CITB ANALYSIS

Skills for a Sustainable Skyline Taskforce labour analysis

Assessing the needs for traditional and low carbon construction skills in support of the work conducted by the Skills for a Sustainable Skyline Taskforce

August **2023**

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1. Introduction

The Skills for a Sustainable Skyline Taskforce (SSST) was established to bring together stakeholders who could utilise their expertise and influence to help progress the aim of achieving a net zero commercial built environment in Central London.

The vision for the taskforce is:

"Through attracting and reskilling Londoners, the aim is to create a skilled workforce that will build and maintain a world-class sustainable built environment for the Square Mile and Central London"[1]

A rapid evidence assessment was conducted in 2022, examining the existing evidence that would help to inform the taskforce in achieving this vision, and as part of the output, the assessment identified areas where further research was needed.

In response to the rapid evidence assessment, this work was undertaken to help address some of the research gaps and develop the points identified. It focuses on:

- collating intelligence on the pipeline of commercial projects that can be identified for Central London, including scale of work and timing.

- estimating the labour demand that this work would require.

- assessing the scale of the challenge for retrofitting commercial buildings in Central London to improve energy performance.

- estimating the labour demand that this would require.

- comparing this labour demand to the construction workforce in London; and

- assessing how this relates to job vacancies and training provision being delivered in London.

CITB, working with Whole Life Consultants Ltd, have experience of producing labour demand analysis for a pipeline of work, using CITB's Labour Forecasting Tool. The approach to carrying out the analysis is outlined in the accompanying Technical Annex report, although in summary, it prepares a bottom up forecast of labour demand by analysing the projects which are known (in terms of scope, value, start and end dates), along with an estimate made of other work that is taking place. The analysis also takes appropriate account of national projects which may be allocated to a central location but may be taking place in one or more other local areas.

The analysis was carried out at a London borough-level for the Skills for a Sustainable Skyline Taskforce area and covered:

- Camden;
- City of London;
- Hackney;
- Haringey;
- Islington;
- Royal Borough of Kensington and Chelsea;
- Lambeth;
- Lewisham;
- Southwark;
- Tower Hamlets;
- Wandsworth; and
- City of Westminster.

The labour demand was then analysed against the wider construction workforce in London, job vacancy data and training provision to help inform the evidence base on the scale of the challenge that the taskforce may be facing.

This report summarises the analysis before drawing out conclusions and recommendations from the work that will help inform the future work of the Skills for a Sustainable Skyline Taskforce.

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1.   Source: Skills for a Sustainable Skyline Taskforce Terms of Reference – Working Group Member Appointment. Available at: www.cityoflondon.gov.uk/assets/Business/Skills-for-a-Sustainable-Skyline-Taskforce-Working-Group-Terms-of-Reference.pdf

2. Labour demand in the 12 boroughs

Using the methodology which is outlined in the Technical Annex accompanying this report we have prepared an analysis of the construction labour demand across the 12 local boroughs. This is based on the known pipeline from published sources such as Glenigan[2] and supplemented with estimates of other work taking place. This section outlines the combined labour demand[3] from the twelve boroughs: the individual analysis for each borough is included in the Technical Annex. Pipeline of known projects

2.1.1 Glenigan pipeline analysis

We have analysed projects in the Glenigan database[4] and, where required, updated that list with any supplementary information provided by the Boroughs.

Table 1 shows the distribution by project type of new build spend for the total pipeline of known projects in 2023. Private commercial construction spend in 2023 is more than 55% of the total construction spend in the Sustainable Skyline areas. Table 2 shows the infrastructure construction spend from the known projects in Table 1 by infrastructure sub-type.

Table 1: New-build construction spend by project type in 2023 (total defined project pipeline)

Project Type	Construction spend in 2023 (2022 values - £m)	% of total
Private commercial	8,158	56%
New housing	4,699	32%
Public non-housing	1,010	7%
Infrastructure	732	5%
Private industrial	57	<1%
Total	**14,656**	**100%**

Table 2: Construction spend by infrastructure sub-type in 2023 (total defined project pipeline)

Project Type	Construction spend in 2023 (2022 values - £m)	% of total
Transport	580	79%
General infrastructure	107	15%
Energy	39	5%
Communications	6	<1%
Total	**732**	**100%**

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2. https://www.glenigan.com/
3. The report refers to labour demand in terms of "number of people"; a person corresponds to a Full Time Equivalent (FTE).
4. The Glenigan database allows contractors to identify leads and to conduct construction market analysis. For the purposes of this analysis, we have used the Q3 2022 cut of data.

2.2 Estimate of labour demand

Figure 1 shows the outcomes of the analysis of future labour demand in the 12 boroughs. The blue area shows the labour demand arising from known projects in the Glenigan database. The grey area shows the labour demand arising from our estimate of work over and above that which is included in the known pipeline. This typically accounts for smaller projects and repair & maintenance (R&M)[5] work.

The total construction labour demand in the area including the volume of other work imputed from the CITB Construction Skills Network Forecast is 246,730 people in 2023. The projected growth between 2023 and 2027 suggests that the labour demand by 2027 will be around 250,370 people.
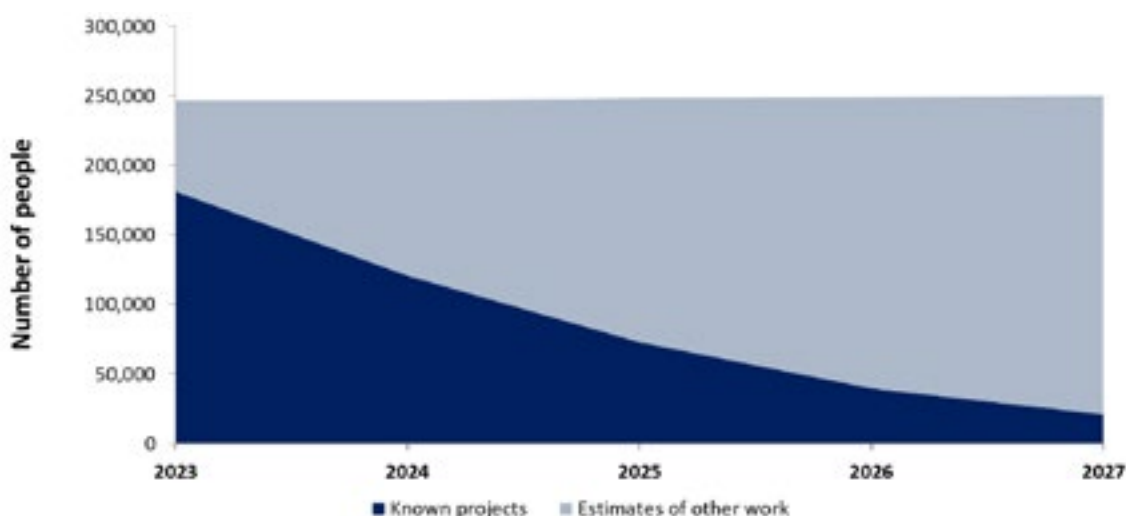
Figure 1: Total construction labour demand including estimates of other work (unknown R&M and new build)
A borough-level breakdown of the 2023 total labour demand is shown in Figure 2.
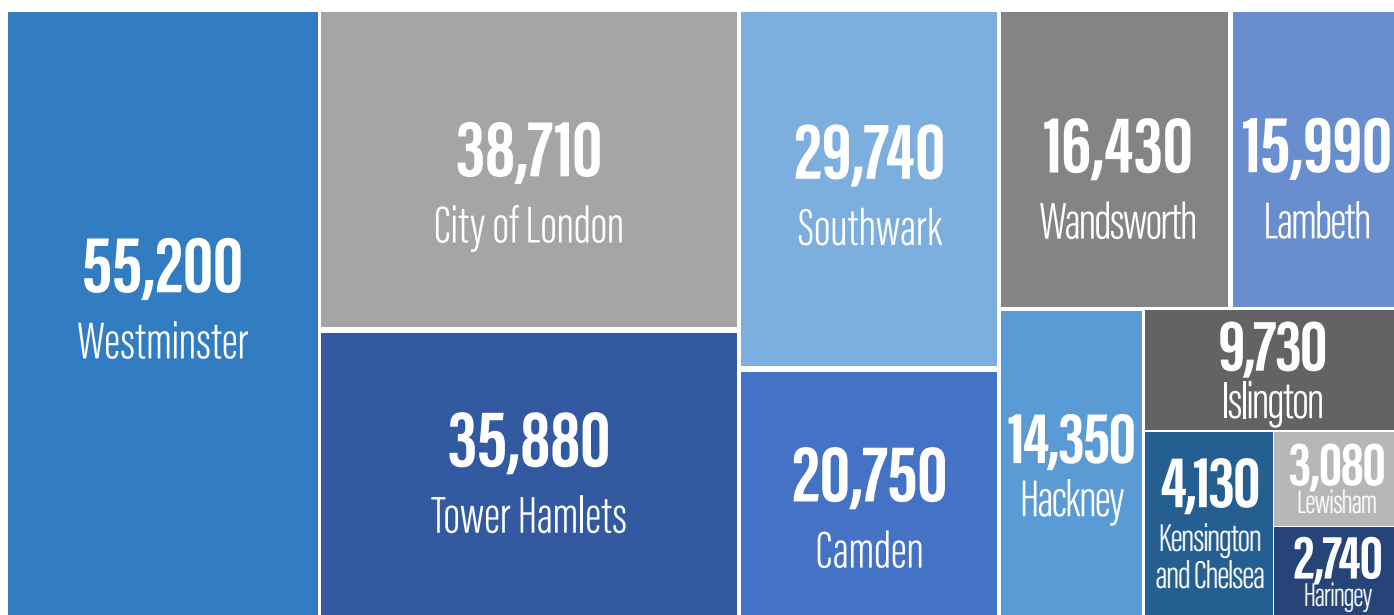
Figure 2: Total construction labour demand by borough

