SOUTH WEST NET ZERO HUB RETROFIT SKILLS REPORT

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WRITTEN BY GEMSERV

Gemserv

South West NET ZERO HUB

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EXECUTIVE SUMMARY

OVERVIEW

Gemserv was commissioned by the South West Net Zero Hub to undertake research to support the South West region to meet its net zero targets by setting out the retrofit requirements for the region, including the installation of heat pumps and deployment of insulation measures. To meet the UK's net zero target of 2050, local areas across the South West are setting ambitious targets. Most local authorities in the region have set net zero targets for 2030, requiring them to decarbonise in less than 7 years from the publication of this report. Pivotal to meeting these targets will be the decarbonisation of the heating and buildings sector which contributes an average of 20% of UK carbon emissions and is the sector on which this report focusses.

Decarbonising the heating and building sector will be challenging, but it is not unachievable. To meet the region's net zero targets, nearly every home in the South West, either new build or existing, must be properly insulated and heated by a low carbon source. This is simultaneously a technical, funding, and social challenge that will require consistent framework for national heat and buildings policy, adequate provision of quality skills training and education, consumer information campaigns to stimulate demand and build consumer confidence, and public financing for retrofit measures for those people and organisations unable to pay.

Despite this, the fundamental challenge remains that without enough adequately trained people, low carbon technologies such as insulation or heat pumps will not be deployed in sufficient numbers to meet even the national 2050 net zero target. Delivering the retrofit requirements will rely on retrofit assessors and coordinators capable of understanding and specifying the retrofit measures required to decarbonise a building, an installer base capable of preparing homes for low-carbon heating via the application of fabric efficiency measures, as well as heating engineers with the skills required to specify, install, and maintain low-carbon heating systems.

Gemserv analysis has identified that a significant growth in energy efficiency measures is needed to meet the region's net zero targets. Figure 1 at page 4 shows the current annual deployment rates of low carbon heating and retrofit measures vs the required annual measures for South West to meet their net zero ambitions by 2030.

APPROACH AND METHODOLOGY

This report focuses on the skills needed to meet the region's net zero objectives in the retrofit and low carbon heating sectors. Emerging from the analysis is a skills gap assessment, informed by a range of qualitative research including interviews and surveys leading to a set of tangible recommendations to enable a successful transformation of the South West's heating and housing sectors. The research was undertaken in four steps as seen in the table below:

	1 Baseline number of jobs	2 Projected number of jobs	3 Conduct a skills gap analysis	4 Propose a series of recommendations
 Regional Report Methodology	Estimate the baseline number of jobs in the retrofit and low carbon heating sector	Project the future number of jobs needed in the retrofit and low carbon heating sector	Quantify the existing skills base and provision of skills in the region to develop the gap analysis.	Develop a set of recommendations for stakeholders in the South West

Table 1 - Process for the report

The report focussed on four key scenarios these were as follows:

1. **Urgent action:** Assumes a net zero target of 2030.
2. **Balanced approach:** Assumes a net zero target of 2040 (i.e. between 2030 and national 2050 net zero targets).
3. **LEP net zero:** Assumes a net zero target of a composite of all the Local Enterprise Partnership targets.
4. **Gradual approach:** Assumes a net zero target of 2050 in alignment with the UK Government's statutory net zero target.

A detailed description of these decarbonisation scenarios can be found on pages 44 and 45 of this report.

KEY FINDINGS

1. **The South West will miss its net zero targets on its current trajectory.**
   - Current deployment rates of low carbon heating and insulation measures in the region are insufficient to meet even the Government's 2050 net zero targets.
   - We estimate that at current deployment rates for each measure it would take the following amount of time to meet net zero:
     - It would take nearly 600 years to deploy enough sold wall insulation measures.
     - It would take 132 years to deploy sufficient loft insulation and 166 years to deploy sufficient cavity wall insulation to meet net zero.
     - It would take 200 years to install enough air source heat pumps (ASHPs) and 278 years to install sufficient ground source heat pumps (GSHPs) to meet net zero.

2. **The South West faces severe labour shortages in key roles of heat pump engineers, heat pump electricians and solid wall insulation installers.**
   - To scale up its workforce to install enough measures, the region requires a compound annual growth rate of 79% for heat pump engineers, 89% for heat pump electricians and 90% for solid wall insulation installers to reach net zero by 2030.
     - The demand for solid wall insulation installers means that 10,700 FTE solid wall insulation installers are required by 2027 across the region under the Urgent Action Scenario compared to 451 in 2023. This compares to an additional 3,400 installers by 2036 under the Gradual Intervention (2050) Scenario.

- The demand for heat pump engineers means that a total 18,000 heating engineers are required by 2028 across the region under the Urgent Action Scenario compared to 524 in 2023. This compares to an additional 8,786 by 2040 under the Gradual Intervention Scenario.

- There are also significant challenges in relation to the supply chain for cavity wall insulation installers, retrofit coordinators, and retrofit assessors which require a compound growth rate of 22%, 39% and 17% per year on average to meet net zero by 2030.

3. **The South West has key gaps in the provision of qualifications for insulation and double-glazing.**
   - There are no education providers in the South West that offer the City and Guilds Level 2 and Level 3 NVQ in Insulation and Building Treatments (Construction)[1]. As we have set out in Annex 7, these courses are critical on the pathway to TrustMark accreditation (required for many publicly funded retrofit schemes) for key insulation installer roles across cavity, solid wall, and loft insulation.
   - Provision of relevant heat pump and retrofit apprenticeships in the South West is low, with only two providers publicly offering apprenticeships locally.
- There are only three providers that offer the Level 2 diploma in fenestration installation which is key to TrustMark and PAS 2030 certification for the installation of energy efficiency measures such as double glazing or insulation.

4. **The economic case supports fast action on decarbonisation and meeting net zero.**
   - Gemserv estimate that the low carbon heating and insulation sectors could contribute up to £21.8 billion to the South West's £164 billion economy between 2023 and 2050. This is an increase of over 13%.
     - We estimate that the construction, servicing, and trade of insulation could contribute £4.4 billion towards the South West's economy in cumulative regional gross value added (GVA) between 2023 and 2050.
     - We estimate that the construction, servicing, and manufacture of heat pumps, could contribute £17.4 billion towards the South West's economy in cumulative regional GVA between 2023 and 2050.
5. **Decarbonisation could reduce energy bills for consumers in the South West, particularly if fast bill payback times are maximised.**
   - Across all scenarios, over £1 billion of annual consumer bill savings could be realised across the region if all the recommended insulation measures are installed.
   - By prioritising measures with lower payback periods such as loft insulation and double glazing and maximising the capacity of current labour in the region, an estimated £200 million could be reduced from consumer bills in the first year.

6. **The South West has unique strengths that position it well to make the net zero transition.**
   - The South West outperforms the national deployment rate of insulation retrofit and heat pump measures, though there is variation within the region. The region has an average deployment rate of 11 installs per 1,000 households, which is greater than the UK average of 7[1].

[1]City & Guilds. 2022. Insulation and Building Treatments (5931). Available at: https://www.cityandguilds.com/qualifications-and-apprenticeships/construction/construction/5931-insulation-and-building-treatments#tab=information

- There is limited action required around the employment rates in the installation of double glazing and fenestration, loft insulation because the South West has the required skills and workforce needed for these measures.
- The South West has engaged insulation retrofit, heat pumps and skills sectors who are keen to collaborate and are aware of the challenges of meeting net zero.
- Provision of training, particularly of heat pumps is widespread throughout the South West, and there is latent demand for retrofit and heat pump skills, suggesting there is scope for the sector to expand under the right conditions.

