aged 16-64 that are under 25		Proportion of people in employment aged 16-64 that are over 50	
			London	United Kingdom	London	United Kingdom	London	United Kingdom	London	United Kingdom
<i>NB/ This data is at the SIC code section level only for London and the United Kingdom, not lower level geographies</i>										
Construction	F	24,500	24%	7%	-	14%	4%	10%	35%	38%
Land Transport	H	12,565	55%	18%	39%	22%	4%	7%	22%	31%
Waste and sewerage	E	1,075	56%	7%	-	23%	8%	8%	19%	31%
Carbon intensive manufacturing	C	860	38%	9%	-	27%	10%	9%	35%	36%
Electricity, gas, steam and air conditioning supply	D	670	44%	10%	-	23%	8%	8%	19%	31%
Agriculture	A	265	4%	1%	-	26%	N/A	14%	30%	62%
Shipping and fishing	Mostly H	115	55%	18%	39%	22%	4%	7%	22%	31%
Aviation	H	55	55%	18%	39%	22%	4%	7%	22%	31%
Steel	C	15	38%	9%	-	27%	10%	9%	35%	36%
Oil and gas	B	0	Not applicable as zero jobs in sub-region							
Coal and lignite mining	B	0	Not applicable as zero jobs in sub-region							
Total in carbon intensive sectors		40,000								
All industries		441,000	36%	13%	-	48%	7%	11%	27%	34%

Source: ONS Business Register and Employment Survey (BRES) and Annual Population Survey (APS)

Notes: The data on gender breakdown of industries in London for SIC codes A-F is not available; the ONS state the figures are suppressed as they are statistically unreliable. The Onward Greening the Giants report included the Retail sector as it accounts for over 2% of UK emissions, even though it has a relatively low amount of emissions per job. However, they excluded the sector from their cross-sectional analysis as they noted a recent LSE study that shows the sector is 91% non-exposed to the transition. We therefore also exclude the retail sector. We use total Employments from the BRES survey, including self-employed workers. (*) Note that for London, data on the gender split on industries is only in the public domain for groups of SIC code sectors; in particular for this table SIC code H (Transport & Storage) is combined with SIC code J (Information and communication)

Although it is not possible to get demographic data at a detailed level of industrial breakdown, we can get some understanding of potential equalities implications using the broad section level SIC codes for each of the eleven areas. As sub-regional equalities data is not in the public domain we can only report the London-wide equalities data for the relevant industrial groups.

For South London the key findings are that:

- Construction and Land Transport are the two largest exposed sectors, respectively accounting for over half and over a quarter of jobs in South London's exposed industries.
- Construction has a lower proportion of non-white workers than the average across London (24% versus 36%), and the national data suggests it is male dominated (14% of workers are women, compared to an average of 48% across all industries). The sector also tends to employ fewer younger workers and a greater number of older workers than other industries.
- Land Transport is part of the Transport and Storage industrial sector. This sector has a much higher proportion of non-white workers compared to all industries across London (55% versus 36%). Sector data broken down by gender at a London level is only available in the combined Transport and Communication grouping, in which 39% of workers identified as female. This is higher than the Transport and Storage average across Great Britain, but below the all-industry average. The Transport and Storage sector also employs fewer younger workers (under 25), but also fewer older workers (over 50) than the average of all industries.

While the green economy presents significant economic opportunity, it is important to ensure there is a just transition which does not leave communities in exposed sectors behind. It is important that distributional challenges identified in carbon-intensive sectors – such as overrepresentation of older workers in Construction, or BAME workers in Transport and Storage – are not simply replicated in new or growing sectors.

Annex

Table A1: Example green occupations within each occupational group

Occupational group	Example green occupations
Managerial occupations	'Production managers and directors in construction'
	'Financial managers and directors'
	'Property, housing and estate managers'
Professional occupations	'Management consultants and business analysts'
	'Business and financial project management professionals'
	'Programmers and software development professionals'
	'IT business analysts, architects and systems designers'
	'Environment professionals'
	'Electrical engineers'
Associate professional and technical occupations	'Chartered surveyors'
	'Business and related associate professionals not elsewhere classified (business systems analysts, data analysts, project coordinators etc.'
	'Marketing associate professionals'
Skilled craft occupations	'Sales accounts and business development managers'
	'Electricians and electrical fitters'
	'Plumbers and heating and ventilating engineers'
	'Gardeners and landscape gardeners'
Non-manual admin. etc.	'Vehicle technicians, mechanics and electricians'
	'Administrative and secretarial occupations'
	'Caring, leisure and other service occupations'
Semi-skilled/elementary	'Sales and customer service occupations'
	'Process, plant and machine operatives'
	'Elementary occupations'

Table A2: Largest occupations within Power; proportions of total employment in sector, Whole of London

Occupation	London	UK
3539 'Business and related associate professionals n.e.c.'	46%	5%
2136 'Programmers and software development professionals'	11%	2%
2135 'IT business analysts, architects and systems designers'	7%	1%
1132 'Marketing and sales directors'	7%	1%
7220 'Customer service mngrs and supervisors'	6%	3%

Source: Quarterly Labour Force Survey, Jan-Mar 2020 to Oct-Dec 2020 combined

Table A3: Largest occupations within Homes, Buildings and Landscape; proportions of total employment in sector, South London

Occupation	London	UK
5241 'Electricians and electrical fitters'	15%	14%
1122 'Production mngrs and directors in construction'	9%	4%
5113 'Gardeners and landscape gardeners'	9%	17%
5314 'Plumbers and heating and ventilating engineers'	8%	14%
5319 'Construction and building trades n.e.c.'	4%	4%

Source: Quarterly Labour Force Survey, Jan-Mar 2020 to Oct-Dec 2020 combined

Table A4: Largest occupations within Reduce, re-use and recycle; proportions of total employment in sector, South London

Occupation	London	UK
5241 'Electricians and electrical fitters'	15%	4%
9236 'Vehicle valeters and cleaners'	10%	3%
1259 'mngrs and Prprtrs in other services n.e.c.'	8%	1%
5223 'Metal working production and maintenance fitters'	6%	6%
9235 'Refuse and salvage occupations'	5%	4%

Source: Quarterly Labour Force Survey, Jan-Mar 2020 to Oct-Dec 2020 combined

Table A5: Largest occupations within Consultancy and Finance; proportions of total employment in sector, South London

Occupation	London	UK
2423 'Management consultants and business analysts'	16%	8%
2136 'Programmers and software development professionals'	4%	2%
3545 'Sales accounts and business development mngrs'	4%	3%
4159 'Other administrative occupations n.e.c.'	4%	3%
2434 'Chartered surveyors'	3%	2%

Source: Quarterly Labour Force Survey, Jan-Mar 2020 to Oct-Dec 2020 combined

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