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5.   [Repair and maintenance] concerns work, which is either repairing something which is broken, or maintaining it to an existing standard. For housing output, this includes repairs, maintenance, improvements, house/ flat conversions, extensions, alterations, and redecoration on existing housing. For non-housing this includes repairs, maintenance, and redecoration on existing buildings, which are not housing, such as schools, offices, roads, shops." (Source: ONS, Appendix 2 to Construction Industry Statistics)

2.2.1 Construction labour demand by occupation in 2023

For 2023 the detailed breakdown for each of the 28 occupational groups for both the pipeline of known projects, estimates of other work and R&M is shown in Figure 3.

Figure 3: Construction labour demand by occupation in 2023

2.2.2 Labour demand by work type

Table 3 shows the labour demand generated by the known projects and the estimates of other work in 2023.

Table 3: Labour demand by work type in 2023[6]

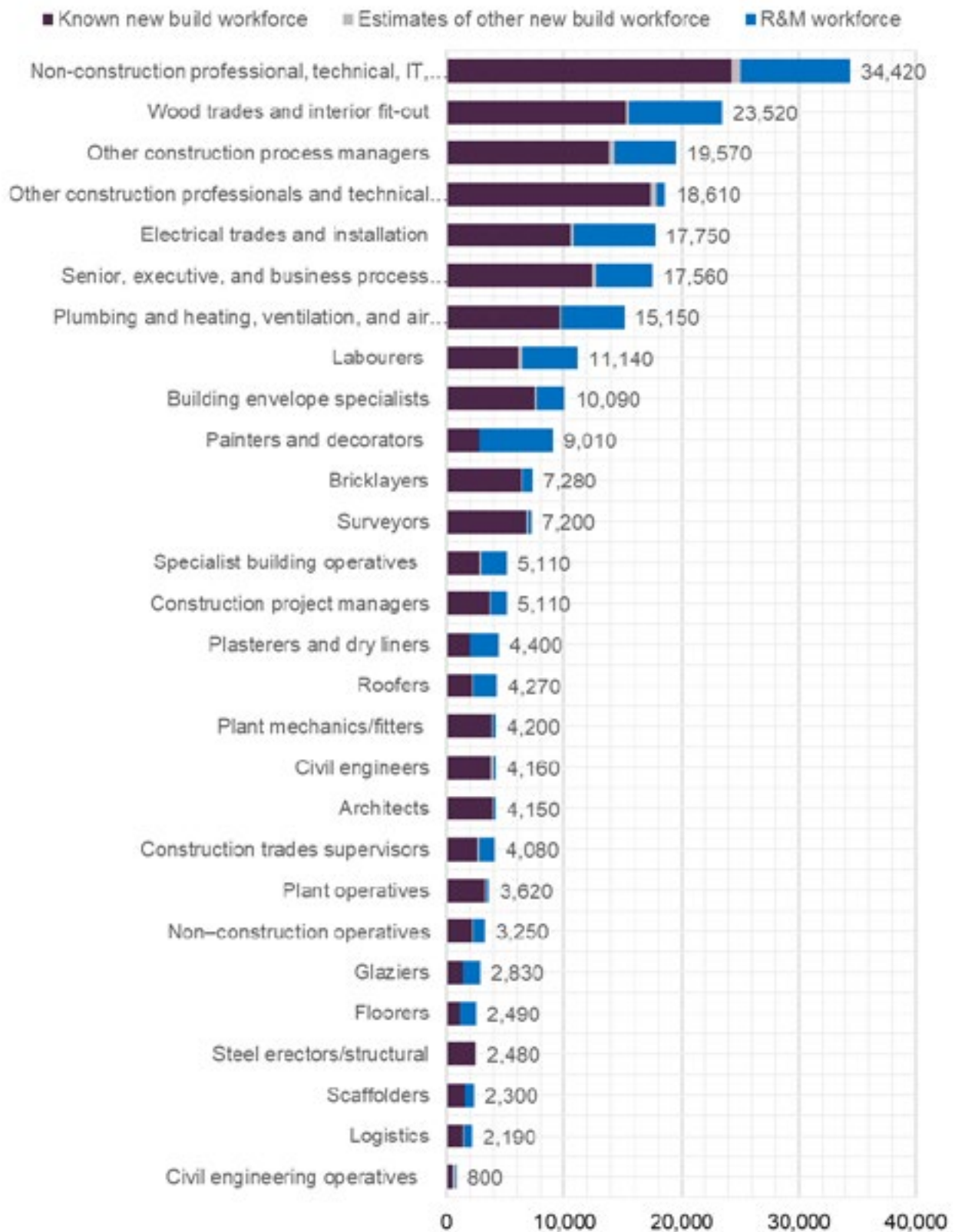| Project Type	Labour demand from known projects (people)	Labour demand from estimates of other work (people)	Total labour demand (people)	% of total in 2023
Private commercial	111,120	1,880	113,000	46%
Non-housing R&M	-	49,290	49,290	20%
New housing	40,510	-	40,510	16%
Housing R&M	10,340	10,480	20,820	8%
Public non-housing	13,410	-	13,410	5%
Infrastructure	5,360	3,410	8,770	4%
Private industrial	870	90	960	<1%
Total	181,610	65,150	246,760	100%

2.2.3 Labour demand by occupation in 2023 for commercial work

The focus of the Skyline Taskforce is on commercial work and so we have isolated that component of the workforce from the total. The labour demand for commercial work in 2023 is 113,000 across the twelve boroughs. This represents more than 45% of the total construction labour demand in the Sustainable Skyline areas. The detailed breakdown for each of the 28 occupational groups for the Glenigan commercial projects in 2023 is shown in Figure 4. This shows the breakdown by occupation for both the pipeline of known commercial projects and the estimates of other commercial work.