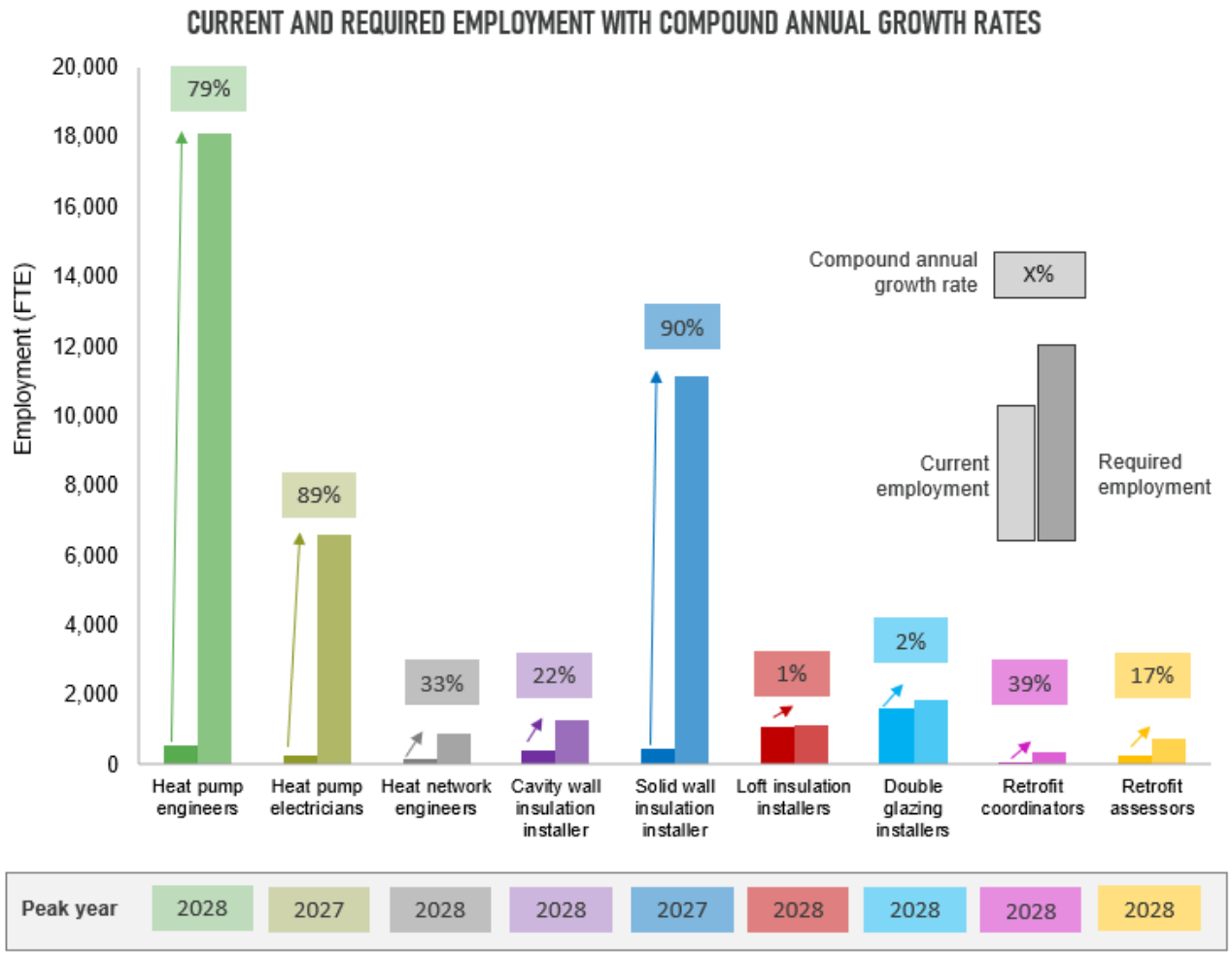


Figure 1 - Current and required employment for the South West to reach net zero by 2030 with compound annual growth rates[2]

SUMMARY OF RECOMMENDATIONS

Table 2 below summarises the key recommendations from the report. Please note these are shortened versions of the recommendations; the full recommendations are contained in the section *'Challenges, opportunities and sector findings'* and are set out at greater length in the *'Barriers to Net Zero in the South West'* at page 55 *and 'Opportunities of Net Zero in the South West'* at page 74 below.

[2] Based on peak employment under Urgent Action deployment scenario (net zero reached by 2030).

Table 2 - Summary of recommendations

THEME	RECOMMENDATION	ISSUE ADDRESSED	PARTNERS
 **Building a Future Installer Base**	Prioritise delivery of courses necessary to filling the region's skills gaps in insulation and heat pump installation and retrofit.	• Lack of clarity on workforce needs and skills gaps locally • Fragmentation of the skills funding system.	Local and combined authorities, Local Enterprise Partnerships (LEPs), employers and trade associations in the region.
	Create a regional role for the SWNZH in coordinating bids for funding across green skills as well as for bids for funding for retrofit and low carbon heating installation projects to ensure strategic coherence and value for money.	• Fragmentation of the skills funding system • Low skills funding rates.	Local and combined authorities, LEPs, colleges and training providers.
	Develop an information campaign on green construction careers locally to be delivered at local schools, colleges and job centres. This could build on the West of England Combined Authority's 'Green Futures Fund'[3] for the whole region.	• Poor recruitment and retention for the sector.	Retrofit sector, colleges, jobcentre plus and training providers.
 **Deliver better quality training**	Develop a regional forum for leaders across industry, training providers, colleges, and local government to develop qualifications for the region.	• Lack of awareness of qualifications • Lack of appropriate/ outdated qualifications.	Local and combined authorities, LEPs, insulation and heat pump employers, colleges, and training providers.
	Provide a regional database of training and qualifications locally for employers in the retrofit sector.	• Lack of awareness of qualifications • Lack of appropriate qualifications.	Local and combined authorities, LEPs, insulation and heat pump employers, colleges and training providers.

[3] West of England Combined Authority. 2023. Green futures fund. Available at: https://www.westofengland-ca.gov.uk/what-we-do/employment-skills/green-futures-fund/

THEME	RECOMMENDATION	ISSUE ADDRESSED	PARTNERS
		• Qualifications available are outdated.	
	Provide targeted 'train the trainer' courses to support scaling up of provision locally.	• Poor recruitment and retention for the skills sector • Lack of skills provision.	Local and combined authorities, training providers.
	Ensure that all new qualifications are certified by an official accreditation body such as MCS, or TrustMark. All new qualifications should be Ofqual certified.	• Lack of appropriate qualifications • Poor quality of installations.	Accreditation bodies, training providers, exam boards.
	Development of new qualification for sector specific roles (designer, salesperson, surveyor etc).	• Lack of appropriate qualifications • Qualifications available are outdated.	Accreditation bodies, training providers, exam boards.
	Update existing qualifications to include relevant focus on green skills and retrofit.	• Lack of appropriate qualifications • Qualifications available are outdated.	Local and combined authorities, LEPs, insulation and heat pump employers, colleges and training providers.
Accelerating Consumer Demand	Provide a regional online tool, which will help individuals in the region to access funding or support to install heat pumps or retrofit their homes. This could align with the West of England Connect programme[4].	• Lack of awareness of funding and support.	SWNZH, Local and combined authorities.
	Consider funding for a 'fabric first' retrofit approach prioritising street by	• Lack of demand locally for retrofit.	Department for Energy Security and Net Zero,

[4] West of England Combined Authority (2023) 'Skills Support Search'. Available at: https://www.westofengland-ca.gov.uk/what-we-do/employment-skills/skills-portal/

THEME	RECOMMENDATION	ISSUE ADDRESSED	PARTNERS
	street cavity wall insulation programme for the South West.		Ofgem, SWNZH, local and combined authorities, energy suppliers, distributors and generators, and public and commercial lenders.
	Create a database of properties with multiple retrofit requirements using EPC and housing stock data against Indices of Multiple Deprivation – this could be used to prioritise projects with short payback times and greatest need and to identify ECO eligible properties.	• Demand identification • Lack of demand locally for retrofit.	Local and combined authorities, Housing providers, energy companies.
	Connect local public sector organisations with a similar requirement for retrofit to commission a joint retrofit programme. This should focus on priority areas of heat pump installations and solid wall insulation to stimulate demand in the sector locally.	• Lack of demand locally for retrofit.	Housing providers, local and combined authorities NHS Trusts, LEPs, Chambers of Commerce.

INTRODUCTION

PURPOSE OF THIS REPORT

Gemserv was commissioned by the South West Net Zero Hub to undertake research to support the South West region to meet its net zero targets by setting out the retrofit requirements for the region, including the installation of heat pumps and deployment of insulation measures.

It sets out the requirements to deliver the ambitions of the published regional policies, action plans and strategies. To understand what is needed, the report will provide an overview of the workforce and skills baseline today and what will be required over the next 2, 5 and 10 years in terms of jobs and skills to deliver them. The report will also examine some of the challenges and barriers to realising these requirements, including issues around funding, policy, skills provision, and workforce.

This report is intended to be utilised by organisations across the region and to provide an evidence base to inform future policy, funding, project-training (from college, apprenticeships, and workforce development) and ultimately support the delivery of large at-scale retrofit and heat pump projects.

SOUTH WEST NET ZERO HUB

The South West Net Zero Hub (SWNZH) is one of five Local Net Zero Hubs in England and covers seven LEP areas with over 40 local authorities (LAs) across the South West. The SWNZH is delivered in partnership with the LEPs, with the majority of the LAs which make up the LEPs declaring Climate Emergencies to achieve net zero by 2030. The seven LEPs provide the strategic direction and governance for the SWNZH. The West of England Combined Authority is the Accountable Body for and organisation hosting the SWNZH.

Figure 2- Area covered by the South West Net Zero Hub

The purpose of the SWNZH is to establish and develop low carbon energy projects across the South West. The Hub's objectives include:

- Increase the number, quality and scale of local energy projects being delivered,
- Raise awareness of the opportunity for, and benefits of, local energy investment,
- Enable local organisations and community groups to attract private and/or public finance for energy projects,
- Support and deliver national and local Government schemes, and

- Collaboration, co-ordination and sharing of best practice.

ABOUT THE SOUTH WEST

The South West encompasses the counties of Bristol, Cornwall (including the Isles of Scilly), Dorset, Devon, Gloucestershire, Somerset and Wiltshire. In addition to these areas the scope of this report also includes Hampshire and constituent District Councils[5]. Around 5.7 million people live in the region, with just under 550,000 businesses and a Gross Domestic Product (GDP) of £164 billion, making the region an economic leader nationally and globally[6].

The major cities in the region including Bath and Bristol are viewed as great strengths, with Bristol cited as a leader in sustainability, being the UK's first ever European Green Capital in 2015. The young demographics of the city regions and the large student population are potential strengths. By comparison to the national level, the region is perceived to be a relatively "climate aware" area, with community engagement in the green agenda through initiatives such as sustainability groups and community energy co-operatives. In the South West 86% of the population are concerned about climate change compared to an average of 83% across the UK. The only region with higher levels of concern is the South East. Citizens in the region are most likely to know about the need to change the way we heat our homes and buildings compared to all other regions of the UK, with 93% of respondents to the Government's public attitudes study reporting some level of awareness. Moreover, knowledge of low carbon heating and support for renewables are high[7].

The existing strengths in the green economy are recognised nationally, with areas in both Hampshire and Gloucestershire featuring in the Energy and Climate Intelligence Unit's green skills report as national green skills hotspots[8]. The region is rural, with both nationally and internationally recognised areas of natural beauty such as Dartmoor National Park[9] and the Jurassic Coast UNESCO World Heritage Site[10] which creates an increased awareness of and connection to the natural world, and the climate. This is complemented by a rich industrial history, with towns and cities such as Portsmouth, Southampton, Plymouth and Bristol operating as historic and contemporary centres of maritime, shipbuilding and trade.

Nearly 40% of the population has skill Level 2 as their highest level of qualification, which signifies a lower level of attainment than the UK average[11]. 60% of the population is economically active, with the remaining 40% of economically inactive people including a large proportion of retirees (25%) and students (5%), which is explained by the region's large number of universities, including the University of Bath, the University of Bristol, the University of Gloucester, and the Universities of Portsmouth, Plymouth and Southampton. The region's economy is dominated by retail and human health and social work activities with just over 30% of people employed in these professions. This is

[5] See Annex 6 for a full list of local authorities in scope of this report.
[6] Office for National Statistics. 2019. GDP, South West: January to March 2019. Available at: GDP, South West - Office for National Statistics (ons.gov.uk)
[7] BEIS. 2022. BEIS public attitudes tracker: Autumn 2022. Available at: BEIS Public Attitudes Tracker: Autumn 2022 - GOV.UK (www.gov.uk)
[8] Energy and Climate and Intelligence Unit. 2023. Mapping the Net Zero Economy. Available at: https://eciu.net/analysis/reports/2023/mapping-the-uk-net-zero-economy
[9] UK Government. 2023. Welcome to Dartmoor. Available at: https://www.dartmoor.gov.uk/
[10] UNESCO. 2023. United Kingdom of Great Britain and Northern Ireland'. Available at: https://whc.unesco.org/en/statesparties/gb
[11] Nomis. 2023. South West Area Profile. Available at: https://www.nomisweb.co.uk/sources/census_2021/report?compare=E12000009#section_6 6

closely followed by careers in education and in construction, with just over 9% of the population of the region employed in each profession respectively.

NET ZERO AMBITIONS

The region has clear and ambitious net zero targets. All the 40 Local Authorities in scope of this report, except the New Forest, have declared climate emergencies with net zero targets by 2030, 20 years ahead of the UK Government's national target. This is repeated at sub-regional level (county councils), with many areas also setting ambitious emission reduction targets, most of which also aim for net zero by 2030. For instance, local councils for Somerset, Bristol, Wiltshire, Gloucestershire and Cornwall and the Isles of Scilly all aim to achieve carbon neutrality and thus net zero by 2030.

Demonstrable progress has been made against these targets. For example, the West of England Combined Authority region has seen a 35% fall in carbon emissions between 2005 and 2018 with total emissions falling from 7,927 $ktCO_2$ (2015) to 5154 k tCO_2 (2018) and the South West region as a whole has lower per-capita emissions than the UK average[12]. It is worth noting that falls in emissions may be largely due to decarbonisation of the electricity grid, moving away from coal towards renewables, and further progress needs to be made to achieve net zero targets beyond this.

THE SCALE OF THE CHALLENGE

The 2030 net zero target offers an opportunity for the South West to become a leader in the UK retrofit market. For example, this ambitious target means that heat pump deployment is likely to need to increase at a faster rate in the region compared to the national 2050 roll-out, providing a platform to build a competitive advantage and skilled workforce. Similarly, the building stock in the region has a high proportion of solid wall properties that will need to be carefully retrofitted. This presents an opportunity to develop expertise in the region which could be exported to other regions.

The CITB estimates that 350,000 jobs must be created nationally by 2028, to retrofit existing buildings to reduce energy demand[13]. In the South West, this means that tens of thousands of new jobs must be created, requiring the training and education of the existing supply chain while attracting new people into the field. Interest and understanding from consumers across the region must be nurtured and supported to foster and sustain the demand required to support growth in the industry. Funding, both to invest in skills and the retrofit measures themselves, must be marshalled and targeted more effectively to the places, people and organisations where they are most needed. Lastly, a consistent and clear long term policy direction from central government downwards must be established for the heat pump, insulation and retrofit sectors, but also across skills, ensuring consistency and quality of provision.

[12] West of England Combined Authority. 2020. West of England Climate Emergency Action Plan. Available at: CE-Action-Plan.pdf (westofengland-ca.gov.uk)
[13] Construction Industry Training Board. 2021. Building Skills for Net Zero. Available at: (https://www.citb.co.uk/about-citb/construction-industry-research-reports/search-our-construction-industry-research-reports/building-skills-for-net-zero/

POLICY OVERVIEW

NATIONAL HEATING AND BUILDINGS POLICY

Heat and Buildings Strategy

Possibly the most significant of the recent policy announcements to the delivery of retrofit and heat pumps is the 2021 Heat and Buildings Strategy which recognised that the heat and buildings sector contributes around 25% of UK carbon emissions. It sets out a strategy to determine how the UK will decarbonise domestic and non-domestic buildings as part of the pathway to reach net zero by 2050.

The strategy suggested that the UK will need to go from installing around 35,000 hydronic heat pumps a year to a minimum market capacity of 600,000 per year by 2028[14]. This would be underpinned by:

- Subsidies for the cost of heat pump installation through the Boiler Upgrade Scheme.
- Ensuring all new buildings are net zero ready and will be fitted with low-carbon heating and high levels of energy efficiency, so that new buildings do not have to be retrofitted in the future[15].
- Boosting funding for the Social Housing Decarbonisation Fund (investing a further £800 million over 2022/23 to 2024/25) and Home Upgrade Grant (investing a further £950 million over 2022/23 to 2024/25)[16].
- Growing UK manufacture and supply of heat pumps to over 300,000 units a year by 2030.
- Setting privately rented commercial buildings a minimum efficiency standard of EPC band B by 2030 in England and Wales[17].
- Phasing out new gas boilers by 2035[18].
- Create 240,000 'green' jobs by 2035.
- Using minimum standards to ensure the UK privately rented housing stock is on track to meet EPC band C by 2035 where practical, cost-effective and affordable[19].

Net Zero Strategy: Build Back Greener

Released in 2021, The Net Zero Strategy sets out policies and proposals to decarbonise the UK's economy to deliver the 2030 Nationally Determined Contribution and reach the 2050 net zero target[20]. It details plans to reduce emissions across the economy, from power, heat and building to transport, and the additional support needed across the economy to reach net zero, including green jobs, skills and industries. The section on heat and buildings reiterated previous commitments around phasing out gas boilers by 2035 and introduced the Boiler Upgrade Scheme to subsidise the cost of installing heat pumps and a new £60 million Heat Pump Ready programme that will provide funding for heat

[14] BEIS. 2021. Heat and Buildings Strategy (p21). Available at: https://www.gov.uk/government/publications/heat-and-buildings-strategy
[15] " " Heat and Buildings Strategy, p22
[16] " "Heating and Buildings Strategy, p24
[17] " "Heating and Buildings Strategy, p25
[18] " "Heat and Buildings Strategy, p21
[19] " "Heating and Buildings Strategy, p24
[20] BEIS. 2021. Net Zero Strategy: Build Back Greener. Available at: Net Zero Strategy: Build Back Greener - GOV.UK (www.gov.uk)

pump technologies[21]. The section on green jobs/skills describes the need for a skilled workforce to deliver net zero, with aims to reform the skills system and grow key training programmes across the UK[22].