6.   Due to rounding totals might not correspond to the sum of the parts.

Legend: ■ Known new build workforce ■ Estimates of other new build workforce

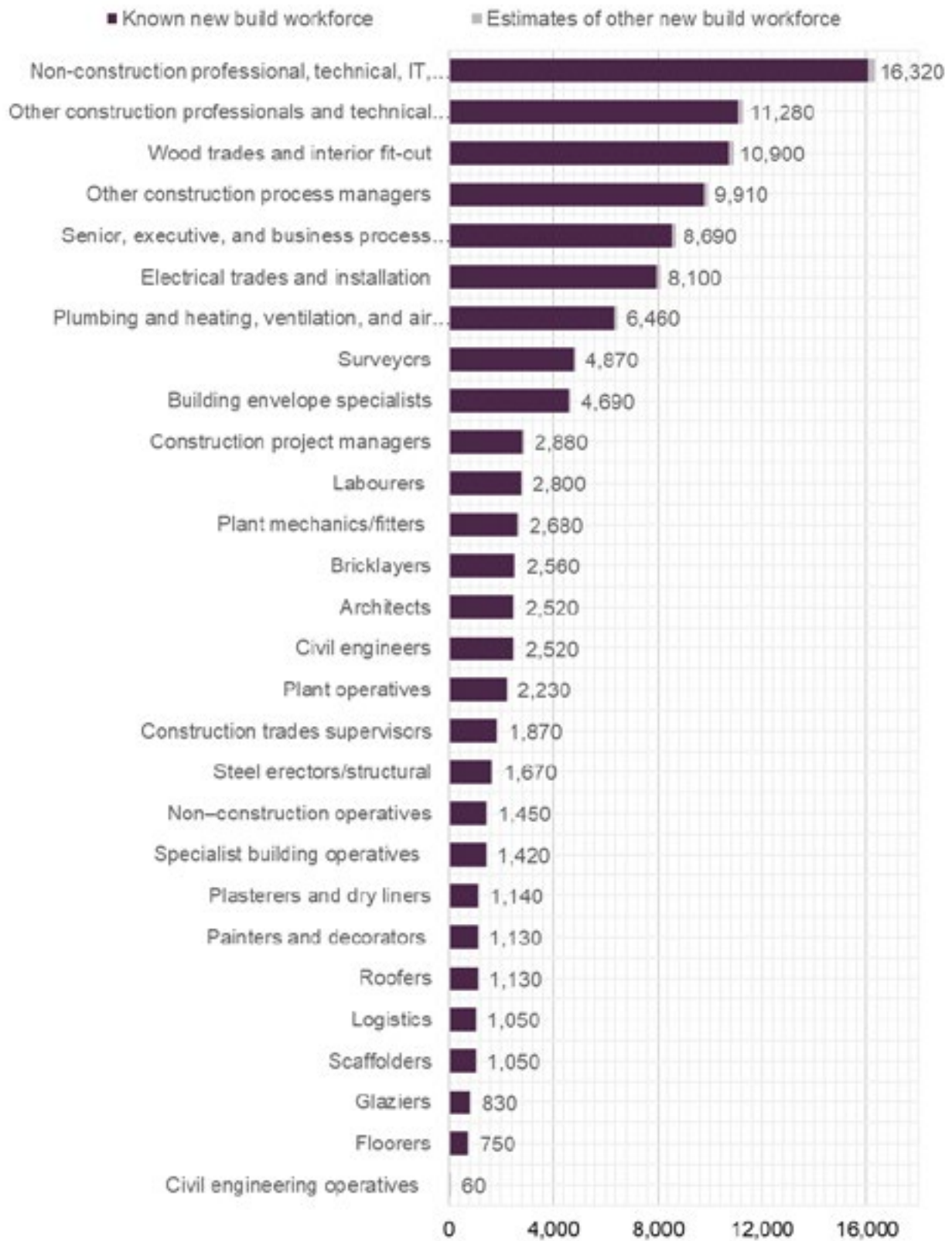| Occupation	Value
Non-construction professional, technical, IT,...	16,320
Other construction professionals and technical...	11,280
Wood trades and interior fit-out	10,900
Other construction process managers	9,910
Senior, executive, and business process...	8,690
Electrical trades and installation	8,100
Plumbing and heating, ventilation, and air...	6,460
Surveyors	4,870
Building envelope specialists	4,690
Construction project managers	2,880
Labourers	2,800
Plant mechanics/fitters	2,680
Bricklayers	2,560
Architects	2,520
Civil engineers	2,520
Plant operatives	2,230
Construction trades supervisors	1,870
Steel erectors/structural	1,670
Non–construction operatives	1,450
Specialist building operatives	1,420
Plasterers and dry liners	1,140
Painters and decorators	1,130
Roofers	1,130
Logistics	1,050
Scaffolders	1,050
Glaziers	830
Floorers	750
Civil engineering operatives	60

Figure 4: Construction labour demand by occupation in 2023: commercial

3. Low carbon skills demand for commercial retrofitting

The skills needs of the industry to respond to the drive towards net zero carbon is significant. In response to this it is important to understand the likely scale of the challenge faced by the 12 boroughs in delivering energy efficiency improvements for their commercial building stock. To provide an insight into this we have undertaken an analysis of energy performance certificates (EPCs) for properties in the boroughs. EPCs provide an assessment of the energy performance of properties on a scale of A to G, and outline the recommendations made by the assessor as to how this performance might be improved.

From the available EPCs we have analysed the recommendations[7] which require low carbon skills. The number of interventions represents the volume of activity which is required to be delivered. Using this volume of activity, we have used the appropriate models within CITB's Low Carbon Labour Forecasting Tool to derive the overall workforce by occupation. In conducting the analysis, it was necessary to make the following assumptions.

- Only properties with an EPC rating of below band C were included.
- Only EPCs lodged since 2013 have been included. Where multiple EPCs have been lodged for the same property the most recent EPC has been used.
- We have assumed that the distribution of recommendations for properties which do not have an EPC is the same as for properties for which an EPC is available.

Figure 5 shows the breakdown of the performance ratings reported in EPCs published since 2013 for commercial properties in the 12 boroughs. Just over 50% of the properties have a rating D and below. EPCs are not available for all the properties in the boroughs, but we estimate that the ones lodged cover 63% of all commercial properties in the area based on the number of commercial buildings in the 12 boroughs.[8]

We estimate that 23,550 person-years will be required to deliver the interventions for commercial properties. Details of the borough-level distribution can be found in Figure 6.
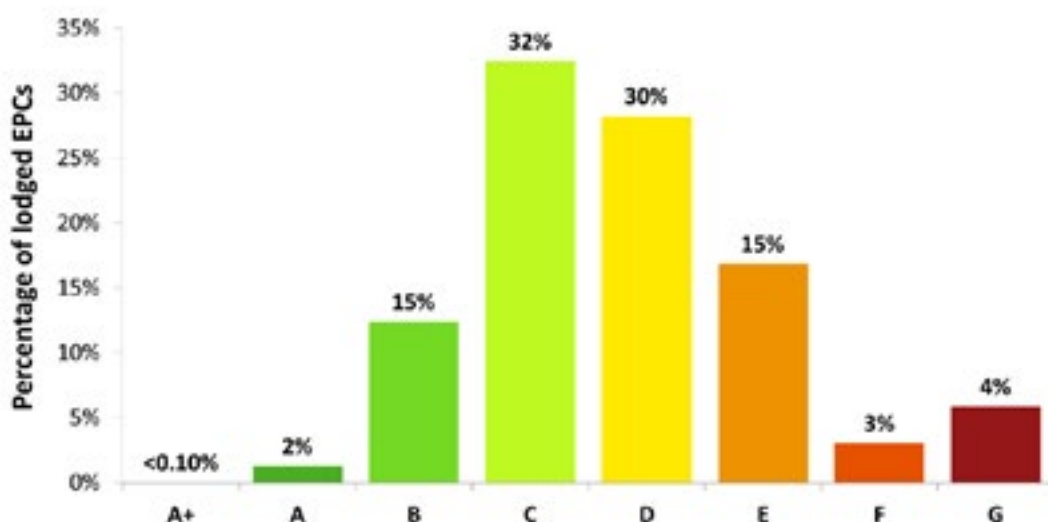

Figure 5: EPC profile of commercial properties across the 12 boroughs

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7. Examples of the recommendations which are included in the EPCs are air source heat pump, cavity wall insulation, low rise external solid wall insulation, Internal solid wall insulation.
8. Number of commercial buildings in the boroughs derived from Department for Business, Energy & Industrial Strategy data published as part of the National Energy Efficiency Data Framework.
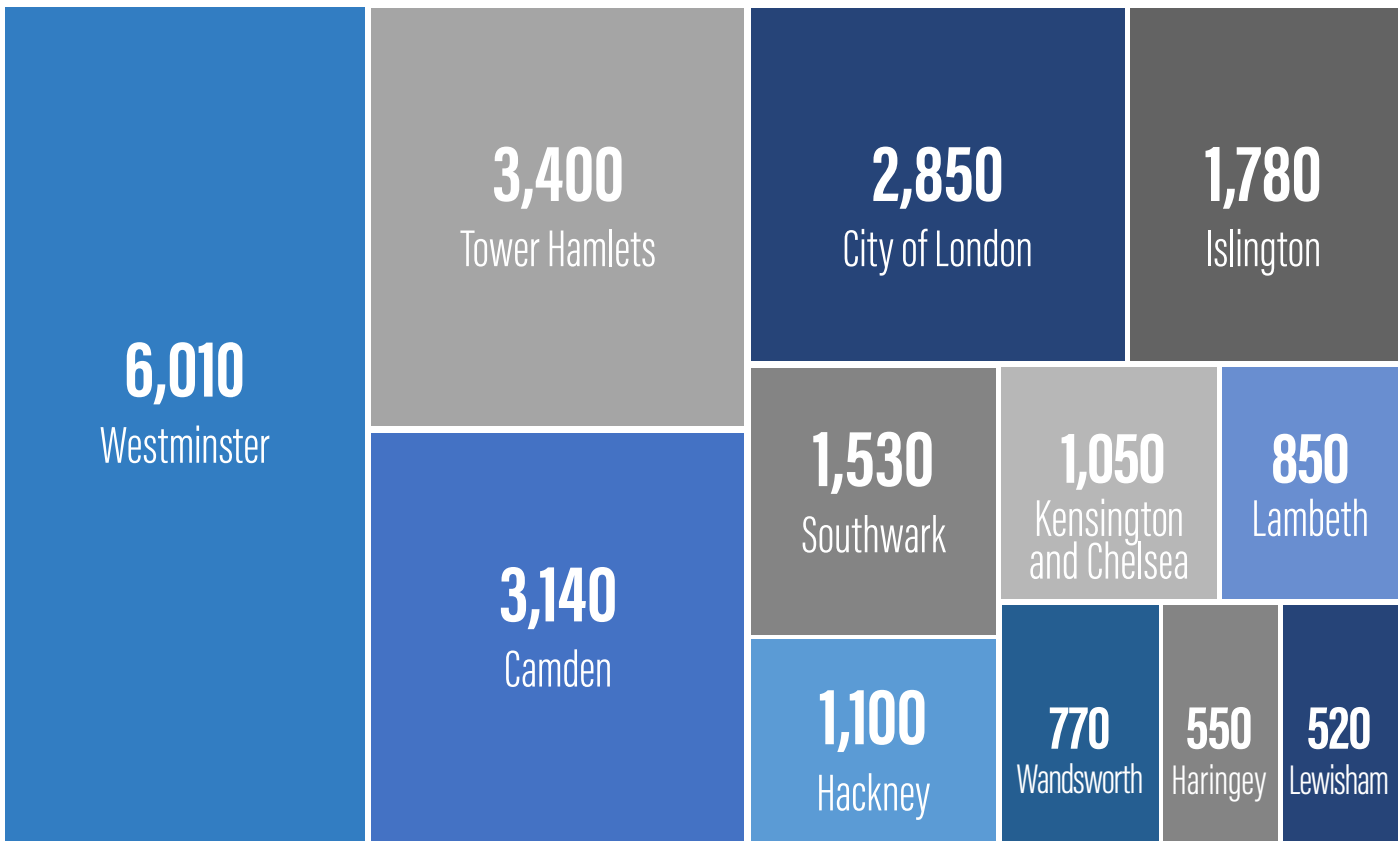
Figure 6: Estimated low carbon skill need for the 12 boroughs: person-years.

Whilst knowing the total number of person-years required to deliver a given set of interventions is useful to understand the scale of the task, it is also important to understand the timeframe in which the delivery is going to take place.

The average number of people required on a yearly basis to deliver the recommended EPC interventions depends on how ambitious the implementation plans are. To illustrate this, we considered two scenarios.

- **Scenario 1:** suggested interventions are being delivered over a 5-year period. This allowed us to align the low carbon skill demand analysis with the timeframe considered for the five-year period from 2023-27 for the wider construction demand analysis.
- **Scenario 2:** a less ambitious scenario allowing for delivery of the interventions over a 10-year period from 2023 to 2032.

Based on these scenarios, we estimated that the annual labour demand for low carbon skills needed to improve the energy performance of buildings rated D and below as being between 4,710 and 2,360 FTEs over the next five to ten years. The average annual low carbon skills demand by occupation for these two scenarios is shown in Figure 7.
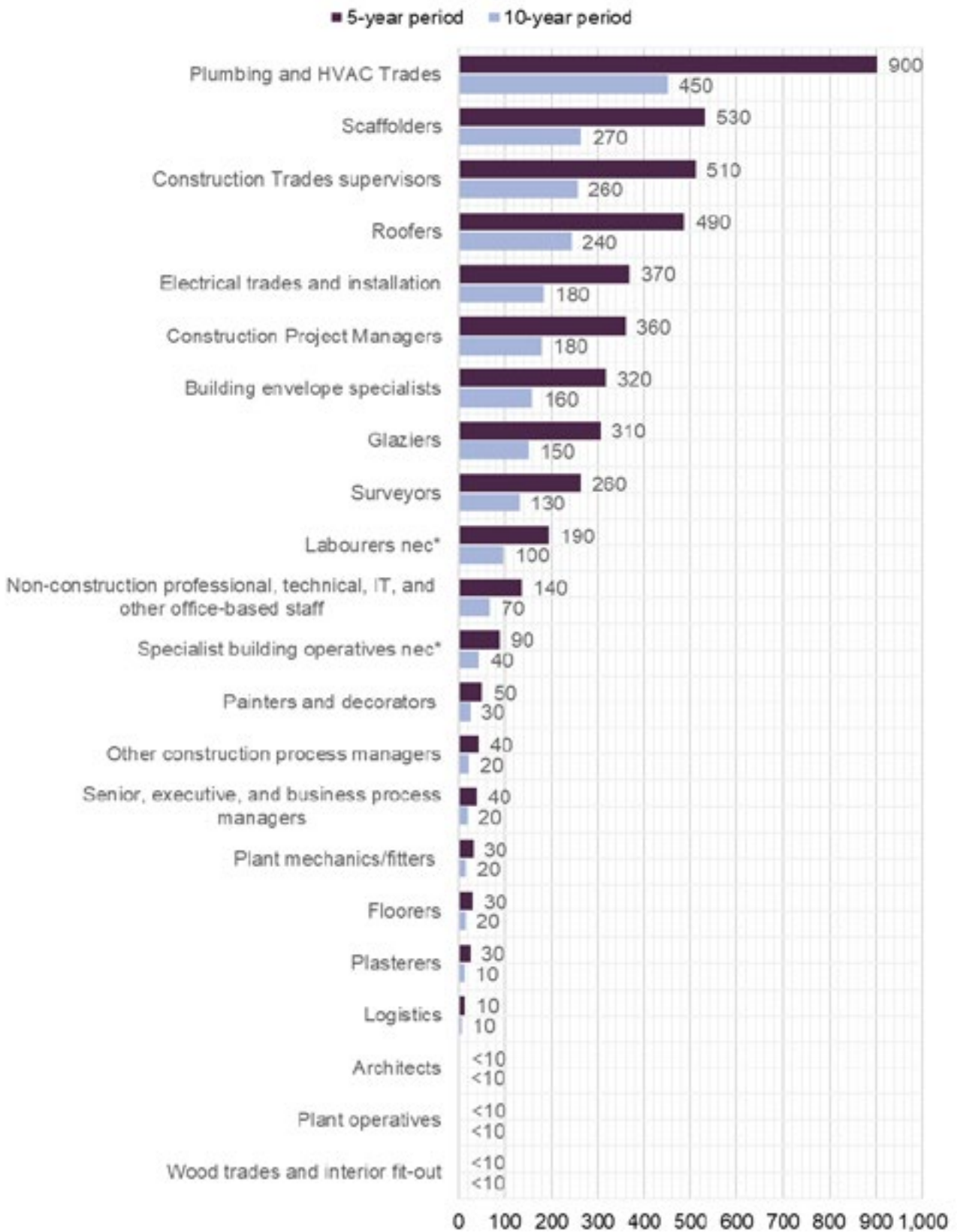
Figure 7: Low carbon skills demand by occupation for 5 year and 10-year implementation scenarios[9]

Under scenario 1 and 2, the estimated low carbon skills needed would account, respectively, for around 1-2% of the total construction labour demand over the 2023-27 period.

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9.   Building envelope specialists are any trade involved with the external cladding of a building other than bricklaying, for example, curtain walling. The include SOC Code 5319 - Construction and building trades not elsewhere classified.

The four occupations with the largest low carbon skill demands for commercial retrofit are as follows.
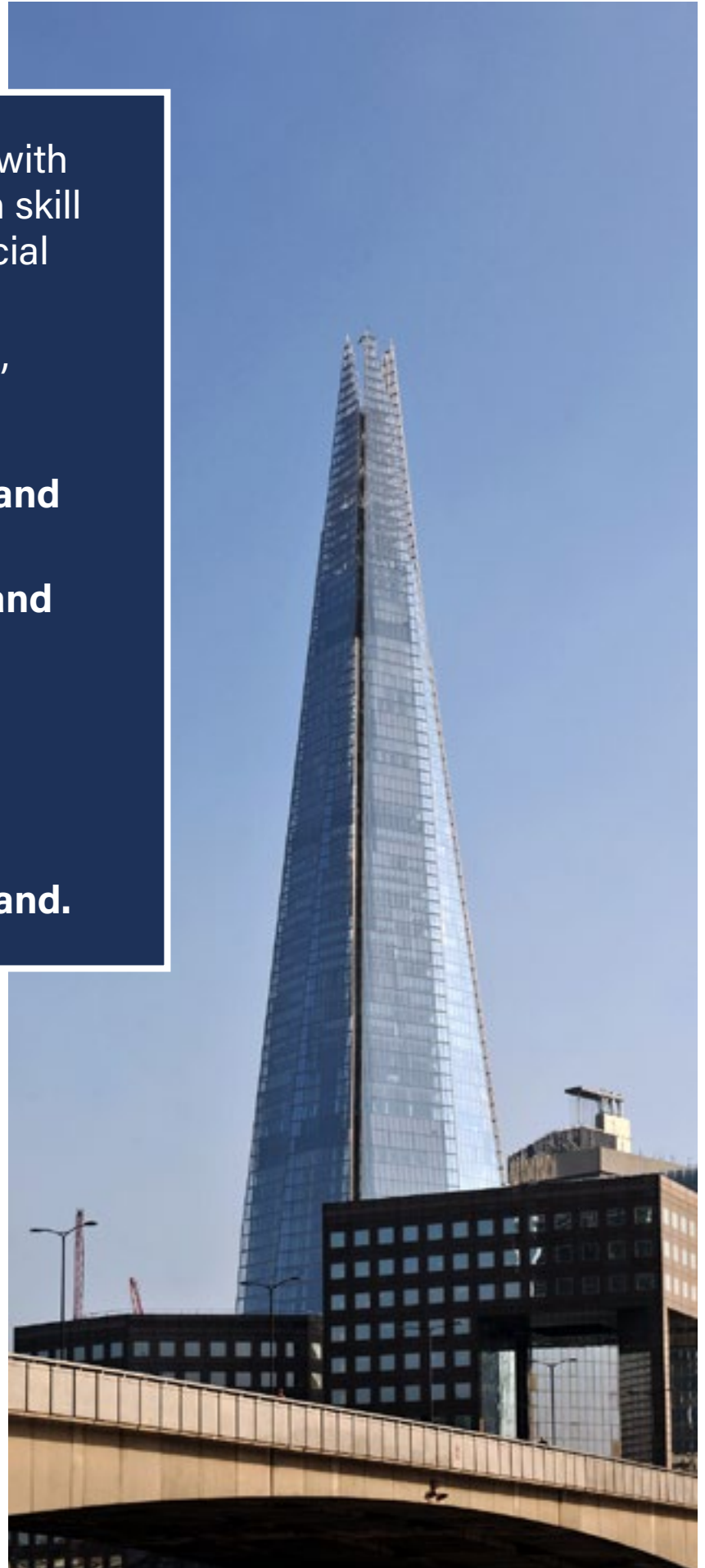
Plumbing and heating, ventilation, and air conditioning trades:
19% of the total demand