Energy Security Strategy

The British Energy Security Strategy provides a further evidence base for the need to invest in energy efficiency and the transition to 'homegrown' energy to increase energy security through greater energy independence. Regarding energy generation, the strategy discusses British oil and gas and renewables, including onshore and offshore wind, solar power, nuclear, hydrogen and other technologies. Overall, the strategy contained little in terms of new announcements.

Mission Zero: independent review of net zero'

While not itself UK government policy, 'Mission Zero: independent review of net zero' sought to identify how the UK could meet its net zero commitments in an affordable and efficient manner, specifically one that is "pro-business, pro-enterprise and pro-growth and economic growth". It was led by Conservative MP and former energy minister Chris Skidmore MP. The report is a comprehensive review of the UK's net zero policy framework and the most comprehensive in recent years, certainly since the publication of most of the strategies referenced in this report.

The review covers the entirety of net zero policy and makes over 120 recommendations for Government. The key recommendations in relation to buildings are set out below.

- Delivering the Green Jobs Taskforce recommendations—convened from November 2020 to July 2021 by ministers from the Department for Business, Energy and Industrial Strategy (BEIS) and the Department for Education, this taskforce published recommendations on the skills needed in the UK job market to transition to net zero— and the commitments from the net zero strategy, reporting regularly on progress and starting by mid-2023.
- Government should expand its energy efficiency advice service in 2023, ensuring that it helps consumers to access qualified traders and providers in local areas[23].
- Government should set the policy framework and supportive investment environment to encourage reskilling and greater training opportunities in the heat pump sector and work to encourage adoption of standards to increase firms able to take up existing schemes[24].
- Adopting a 10-year mission to make heat pumps a widespread technology in the UK and regulating for the end of new and replacement gas boilers by 2033 at the latest.
- Reforming EPC ratings to create a clearer, more accessible net zero performance certificate for households.
- Simplifying the local net zero funding landscape to make it more efficient and productive for central and local government.

[21] BEIS. 2021. Net Zero Strategy: Build Back Greener (p22). Available at: Net Zero Strategy: Build Back Greener - GOV.UK (www.gov.uk)
[22] " "Net Zero Strategy: Build Back Greener, p229
[23] " "Net Zero Strategy: Build Back Greener, p248
[24] " "Net Zero Strategy: Build Back Greener, p248

- Backing a set of 'trailblazer' places that want to go further and faster on net zero[25].

NATIONAL SKILLS POLICY

Adult Education Budget

The Adult Education Budget (AEB) is England's main funding mechanism for adults aged over 19 years old. The AEB aims to engage adults and provide the skills and learning they need to progress into, or within work; or equip them for an apprenticeship or other learning.

The AEB is split in two, with a centrally managed portion, administered by the Department for Education's Skills and Funding Agency (ESFA) and a devolved portion, administered by Combined Authorities. The centrally administered AEB is worth roughly £1 billion per year with priorities and funding rules set by the ESFA. The AEB is delegated in 9 Combined Authority areas in England. It has been devolved in the West of England Combined Authority since 2018[26]. The Devolved AEB is worth £786 million to Combined Authorities across 2022-2023 financial year, including roughly £15 million for the West of England Combined Authority[27]. Investment priorities for the devolved AEB are determined locally, but are constrained by the quantum, funding guidance and ringfences set by the Department for Education (DfE) and the ESFA[28].

Levelling Up Funding

For the purposes of this report, we will treat Levelling Up Funding as a collective umbrella term for a range of funding used for regional development and regeneration[29]. Specifically, this report will focus on those used to fund skills, education, and training opportunities[30] and therefore will include residual European Structural Funds. The key levelling up funds and their details are as follows:

[25] Lords Library. 2023. Mission Zero Independent Review of Net Zero. Available at: https://lordslibrary.parliament.uk/mission-zero-independent-review-of-net-zero/#heading-5
[26] Department for Education. 2022. Adult Education Budget Funding Rules. Available at: https://www.gov.uk/government/publications/adult-education-budget-aeb-funding-rules-2022-to-2023/adult-education-budget-aeb-funding-rules-2022-to-2023#introduction-and-purpose-of-the-document
[27]Department for Education. 2022. Mayoral Combined Authorities S31 Adult Education Budget for 2022 to 2023. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1063697/Mayoral_combined_authorities_S31_adult_education_budget_for_2022_to_2023.pdf
[28] Department for Education. 2018. Exercising devolved adult education functions. Available at: https://www.gov.uk/government/publications/exercising-devolved-adult-education-functions
[29] This includes the UK Community Renewal Fund, the UK Shared Prosperity Fund, the Levelling Up Fund, the European Regional Development Fund and the European Social Fund, Skills Bootcamps and Strategic Development Fund.
[30] Department for Housing, Communities and Local Government. 2022. What is Levelling Up. Available at: https://levellingup.campaign.gov.uk/what-is-levelling-up/

Table 3 – UK levelling up funds

FUND NAME	DESCRIPTION	QUANTUM	REGIONAL ALLOCATION	END DATE
UK Shared Prosperity Fund	The fund will invest in domestic priorities and targeting funding where it is needed most: building pride in place, supporting high quality skills training, supporting pay, employment and productivity growth, and increasing life chances.	It provides £2.6 billion of new funding for local investment by March 2025, with all areas of the UK receiving an allocation from the Fund via a funding formula rather than a competition.	• West of England Combined Authority: £13,795,332 • Cornwall and Isles of Sicily £132,00531 • Dorset: £6,014,090 • Isle of Wight £1,730,230 • North Somerset £3,354,093 • Plymouth: £4,448,945 • Portsmouth: £2,503,904 • Gloucestershire: £2,742,441 • Somerset: £2,485,156 • Hampshire: £5,797,058	Steady state. Skills from 2024
UK Community Renewal Fund	The UK Community Renewal Fund provided funding for the following investment priorities: • Investment in skills • Investment for local business • Investment in communities and place • Supporting people into employment.	£220 million of investment over 2021-22 financial year.	• Devon Retrofit skills and business accelerator: £1,015,184.	2022
Levelling Up Fund	The Levelling Up Fund provides funding for the following priorities: • Transport investments • Regeneration and town centre investment • Cultural investment.	The first round of the Levelling Up Fund supported £1.7 billion of projects in over 100 local areas across all corners of the UK. The full fund is worth £4.8bn	The successful projects in the South West are as follows: • Transport Project (Gloucester Docks Sustainable Travel Improvements): £12,822,000.00 • East Cowes Marine Hub, £5,841,254.00 • Scilly Sea Links: £48,443,497.00 • Transforming the visitor economy of Portsmouth: £20,000,000.	2025
Strategic Development Fund	The SDF provides investment to enable areas across England to: • Reshape their teaching and training provision • Update their facilities in preparation for the rollout of local skills improvement plans	The project is worth £150m. Estimate suggest phase 1 cost around £65m with phase 2 costs at £85m[31]	Full regional allocations of funding can be found on the gov.uk website.[32]	2023 for phase 2
Skills Bootcamps	Deliver a flexible training programme based on employer/sector 'in-demand' skills needs which may be either regulated (i.e. qualification based) or non-regulated (i.e. based on alignment with industry standards).	The National Skills fund is worth 2.5bn over the next Parliament. The ESFA has recently launched a funding round worth £60m.	• Skills Bootcamp in Green Technologies • Organisational sustainability/net zero bootcamps • Skills bootcamp in AI for environmental sustainability • Skills Bootcamp in Environmental Data Science.	

[31] FE Week. 2022. ESFA to seek bids for national strategic development funding rollout. Available at: https://feweek.co.uk/esfa-to-seek-bids-for-national-strategic-development-fund-rollout/

[32] Department for Education. 2022. Strategic Development Fund awards 2022 to 2023. Available at: https://www.gov.uk/government/publications/strategic-development-fund-awards-2022-to-2023/strategic-development-fund-2022-to-2023-financial-year#south-west

They currently cover digital, technical and construction sectors.