Scaffolders:
11% of the total demand

Construction trades supervisors:
11% of the total demand

Roofers:
10% of the total demand.

Borough-level details of the low carbon skills needs for commercial retrofitting can be found in the Technical Annex.

4. Construction supply

4.1 London overview

As the commercial work in the Skills for a Sustainable Skyline Taskforce area is part of the total construction work across London, it is useful to be aware of the general context. Latest figures for London show[10] that in 2022 there was:

- £36.5bn of total construction output.
- £8.2bn for new build commercial work (22% of total output).
- a total construction workforce of 411,000.

New build commercial work was the dominant sector for construction work in London, accounting for over a third of total output from 2000 - 2008, however, its share of work reduced following the 2008/2009 financial crisis and in 2021, private housing output overtook it as the main sector. This is due to a combination of declining commercial output and strong increases in private housing output since 2017. Although we see private housing continuing to be

the main sector for output over the next five years in London, commercial new build remains an important sector for construction work, and in 2022, London accounted for 36% of the UK's total commercial output.

Figure 8 illustrates the changes in construction output and workforce for London between 2014 and 2023. Output from 2014 was recovering from the 2008 financial crisis before dipping after 2017, which may be due to a drop in commercial work following the UK's decision to withdraw from the European Union. The impact of Covid-19 working restrictions was seen in 2020, with the construction industry bouncing back in 2021, then levelling off in 2022. Under current economic conditions, CITB are forecasting that output in London will either remain steady or decrease very slightly in 2023.
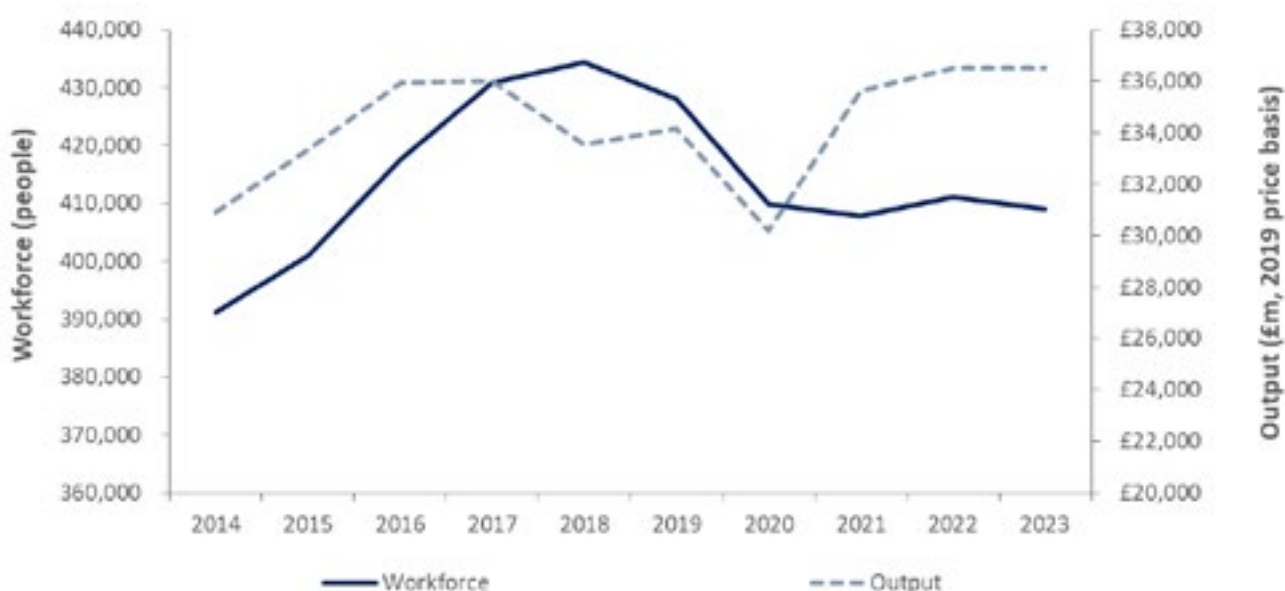

Figure 8: Construction output and workforce in London, 2014-2023. Source: CITB/Experian

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10.   CITB (2023) CSN Industry Outlook – Greater London 2023-2027

The construction workforce in London follows a similar pattern to output, although there tends to be a slight lag as the workforce responds to changes. The workforce peaked at over 430,000 in 2018 before dropping to around 410,000, which it has maintained over the last few years. In 2023, we are not expecting significant workforce growth as output levels off.

To help inform the view on the potential supply of construction workers for the taskforce area, we examined data from the Annual Population Survey (APS)[11], comparing workplace against where people live. The output from this analysis is summarised in Figure 9 below.

The work bar shows that 55% of the demand for construction workers in London between October 2021 and September 2022 was in the 12 boroughs of the taskforce area.

The live bar shows that around 20% of the construction workforce were residents in the taskforce area, and if we assume that all the construction workers who live within London, actually work within London, then an additional 20% would be coming in from outside London to meet demand.
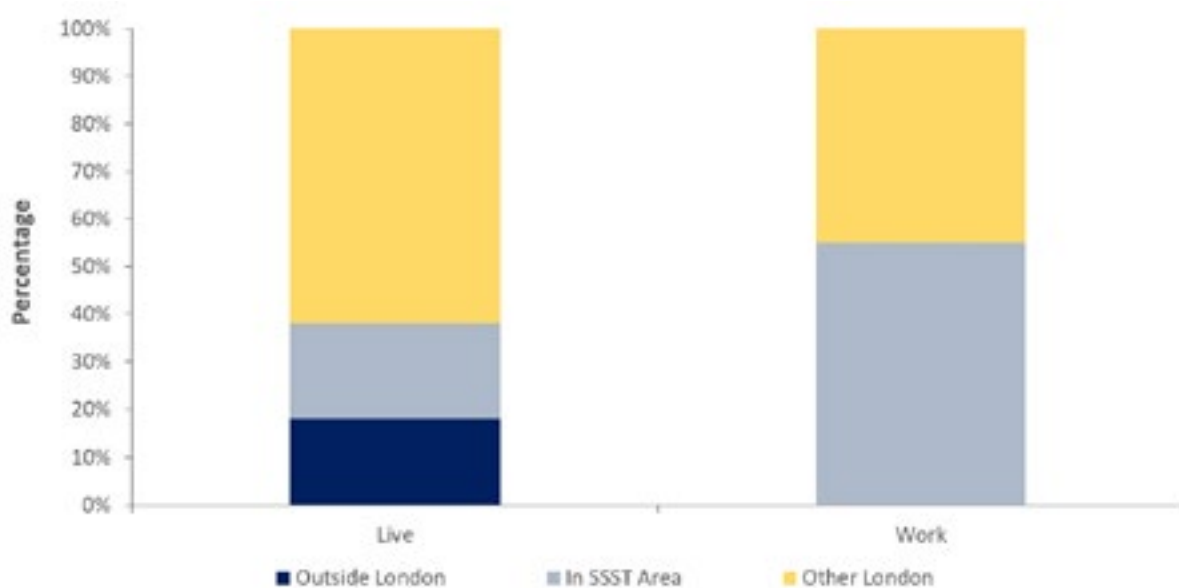

Figure 9: Analysis of construction workers, residence vs workplace. Source: Office for National Statistics

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11.   Office for National Statistics, Annual Population Survey, October 2021-September 2022, accessed through NOMIS.