REGIONAL NET ZERO POLICY

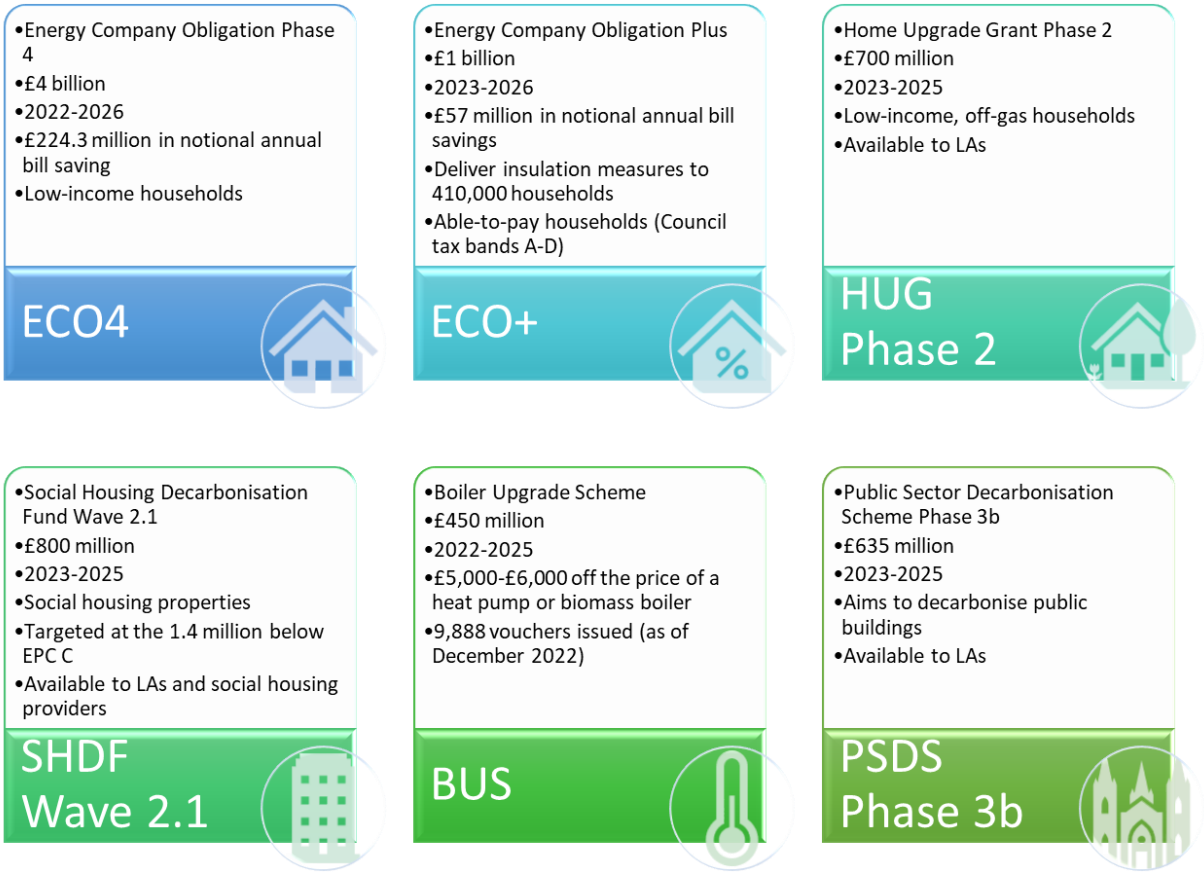


Figure 3 – overview of UK funding schemes

Green Home Grant: Local Authority Delivery Scheme Phase 2

The South West Net Zero Hub received a total of £52,950,000 of government funding as part of Phase 2 of the Local Authority Delivery scheme (LAD 2) which ran until 30 September 2022[33]. The objectives of the programme were to improve the energy efficiency of homes of low-income households (under £30,000) living in the South West area. The scheme aimed to improve low Energy Performance Certificate (EPC) D to G rated homes. The intent was that this would deliver progress towards sustainable warmth: reducing household energy bills as well as supporting the phase out of fossil fuel heating and the UK's commitment to net zero by 2050.

[33] South West Net Zero Hub. 2022. GREEN HOMES GRANT: LOCAL AUTHORITY DELIVERY SCHEME PHASE 2 (LAD2). Available at: https://www.swenergyhub.org.uk/housing-retrofit/green-homes-lad2/

Social Housing Decarbonisation Fund

The Social Housing Decarbonisation Fund (SHDF) provides funding to upgrade a significant amount of the social housing stock currently below EPC C up to that standard[34]. £4.7 million of funding was provided through Wave 1 of the SHDF to install new heat pumps, double glazing, solar panels and external roof and wall insulation for 467 homes in the region[35].

The Wave 2.1 competition will allocate up to £800 million of funding to support the installation of energy performance measures in social homes in England. The SHDF Wave 2.1 competition closed to applications on 18 November 2022.

Sustainable Warmth

The Sustainable Warmth Competition invested around £500 million across 78 projects helping LAs to upgrade energy inefficient homes of low-income households in England. The projects started in early 2022 and complete by March 2023.

This competition brings together 2 existing fuel poverty schemes into one funding opportunity:

- Local Authority Delivery Phase 3 (LAD 3): a third phase of the LAD scheme with over £280 million available. LAD 3 has a refined scope to support low-income households heated by mains gas.
- Home Upgrade Grant Phase 1 (HUG 1): over £218 million for low-income households with homes that are off the gas grid through the HUG scheme.

Table 4 – Funding types received by local authorities

LEAD AUTHORITY	CONSORTIUM MEMBERS	FUNDING SCHEME AND QUANTUM
Bristol City Council	Bath and North East Somerset, Bristol City Council, North Somerset	HUG Project Grant: £3,640,592
Cornwall County Unitary Authority	Isles of Scilly	HUG Project Grant: £7,566,386.80
Devon County Council	East Devon, Exeter, Mid Devon, North Devon, South Hams, Teignbridge, Torbay, Torridge, West Devon	• HUG Project Grant: £7,151,059.00 • LAD 3 Project Grant: £2,472,500.00
Plymouth Council	None	• HUG Project Grant: £2,254,202 • LAD 3 Project Grant: £1,752,137.22
Portsmouth Council	East Hampshire, Horsham, Mid Sussex, Peterborough, Rushmoor,	• HUG Project Grant: £16,234,654

[34] BEIS. 2022. Social Housing Decarbonisation Fund Wave 2. Available at: https://www.gov.uk/government/publications/social-housing-decarbonisation-fund-wave-2
[35] South West Net Zero Hub. 2022. GREEN HOMES GRANT: LOCAL AUTHORITY DELIVERY SCHEME PHASE 2 (LAD2). Available at: https://www.swenergyhub.org.uk/housing-retrofit/green-homes-lad2/

	Winchester, Worthing, Eastleigh, Fareham, Gosport, Havant, New Forest, Portsmouth, Southampton among others can be found on the gov.uk website[36]	• LAD 3 Project Grant: £15,694,038.00
Stroud Council	Cheltenham, Cotswold, Forest of Dean, Gloucester City Council, South Gloucestershire, Stroud, Tewkesbury	• HUG Project Grant: £4,217,985.00 • LAD 3 Project Grant: £1,030,000.00
West of England Combined Authority	Swindon, South West Net Zero Hub, Wiltshire	HUG Project Grant: £5,031,652

ECO and ECO4

The Energy Company Obligation (ECO), is a government energy efficiency scheme for Great Britain, administered by Ofgem. The main objective of ECO4 is to improve the energy efficiency of housing stock occupied by low income and vulnerable households. One route that can be used to identify these households is 'ECO4 Flexibility' (ECO4 Flex). Under ECO4 Flex, a participating LA can refer private tenure households that it considers to be living in fuel poverty or on a low income and vulnerable to the effects of living in a cold home.

There are other funds available that can be found at Annex 5.

West of England Combined Authority Climate Action Plan

The West of England Combined Authority released their Climate and Ecological Strategy and Action Plan in 2022, with the ambitions of achieving net zero by 2030 in the region and recovering wildlife and the natural environment. The plan is supported by ongoing work from the Joint Green Infrastructure Strategy, Joint Local Transport Plan and planning policies[37]. The action plan provides a framework for achieving their ambitions and priorities, including these key areas:

- Low carbon transport (action: £50 million Green Recovery Fund)
- Low carbon buildings and places (action: develop and implement Retrofit Accelerator to increase the scale and pace of retrofit within the region)
- Nature recovery (action: enhance the ecological network)
- Low carbon business (action: reduce carbon emissions, especially in transport as 2023 goal)
- Renewable energy (action: delivering over £1 million of renewable energy programmes).

[36] BEIS. 2022. Sustainable Warmth Competition successful local authorities. Available at: https://www.gov.uk/government/publications/sustainable-warmth-competition-successful-local-authorities/sustainable-warmth-competition-successful-local-authorities

[37] West of England Combined Authority. 2022. West of England climate and ecological strategy and action plan 2022. Available at: West of England Climate and Ecological Strategy and Action Plan 2022 (westofengland-ca.gov.uk)

Local Council Plans

Most of the region's local council's carbon or climate plans have a goal of achieving net zero by 2030 in the local council area, including Somerset, Bristol, the Isles of Scilly, Gloucestershire, Wiltshire and Cornwall. These plans recognise the urgency and immediacy of meeting net zero in their areas and set out actions for the regions to take. The full list of these local council plans can be found in Table 5 below:

Table 5 – local council plans for achieving net zero

COUNCIL	NET ZERO PLAN	NET ZERO TARGET	DATE OF REPORT
Devon	Devon Carbon Plan – Quick Reads – Devon Climate Emergency	2050	2022
Cornwall	Climate Change Action Plan (cornwall.gov.uk)	2030	2019
Somerset	Somerset's Climate Emergency Strategy documents	2030	2020
Bristol	Our action on climate and ecology (bristol.gov.uk)	2030	2019
Isles of Scilly	Climate Change Action Plan | Council of the ISLES OF SCILLY	2030	2022
Dorset	Climate and ecological emergency strategy - Our approach - Dorset Council	2040	2020
Gloucestershire	We will - Gloucestershire County Council; Gloucestershire's climate change strategy - Gloucestershire County Council	2030	2019
Wiltshire	Climate strategy - Wiltshire Council	2030	2022
Hampshire	Climate change strategy and action plan | Hampshire County Council (hants.gov.uk)	2050	2020

REGIONAL SKILLS POLICY

Local Enterprise Partnerships and Skills Advisory Panels

Since 2018, the Department for Education has provided grant funding to Mayoral Combined Authorities (MCAs), the Greater London Authority (GLA) and Local Enterprise Partnerships (LEPs) through the Skills Advisory Panels (SAPs) programme. The programme has aimed to:

- Increase the quality of local-level skills and labour market analysis,
- Strengthen links between local employers and skills providers, and

- Increase the continuity of output across the country, with all areas publishing Local Skills Reports[38].

Cornwall and the Isles of Scilly, Dorset, G-First, Heart of the South West, Swindon and Wiltshire and the West of England each have local skills reports for their regions setting out skills shortages and proposed interventions and provision for their areas[39]. There are now plans for a national rollout of Local Skills Improvement Plans (LSIPs), led by employer representative bodies. The funding provided to MCAs and LEPs via the SAPs grant in the financial year 2022-2023 will support the development of analysis for the new LSIPs.

Local Skills Improvement Plans

LSIPs were established by the Skills and Post-16 Education Act 2022. They mark a shift in responsibility away from LEPs from developing local skills reports and labour market intelligence, towards Employer Representative Bodies (ERBs). ERBs are responsible for creating LSIPs. These should:

- Set out the key priorities and changes needed in a local area to make post-16 technical education or training more responsive and closely aligned to local labour market needs;
- Provide a representative and coherent employer view of the skills most needed to support local economic growth and boost productivity, and improve employability and progression for learners;
- Set out actionable priorities to better meet these skills needs that employers, providers and stakeholders in a local area can get behind to drive change in ways that add value to relevant local strategies and effectively join-up with other parts of the local skills system;
- Not attempt to cover the entirety of provision within an area but focus on the key changes and priorities that can gain traction and maximise impact informed by robust underpinning evidence, meaningful dialogue between employers and providers and constructive engagement with MCAs/GLA, LEPs, LAs and other stakeholders;
- Cover at least the next 3 years.

Implementation of LSIPs is supported by the Strategic Development Fund, which as set out above, provides funding for local areas to prepare for and implement LSIPs.

[38] Department for Education. 2022. Skills Advisory Panels list. Available at: https://www.gov.uk/government/publications/skills-advisory-panels/skills-advisory-panels-list
[39] Ibid

THE SOUTH WEST'S REQUIREMENT FOR NET ZERO

Summary

- The region has an average deployment rate of 11 installs per 1,000 households, which is greater than the UK average of 7[1].
- The deployment of air source heat pumps (ASHP) and double glazing are relatively high, with more than 10,000 of each estimated to be installed last year in the region.
- The region has an average of 68% EPC coverage.
- 42% properties in the region are rated A-C, slightly lower than the average in England of 43%[1].
- The age of properties in the region is roughly in line with the national average with around 16% of domestic properties built before 1900 compared to 15% in the whole of the UK.
- 25% of properties do not have access to the gas network infrastructure, compared to the GB average of 15%.
- The share of solid walled properties in the region is 30%, just lower than the UK average of 33%[1].

Businesses and labour for insulation retrofit

- 184 businesses offering retrofit assessment services. The second most common service offered is double glazing installation.
- There are at least 97 businesses that offer double glazing installations services in the region and 64 that offer loft insulation services.
- There is an estimated 3,890 people (FTE) working in insulation installation and services across the region.

Businesses and labour for heat pumps

- There are 215 accredited heat pump installation businesses across the region with most of these offering both air source and ground source heat pump installations (124 businesses) but some specialising in just air source heat pumps (88 businesses) and ground source heat pumps (3 businesses).
- There are an estimated 647 accredited heat pump installers. The wider low carbon heating skills sector analysed included: accredited heat pump installers, other renewable heat installers and heating control installers.

INTRODUCTION TO THE SOUTH WEST'S BUILDING STOCK

EPC coverage

To understand the size of the challenge in decarbonising the building stock for the South West region, a thorough analysis of EPC data across the South West was carried out to estimate the potential range of low carbon measures as well as the key characteristics of the dwelling stock. The EPC analysis was carried out on an adjusted sample of data. This was to help account for properties without an EPC record whilst avoiding any potential distortion this may have had on the data.

Overall, the building stock of the region with EPC certificates is roughly equally divided between on-grid and off-grid properties. Coverage is only marginally higher in on grid properties (69%) compared to off grid properties (67%), however urban areas such as Bristol has significantly higher coverage rates of around 75%.

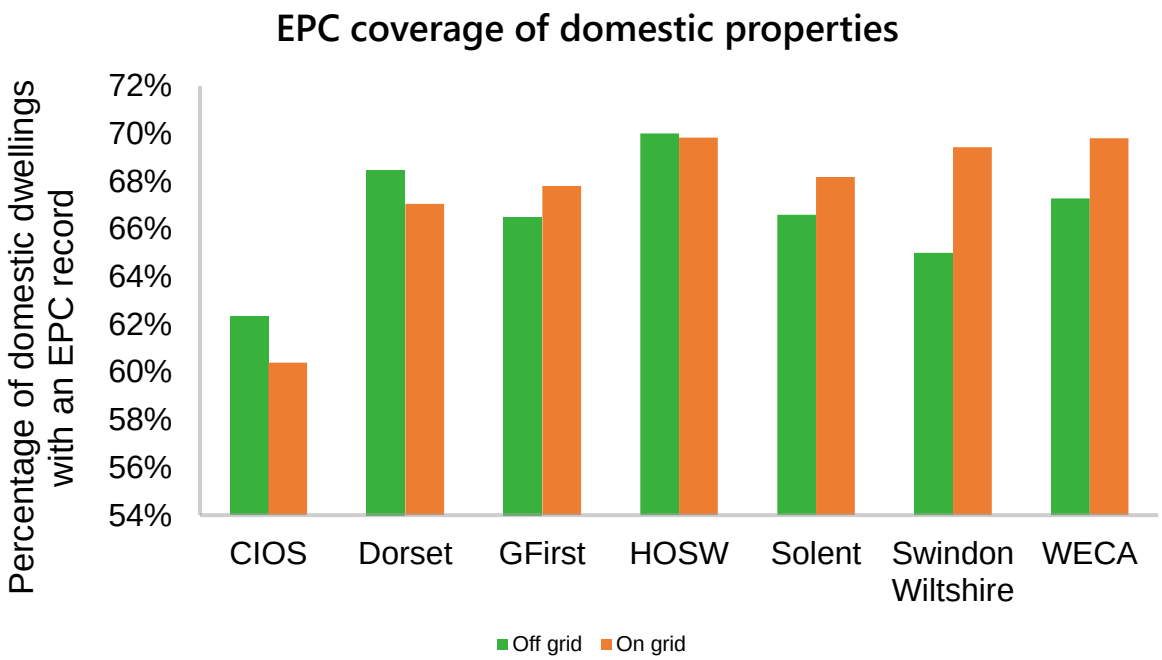


Figure 4 - EPC coverage of domestic properties

As properties are required to have a valid EPC when constructed or marketed for sale or rent, properties with an EPC record, by default, tend to be newer and better insulated than those without. To account for this selection bias, a stratified sample was formed by duplicating records of select properties such that the adjusted sample is consistent with data[40] on all properties in the region. By matching the number of properties by size, access to the gas grid, and age, a representative sample of the entire building stock in the area was formed, accounting for any selection bias through targeted stratification.