In reality, this share is likely to be higher and recent CITB research[12] puts the figure for workers from outside London at 27%, although in previous reports it's been as high as 37%, which is due to workers from London carrying out work in other regions, mainly either the East of England or the South East. The research showed that in 2022:

- average travel distance for a London construction worker was 16 miles; and

- the maximum distances travelled to work were:

  - 47%: no more than 20 miles;

  - 28%: between 21 and 50 miles;

  - 20%: between 51 and 100 miles; and

  - 6%: more than 100 miles.

The average maximum travel distance for construction workers in London is less than the corresponding UK average, and there are two main points when looking at workforce mobility.

1. There is a clear pattern of construction workers moving between London, the East of England, and the South East regions. This movement goes in and out of London, highlighting the mobile and fluid nature of construction work.

2. The demand for construction work within the taskforce area far outweighs the number of construction workers that live within it, by a factor of around 2.5 times. Work in the taskforce area is pulling in people from other boroughs of London and other regions of the UK.

As commercial work in the taskforce area is only one aspect of construction work across London, and there is a high level of workforce movement around and into London, this creates a challenge when trying to assess demand against potential supply.

If the analysis is restricted to comparisons of demand and supply of workers within the taskforce area, then there will be very significant gaps in all occupational groups as the workforce required isn't there. This is also evidently an unrealistic comparison given the significant number of workers already travelling into the area for work.

Taking a view of potential supply from a wider area means comparing demand against larger supply values, in essence, the wider we look, the more workers there will be. This would mask potential gaps between demand and supply.

To overcome this, we have taken an approach that seeks to highlight how the occupational demand for new commercial work and net zero retrofit of commercial buildings differs from other types of construction work. This allows us to understand the main types of occupations that will be in demand, which we can then compare against data on current vacancies and training to give an outline of potential skills challenges that the taskforce is likely to face.

Looking first at how the workforce demand for commercial new build work in the taskforce area compares to the overall workforce in London, Table 4 highlights occupations that will be in particular demand.

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12.   CITB (2022) Workforce Mobility and Skills in the UK Construction Sector 2022, London Report

Table 4: Commercial workforce build profile vs overall construction, London, 2023

CITB Occupational groups	Commercial (share %)	All construction (share %)	Commercial as % of London workforce
Other construction professionals and technical staff	10.0%	8.1%	34%
Plumbing and heating, ventilation, and air conditioning trades	5.7%	3.9%	40%
Wood trades and interior fit-out	9.6%	7.9%	34%
Plant mechanics/fitters	2.4%	1.0%	69%
Electrical trades and installation	7.2%	6.0%	33%
Steel erectors/structural	1.5%	0.5%	76%
Scaffolders	0.9%	0.3%	96%

The occupations identified in the table have a demand which is greater for commercial work than their corresponding share of the London workforce. For example, plumbing and HVAC trades make up 5.7% of the workforce demand for commercial work, while accounting for 3.9% of the total construction workforce demand in London. There are also some occupations identified where the demand for commercial work represents a very significant share of the occupational workforce, for example scaffolders involved in commercial work account for nearly all the scaffolder demand in London (96%).

The percentages of commercial share also highlight that of these occupations, four will account for 33% of the total commercial workforce demand, so they are critical in terms of their share and actual number of workers needed.

- Other construction professionals and technical staff
- Plumbing and heating, ventilation, and air conditioning trades
- Wood trades and interior fit-out
- Electrical trades and installation

The analysis of potential low carbon skills for commercial retrofit demand in the taskforce area identifies similar areas of occupational demand. Plumbing and HVAC trades, scaffolders, and construction trades supervisors are all ranked as the main occupational groups that will be in demand for work, with electrical trades also heavily involved.

Looking at construction job vacancy postings in London, Figure 10 shows that the level of online job postings in London has stayed high through 2021 and 2022, then rising sharply in January 2023. While there can be some seasonal variation in vacancies, due to weather having an influence on how construction work progresses, this is a pattern we've seen across the UK and indicative of the recruitment difficulties reported by construction companies. Although Figure 10 focused on Jan 2021 to Jan 2023, when looking back further to the end of 2019, vacancies were around half of the current level.
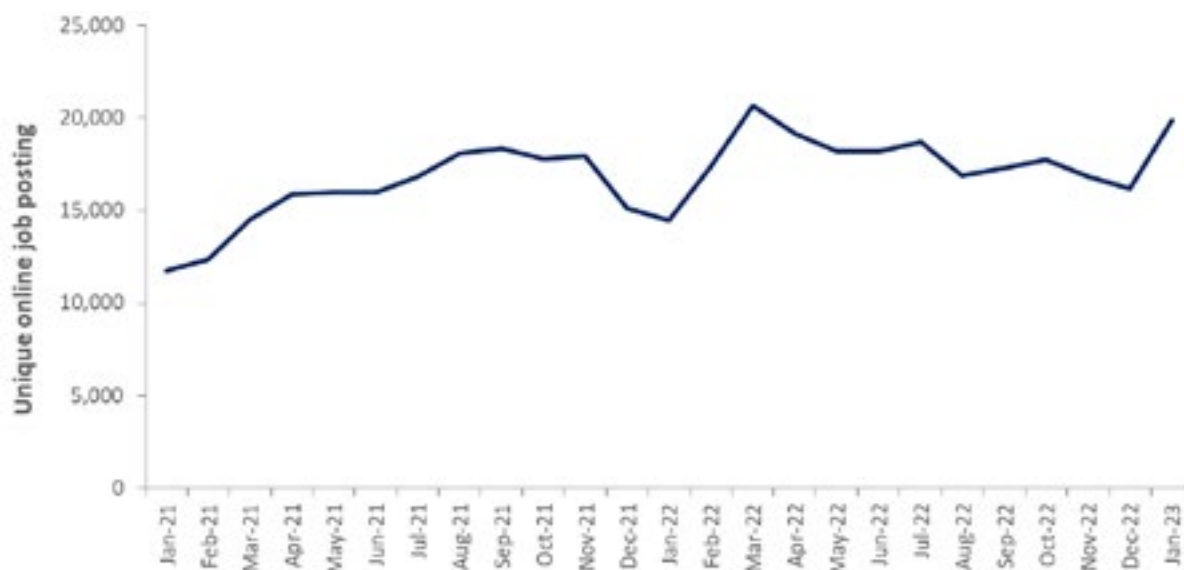
Figure 10: Construction vacancies per month, London[13].

The main construction occupations with advertised vacancies are as follows.

- Quantity surveyors/building surveyors
- Infrastructure engineers
- Field service engineers
- Labourers
- Carpenters
- Site managers
- Electricians
- Structural engineers
- Engineering managers
- Gas engineers
- Plumbers

Although surveyors were not an occupation that was highlighted as being in demand for commercial new build or low carbon retrofit work, they would be involved, and could help with advice and guidance on the installation of appropriate retrofit measures. The range of engineering occupations would be picked up in the 'Other construction professionals and technical staff' group, while the demand for carpenters, electricians and plumbers highlights that there is an existing difficulty in recruiting people with these skills.

Looking at demand against current vacancies highlights that the work being taken forward in the taskforce area will create a demand for workers in occupations that are already experiencing a shortage.

One way of addressing this challenge is through the training and development of future workers and to understand this for London, it is helpful to look at the training which is taking place. As most construction related training is supported by public funding, either through further education or apprenticeships, both aspects will be discussed in turn, covering the general training that has been taking place, along with training that is linked to low carbon skills.

4.1.1 Further education

We looked at learning aims at Level 2 and above that were taken during the 2021/22 academic year for London, for learners in further education. While there is a significant portion of training at Level 1, this tends to cover aims that either help learners progress into further training or, are general introductory aims. Qualifications at Level 2 and above tend to be recognised by industry as being the starting points for construction careers in skilled trades, especially for occupational competence when the qualifications are linked to learning in the workplace.

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13.   Source: Lightcast, online vacancy postings, selected construction occupations

At a headline level, and taking into account the relative workforce/population in each region, the volume of further education training in London is comparable to training taking place in either the East of England or the South East, as shown in Table 5.

Table 5: Construction subject area, learning aim enrolments, 2021/22

Region	Level 2	Level 3	Level 4+
London	5,964	1,908	45
East of England	4,146	2,032	17
South East	4,980	1,389	8

Source: Department for Education

There is a similar volume of learning being undertaken, with provision being delivered in each region by around 35-45 providers, and a small group of 10-15 providers delivering most learning in each region (around 80% of all learning aims).

Within London the main providers of further education learning in 2021/22 were as follows.

- South Bank Colleges
- New City College
- United Colleges Group
- London South East Colleges
- Barnet & Southgate College
- The WKCIC Group[14]
- HCUC[15]
- South Thames Colleges Group
- Waltham Forest College
- Barking And Dagenham College

The main construction learning aims being taken in London were as follows:

- Diploma in Electrical Installations (Buildings and Structures)
- Advanced Technical Diploma in Electrical Installation

- Diploma in Plumbing Studies
- Advanced Technical Diploma in Plumbing
- Certificate in Removal of Non-hazardous Waste (Construction)
- NVQ Diploma in Associated Industrial Services Occupations - Passive Fire Protection
- Diploma in Site Carpentry
- NVQ Diploma in Occupational Work Supervision (Construction)
- NVQ Certificate in Construction and Civil Engineering Operations
- Diploma in Bricklaying

The main learning aims being taken in London are similar to those being taken in the East of England and the South East, apart from Passive Fire Protection, which is mainly in London. The similarities in the three regions for further education point towards an established network of further education training that supports the main occupations such as electricians, plumbers, carpenters, and bricklayers.

Looking within the range of further education learning aims being taken in London that would support net zero carbon work (Appendix A), in 2021/22 there were:

- Two providers delivering the level 2 Diploma in Refrigeration, Air Conditioning and Heat Pump Systems, with a total of over enrolments on this learning aim;
- One of those providers delivered the level 3 Diploma in Refrigeration, Air Conditioning and Heat Pump Systems, with less than 5 enrolments on this learning aim;
- One provider who delivered the level 2 Award in Understanding Domestic Retrofit, with less than 5 enrolments on this learning aim; and
- There were no learning aims that were linked to solar photovoltaic installation, insulation treatments or energy advice/energy assessment.

When looking across the East of England and the South East, a similar pattern emerges with low volumes of learning aims being delivered for heat pumps and retrofit assessment, and nothing as yet for other qualifications that would support net zero carbon skills.

4.1.2 Apprenticeships

We looked at apprenticeships in a similar way, again comparing London to the East of England and South East regions. Unlike further education there is a noticeable difference when it comes to the number of apprenticeships being delivered in London and the occupations they support. Table 6 shows that London has a significantly higher number of Higher and Degree level apprenticeships, and lower numbers of Intermediate and Advanced levels when compared to either the East of England or the South East.

Table 6: Apprenticeship starts by level, construction subject area, delivery region, 2021/22

Region	Intermediate	Advanced	Higher
London	705	449	1,195
East of England	1,121	696	358
South East	1,453	1,071	476

Source: Department for Education

The main occupations supported by the different levels of apprenticeships are as follows.

- Intermediate: Carpentry, Bricklaying, Property Maintenance
- Advanced: Plumbing and Domestic Heating Technician; Maintenance and Operations Engineering Technician
- Higher: Chartered Surveyor (Degree), Construction Site Supervisor, Civil Engineer (Degree)

Electrical apprenticeships are covered in the Engineering and Manufacturing sector subject area, not Construction, therefore they are not included in Table 6. However, Installation Electrician and Maintenance Electrician apprenticeships are delivered in all regions and follow the same pattern shown above with lower numbers in London and the highest in the South East.

Although the number of apprenticeship starts varies, there are a similar number of providers delivering in each region. Between 75-95 providers delivered apprenticeship starts in each area, which is a wider spread than noted with further education.

The main apprenticeship providers in London for 2021/22 were as follows.

- London South Bank University
- University College of Estate Management
- Simian Risk Management Limited
- London South East Colleges
- New City College
- The University of Westminster

For London South Bank University, University College of Estate Management and The University of Westminster it is higher level apprenticeships that are the main driver of start numbers.

Within the range of apprenticeships that are related to low carbon skills (Appendix B), Table 7 shows that in 2021/22 there were starts in London for a number of relevant apprenticeships. The main start numbers were in electrical and plumbing apprenticeships, which reflects the wider demand for these occupations.

Table 7: Apprenticeship standards related to low carbon skills for construction, London, 2021/22

Standard name	Code	Starts
Building Services Design Engineer (Degree)	ST0372	69
Building Services Engineering Craftsperson	ST0062	33
Building Services Engineering Installer	ST0065	25
Building Services Engineering Senior Technician	ST0041	57
Building Services Engineering Service and Maintenance Engineer	ST0061	53
Building Services Engineering Site Management (Degree)	ST0040	8
Building Services Engineering Technician 2022	ST0063	25
Installation Electrician and Maintenance Electrician	ST0152	481
Plumbing and Domestic Heating Technician	ST0303	172
Refrigeration Air Conditioning and Heat Pump Engineering Technician	ST0322	36

Source: Department for Education

When compared to the East of England and South East regions, the start numbers in London were higher for Building Services Engineering apprenticeships and lower for both electrical and plumbing apprenticeships.

5. Conclusions and recommendations

In looking at demand against supply, the following picture emerges.

- There is a significant demand in the taskforce area for building new commercial property that is energy efficient, and for retrofitting existing building to improve their energy efficiency. Our analysis suggests that the total labour demand for commercial work in 2023 in the SSST area is 113,000 people. This represents more than 45% of the total construction labour demand in the area and over 27% of the construction demand in London.

- This demand is likely to continue to represent a significant proportion of future construction work in London.

- During 2023, the most labour-intensive occupational group both borough-wide and in the context of commercial work is non-construction professional, technical, IT and other office–based staff with an annual demand of 34,420 people (of which 16,320 are engaged in commercial work).

- The estimate of the three largest labour demands in the trade occupations in 2023 for commercial work are as follows.
  - Wood trades and interior fit-out trade: 10,900 people
  - Electrical trades and installation trades: 8,100 people
  - Plumbing and heating, ventilation, and air conditioning trades: 6,460 people.

- Estimated low carbon skill needs for the retrofit of commercial properties falling in an EPC band of D or below could account for around 2% of the total construction labour demand for commercial properties over the 2023-27 period. This will depend on the pace at which energy improvements are being delivered.

- The workforce that is meeting current workload demand in the taskforce area is being drawn in from a wide geographic area, certainly from across London and from adjacent regions of England.

- With the scale of workforce demand outlined in the report, it is highly likely that the supply of workers to meet future demand will continue to be drawn in from a wide geographic area.

- The main occupations that will be needed for the work are currently experiencing a high level of job vacancies being advertised in London, with companies reporting difficulty when trying to recruit new staff.

- In 2021/22 further education training covering a range of construction operations was being delivered by providers in London. The volume of learning in London was similar to that being delivered in either the East of England or the South East.

- However, there was very little further education training identified that was linked to low carbon skills related qualifications.

- In 2021/22 apprenticeship training in London was noticeably different to what was delivered in either the East of England or the South East. Apprenticeship start numbers were slightly lower overall, and noticeably lower for skilled trade occupations such as electricians and plumbers.

- As with further education training, there was very little Apprenticeship provision that was linked to low carbon skills related qualifications.

In summary, the overall conclusions from the work suggest that there is going to be a sizeable demand for workers with skills to deliver a built environment in Central London that achieves net zero emissions. These skills are lacking in the current workforce in the volume that will be needed and the training infrastructure to support development of these skills in London has not yet been established.

We recognise that the Skills for a Sustainable Skyline Taskforce has a programme of work that will look to:

1. **Build the evidence base** on the planning pipeline, skills gaps, qualifications gaps, identifying barriers to action, and the business case for investing in green skills.

2. **Deliver impactful interventions which directly address the issues raised in the evidence piece.** This may involve career and qualification pathways, unlocking financing for upskilling, planning policy, procurement rules etc.

3. **Deliver an industry engagement campaign** to promote reskilling and upskilling among the existing workforce, and raising career awareness amongst Londoners, including those from underrepresented backgrounds.

We hope that the research will provide evidence that helps to deliver this work, although we also suggest that three further recommendations should be considered.

- Energy Performance Certificates (EPCs) for non-dwelling buildings that are being sold or rented have been required since 2013, however, only half of the commercial property in the taskforce area has a current EPC rating. To have a fuller view on the scale of the retrofitting task we recommend that the taskforce encourages building owners in the area to have an EPC assessment carried out. The progression to a net zero emissions-built environment will require an understanding of what the energy performance of current builds is in order to determine how best to improve in the future.

- Progression to a net zero built environment will take time and investment, both in terms of capital investment to improve buildings, and investment in the workforce to ensure they are equipped with the necessary skills. CITB's research[16] into retrofit work highlighted three relevant points:

- Construction employers need confidence that there will be a long-term pipeline of work when looking to make investments in workforce skills. The better the taskforce can clearly demonstrate this, the more likely it is that employers will make the necessary investment.
- Consider the use of building passports/building renovation passports[17], which set out their initial state, the actions and changes that have taken place, and how this has impacted energy performance.
- Collaborative working. Industry, government, and stakeholders will need to work collaboratively and consistently to address the retrofit challenge as it will affect all aspects of construction work in London. There is an opportunity for the Skyline Taskforce to be a voice for this in London.

- And linked to the theme of collaborative working, although the work focused on the London boroughs within the taskforce area, the geographic workforce patterns show that there must be a pan-London approach for skills development. We would recommend that the taskforce actively works with other initiatives that are taking place across London to develop net zero/low carbon skills.