Age of properties

The age of properties is an important influencing factor when determining the requirement for energy efficiency measures and low carbon heating. Generally, older properties tend to be more poorly insulated and often are more difficult to insulate as there is a greater prevalence of properties with solid walls, for example. The age breakdown of properties in the region is roughly in line with the national average with around 16% of domestic properties built before 1900 compared to 15% in the whole of the UK.

However, there is large variance within the region, with 24% of domestic properties in the Cornwall and Isles of Scilly (CIOS) LEP area built before 1900 compared to only 6% in the Solent LEP area. Using this metric, West Devon has the oldest building stock amongst all local authorities with 31% built before 1900, whereas Bournemouth Christchurch and Poole has the newest building stock with only 3% constructed before 1900 and 10% built after 2002. Decarbonising the building stock in the regions highlighted as having an old building stock may therefore be more complex.

[40] BEIS (2022) Regional and local authority gas consumption statistics; BEIS (2022) Regional and local authority electricity statistics; DLUHC (2022) Live tables on dwelling stock (including vacants); MCS (2023) The MCS Data Dashboard; BEIS (2022) National Energy Efficiency Data-Framework (NEED): consumption data tables 2021

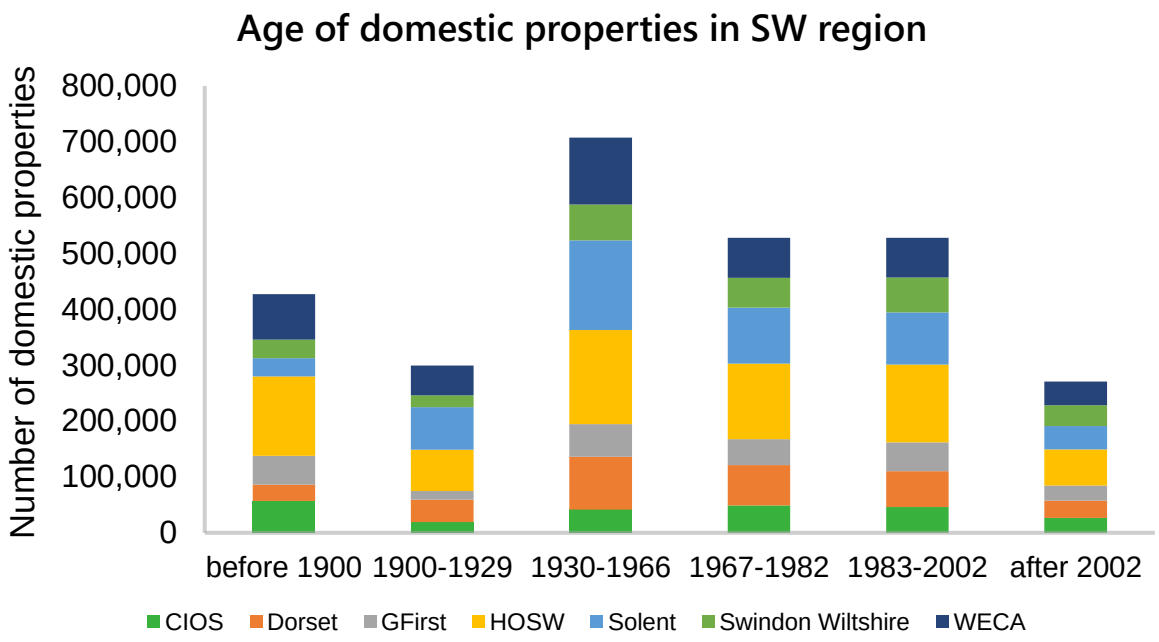


Figure 5 - Age of domestic properties in the SW region[41]

Property Type

Property type can influence the optimal decarbonisation pathway for a building. A property's suitability for certain heating systems for example, may be influenced by its size and position. This may determine whether installing certain measures in a property is technically and economically feasible. For example, the 22% of properties in the South West that are flats may be more suited to heat network or communal heating systems, potentially using a ground source heat pump with a shared ground loop, as they may lack the space to install standalone heating systems. The region where this is most applicable is the Dorset LEP where over 30% of properties are flats. The most common property type in the entire region is terraced housing, accounting for around a quarter of all domestic properties.

[41] DLUHC. 2023. Energy Performance of Buildings Data: England and Wales. Available at: https://epc.opendatacommunities.org/login

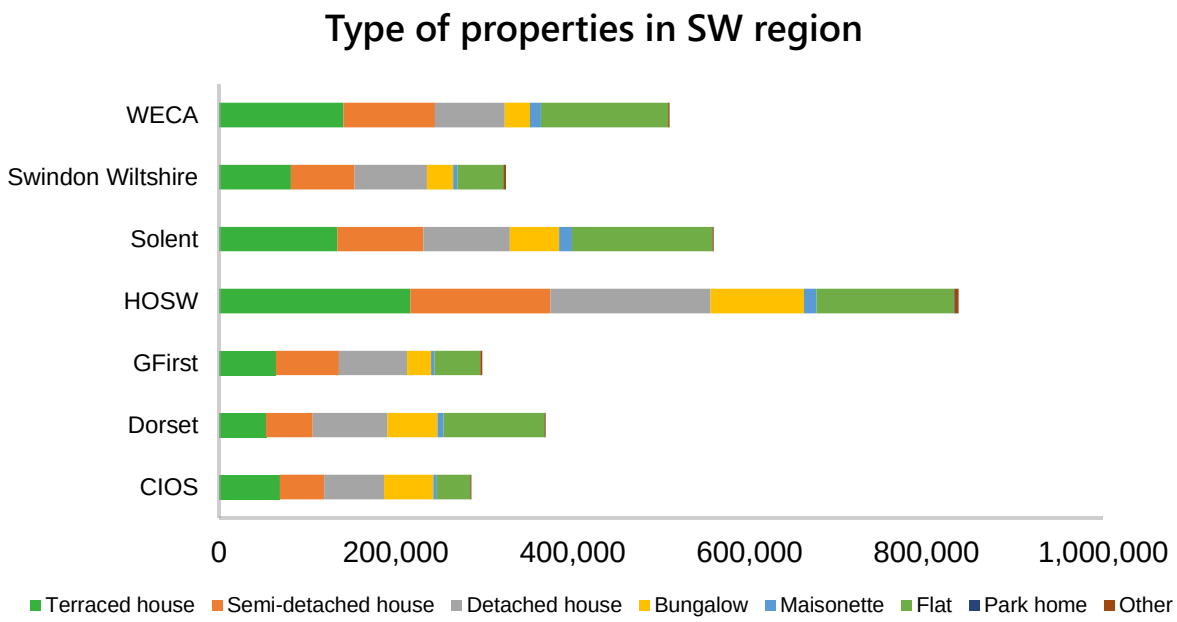


Figure 6 - Type of properties in SW region[42]

EPC ratings

EPC Ratings offer an important insight into the energy efficiency levels of properties, ranging from A, high energy efficiency, to G, low energy efficiency. Areas with a high proportion of properties with lower EPC ratings are likely to be suitable for localised and targeted retrofit programmes. 42% properties in the region are rated A-C, slightly lower than the average in England of 43%[43]. CIOS has the lowest proportion of A-C rated homes with 36% and Swindon Wiltshire LEP has the highest with nearly half of domestic properties rated A-C. Swindon Wiltshire LEP is also home to the local authority with the highest energy efficiency levels, with over half of the homes in the Swindon local authority area having EPC ratings of A-C.