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16.   CITB (2022) Net Zero and Construction: Perspective and pathways
17.   Harrow, Richmond, and Uxbridge Colleges

Appendix A: Examples of qualifications related to Net zero/low carbon skills

Roles	Required qualifications
Ground and/or air source heat pump installers	The following qualifications can be used to demonstrate competency towards MCS certification: • BPEC Level 3 Award in the Installation & Maintenance of Heat Pump Systems (non-refrigerant Circuits) • BPEC Heat pump systems (NOS Mapped) • BPEC Level 3 Award in the Installation & Maintenance of Heat Pumps Systems (Non-refrigerant Circuits) - 600/6606/4 • City & Guilds Level 3 Award in the Installation and Maintenance of Heat Pump Systems (non-refrigerant Circuits) • City & Guilds Level 3 Award in the Installation of Heat Pump Systems (non-refrigerant Circuits) • City & Guilds Level 3 NVQ Diploma in Domestic Plumbing and Heating (6189-31) (600/1122/1) Heat pumps pathway • EAL Level 3 Award in the Installation & Maintenance of Heat Pump Systems (Non-refrigerant Circuits) • EAL Level 3 Award in the Installation of Heat Pump Systems (Non-refrigerant Circuits) • LCL Level 3 Award in the Installation & Maintenance of Heat Pump Systems (Non-refrigerant Circuits) • LCL Level 3 Award in the Installation & Maintenance of Air Source Heat Pump Systems (non-refrigerant Circuits) • BPEC Level 3 NVQ Dip in Domestic Heating 600/6871/1 - EN2 (Heat Pumps) • BPEC Level 3 NVQ Dip in Domestic Plumbing & Heating 600/6863/2 - EN2 (Heat Pumps) • NICEIC Heat Pump qualification • ProQual Ltd Award in the Installation of Heat Pump Systems (Non-refrigerant Circuits) • City & Guilds Level 3 NVQ Diploma in Domestic Heating (6189-41) 600/1473/8 Heat pumps pathway
Home energy systems integrators	No qualification - responsibility lies within each individual trade Training for controls covered by individual trades - e.g., plumbing/electrical courses. It does not cover on how these need to integrate together, compatibility of technologies, interfaces between different control systems

Roles	Required qualifications
Solar thermal installers	The following qualifications can be used to demonstrate competency towards MCS certification for SOLAR THERMAL: - BPEC Level 3 Award in the Installation & Maintenance of Solar Thermal Hot Water Systems - BPEC Level 3 Award in the Installation & Maintenance of Solar Thermal Hot Water Systems - 600/6608/8 - BPEC Solar thermal systems (NOS mapped) - City & Guilds Level 3 Award in the Installation & Maintenance of Solar Thermal Hot Water Systems - City & Guilds Level 3 NVQ Diploma in Domestic Plumbing and Heating (6189-31) (600/1122/1) Solar thermal pathway - City & Guilds Level 3 Award in the Installation of Solar Thermal Hot Water Systems - EAL Level 3 Award in the Installation and maintenance of Solar Thermal Hot Water Systems - EAL Level 3 Award in the Installation of Solar Thermal Hot Water Systems - LCL Level 3 Award in Energy Efficiency for Gas fired and Oil fired domestic heating and Hot water systems - LCL Level 3 Award in Installation and maintenance of Solar Thermal Hot Water Systems - BPEC Level 3 NVQ Dip in Domestic Heating 600/6871/1 - EN (Solar Thermal) - BPEC Level 3 NVQ Dip in Domestic Plumbing & Heating 600/6863/2 - EN (Solar Thermal) - NICEIC Solar Thermal Hot Water qualification - ProQual Ltd Level 3 Award in the Installation and Maintenance of Solar Thermal Hot Water Systems - ProQual Ltd Level 3 Award in the Installation of Solar Thermal Hot Water Systems - City & Guilds Level 3 NVQ Diploma in Domestic Heating (6189-41) 600/1473/8 Solar thermal pathway

Roles	Required qualifications
Solar PV installers	The following qualifications can be used to demonstrate competency towards MCS certification for SOLAR PV: ▪ BPEC Level 3 Award in the Installation & Maintenance of Small Scale Solar Photovoltaic Systems ▪ BPEC Level 3 Award in the Installation & Maintenance of Solar Thermal Hot Water Systems - 600/6283/6 ▪ BPEC Solar photovoltaic (NOS mapped) ▪ City & Guilds Level 3 Award in the Installation & Maintenance of Small Scale Solar Photovoltaic Systems ▪ City & Guilds Level 3 in the Installation of Small Scale Solar Photovoltaic Systems ▪ EAL Level 3 Award in the Installation and maintenance of Small Scale Solar Photovoltaic Systems ▪ EAL Level 3 Award in the Installation of Small Scale Solar Photovoltaic Systems ▪ LCL Level 3 Award in Installation and maintenance of Small Scale Solar Photovoltaic Systems ▪ ProQual Ltd Level 3 Award in the Installation and Maintenance of Small Scale Solar Photovoltaic Systems ▪ ProQual Ltd Level 3 Award in the Installation of Small Scale Solar Photovoltaic Systems

Roles	Required qualifications
Battery storage installers	• For MCS accreditation, installers need training / experience of solar PV systems in accordance with standard requirements; All personnel involved in the installation of an EESS, either employed by, or subcontracted to, the MCS Contractor shall be skilled or instructed for the activities they undertake
Insulation installers	• Insulation and Building Treatments L2 NVQ • Insulation and Building Treatments L3 NVQ The following qualifications can be used to demonstrate competency towards MCS certification: • BPEC Part L Energy Efficiency • Energy Efficiency related Building Regulations: Part L - CIBSE See CIBSE energy efficiency training
Smart heating controls installers	• Schneider Electric runs training EcoXpert for electricians with technical qualifications around smart home Manufacturers will run their own courses e.g., https://www.vaillant.co.uk/for-installers/training/course-information/vaillant-controls-installation-and-setup/ and https://www.worcester-bosch.co.uk/professional/training/courses/worcester-controls-training-course
Domestic energy advisors	• City & Guilds Energy Awareness (6281-01) • Level 3 Renewable Energy in the Home
Heat network installers	• REHAU's RE04 District Heating Installation Academy course • Heat networks Code of Practice - CIBSE • Vocational qualification, apprenticeship, or EAS compliance route, e.g., NVQ Level 2 and 3 plumbing and heating qualification.
Retrofit designers	• Low Carbon Consultant, CIBSE • ISO 50001:2018 Energy Management System/Low Carbon Consultancy, CIBSE • Low Carbon Buildings and Energy Infrastructure for Local Authorities • L3 Award in Home Energy Advice • L3 Diploma in Green Deal Advice • L3 Certificate in Domestic Energy Assessment • L3 Certificate in Retrofit Advice • L4 Award in Retrofit Assessment • L5 Award in Retrofit Coordination and Risk Assessment
Retrofit coordinators	• Retrofit Coordinator Training (to comply with PAS 2035) • L2 Award in Understanding Domestic Retrofit • L3 Certificate in Domestic Energy Assessment • L3 Certificate in Retrofit Advice • L4 Award in Retrofit Assessment • L5 Award in Retrofit Coordination and Risk Assessment

Roles	Required qualifications
Retrofit assessors	• Retrofit Assessor Training (provides training for PAS 2035 for those already trained as DEAs)
	• Domestic Energy Assessor (DEA) Training
	• Non-Domestic Energy Assessors (NDEA)
	• L3 Award in Home Energy Advice
	• L3 Diploma in Green Deal Advice
	• L3 Certificate in Domestic Energy Assessment
	• L3 Certificate in Retrofit Advice
	• L4 Award in Retrofit Assessment
	• L5 Award in Retrofit Coordination and Risk Assessment

Appendix B: List of Apprenticeship standards that support Net zero Carbon skills

Title	Code	Level	Area
Electrical or electronic technical support engineer (degree)	ST0024	6	Electrical commercial
Building services engineering site management (degree)	ST0040	6	Commercial building services
Building services engineering senior technician	ST0041	4	Commercial building services
Building services engineering ductwork installer	ST0060	2	Commercial building services
Building services engineering service and maintenance engineer	ST0061	3	Commercial building services
Building services engineering craftsperson	ST0062	3	Commercial building services
Building services engineering technician 2022	ST0063	3	Commercial building services
Building services engineering ductwork craftsperson	ST0064	3	Commercial building services
Building services engineering installer	ST0065	2	Commercial building services
Installation electrician and maintenance electrician	ST0152	3	Electrical commercial
Plumbing and domestic heating technician	ST0303	3	Plumbing
Refrigeration air conditioning and heat pump engineering technician	ST0322	3	Commercial building services
Building services design engineer (degree)	ST0372	6	Commercial building services
Building services engineering ventilation hygiene technician	ST0391	3	Commercial building services
Low carbon heating technician	ST1020	3	Plumbing

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