[42] DLUHC. 2023. Energy Performance of Buildings Data: England and Wales. Available at: https://epc.opendatacommunities.org/login

[43] ONS. 2022. Energy efficiency datasets. available at: https://www.ons.gov.uk/peoplepopulationandcommunity/housing/datasets/energyefficiencyofhousingenglandandwalescountryandregion

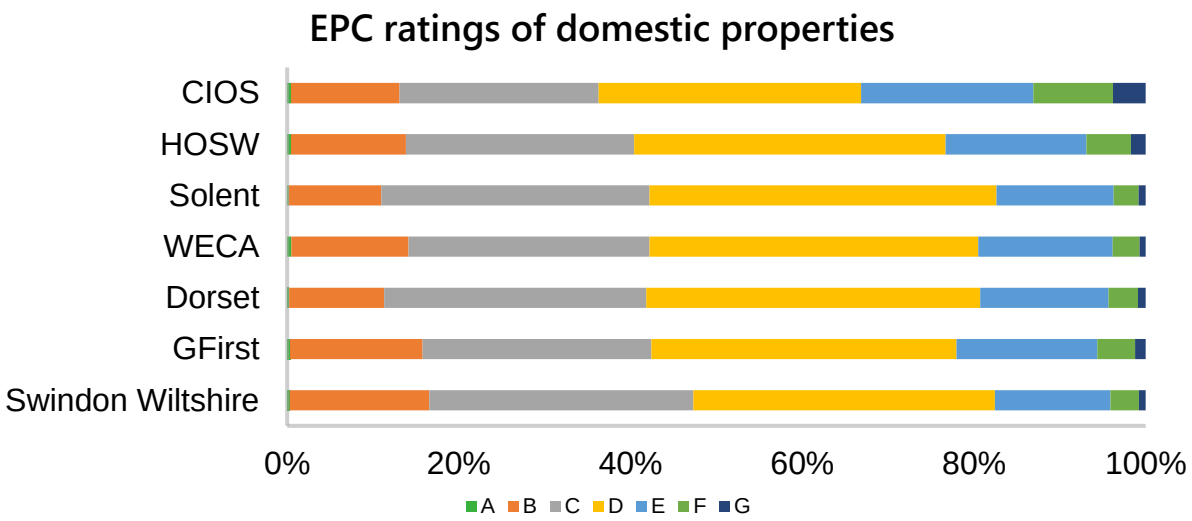


Figure 7 - EPC ratings of domestic properties[44]

Access to the gas grid

The South West has a high proportion of properties that are "off gas" with a quarter of all domestic properties not having access to the gas network infrastructure, compared to the GB average of 15%[45]. Importantly, this has meant that most homes have historically utilised oil or LPG boilers as opposed to natural gas, resulting in even higher carbon emissions. This makes off-grid homes prime targets for retrofit, especially through the deployment of low carbon heating systems such as heat pumps. In general, off grid areas have seen greater take up from government schemes such as the Renewable Heat Incentive (RHI) and the Boiler Upgrade Scheme (BUS), and this can be seen by the relatively high deployment rates in area such as Cornwall.

[44] DLUHC. 2023. Energy Performance of Buildings Data: England and Wales. Available at: Energy Performance of Buildings Data

[45] BEIS. 2022. Available at: Sub-national estimates of properties not connected to the gas network

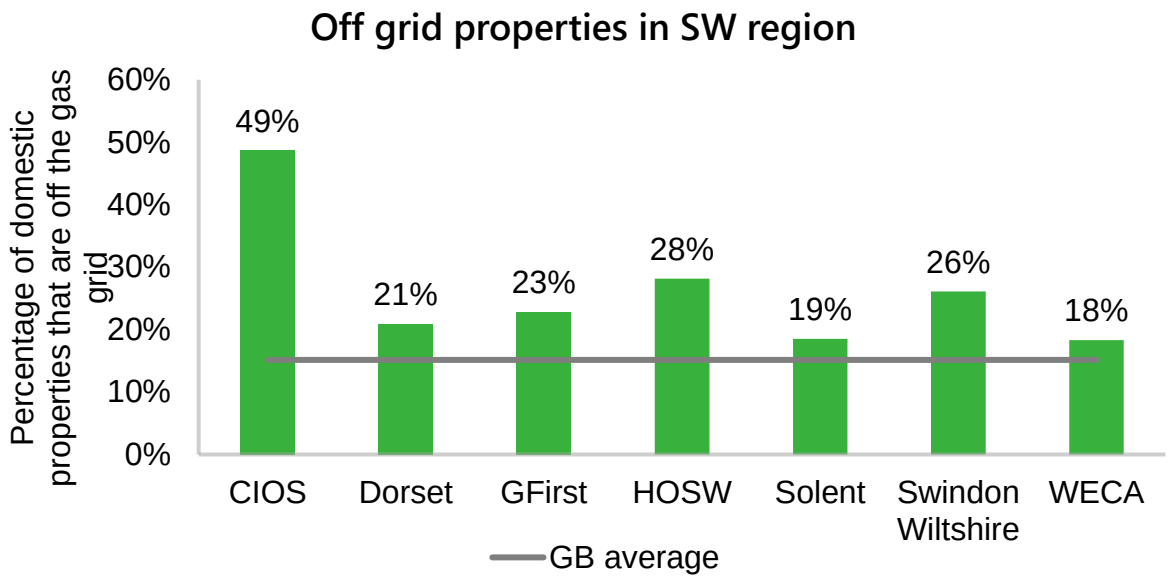


Figure 8 - Off grid properties in SW region[46]

Solid wall properties

Older homes often have solid walls as opposed to cavity walls. This makes the walls of the property harder to insulate requiring external or internal solid wall insulation which is highly labour intensive to install and can come at a higher cost to the consumer. Due to this, historically, solid walled properties have tended to be insulated at a lower rate than cavity walled properties and thus, a large share of solid walled properties require retrofitting. The share of solid walled properties in the region is 30%, just lower than the UK average of 33%[47]. The LEP regions with relatively old building stocks, such as the CIOS and the West of England Combined Authority areas, have a higher share of solid walled properties, whereas more urban LEP areas with more modern building stocks, such as the HotSW, have a significantly lower share of solid walled properties.

[46] DLUHC. 2023. Energy Performance of Buildings Data: England and Wales. Available at: (Energy Performance of Buildings Data
BEIS. 2022. Available at: Sub-national estimates of properties not connected to the gas network

[47] Peter Hansford FREng. 2015. Available at: SOLID WALL INSULATION: Unlocking Demand and Driving Up Standards

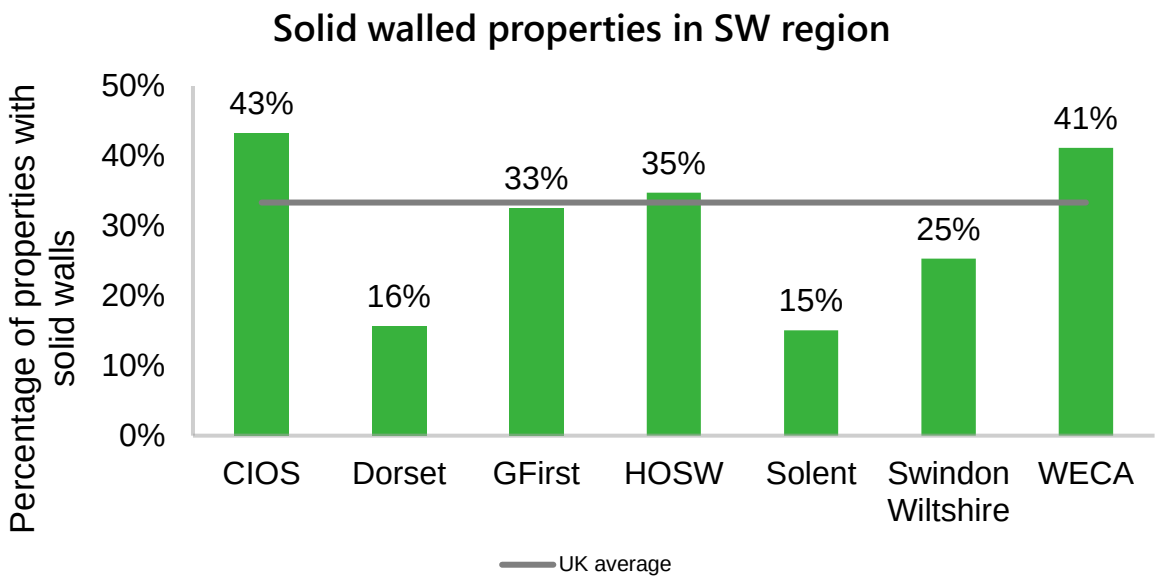


Figure 9 - Solid walled properties in SW region[48]

Primary heating systems

The way that people in the South West currently heat their properties will influence the need for replacement low-carbon heating systems. Around 37% of UK emissions are from heating and about 17% from space heating and cooling of buildings and so changing the way we heat our homes, offices and shops is vital in reducing emissions[49]. The rollout of low-carbon heating measures is therefore one of the primary ways that a significant proportion of domestic emissions can be reduced and to do this, a sizeable skills base, capable of installing, maintaining, and replacing low-carbon heating measures will be required.

With a high share of off grid homes, the challenge of decarbonising heating is enhanced. The below graph shows the split of heating systems by on and off grid domestic properties. On grid properties predominantly use natural gas whereas off grid properties tend to use direct electric systems, predominantly in urban areas, or oil and LPG, in rural areas. Oil and LPG heating systems are a natural target for conversion to heat pumps with high long-term running costs and even higher emissions than other fossil fuel systems such as those using natural gas. The below graph also shows how take-up of heat pumps has been far greater in off grid areas with over three times more heat pumps in off grid properties than on grid ones, despite most properties having access to the gas grid.

[48] DLUHC. 2023. Available at: Energy Performance of Buildings Data
[49] ESC. 2023. Available at: https://es.catapult.org.uk/guide/decarbonisation-heat/

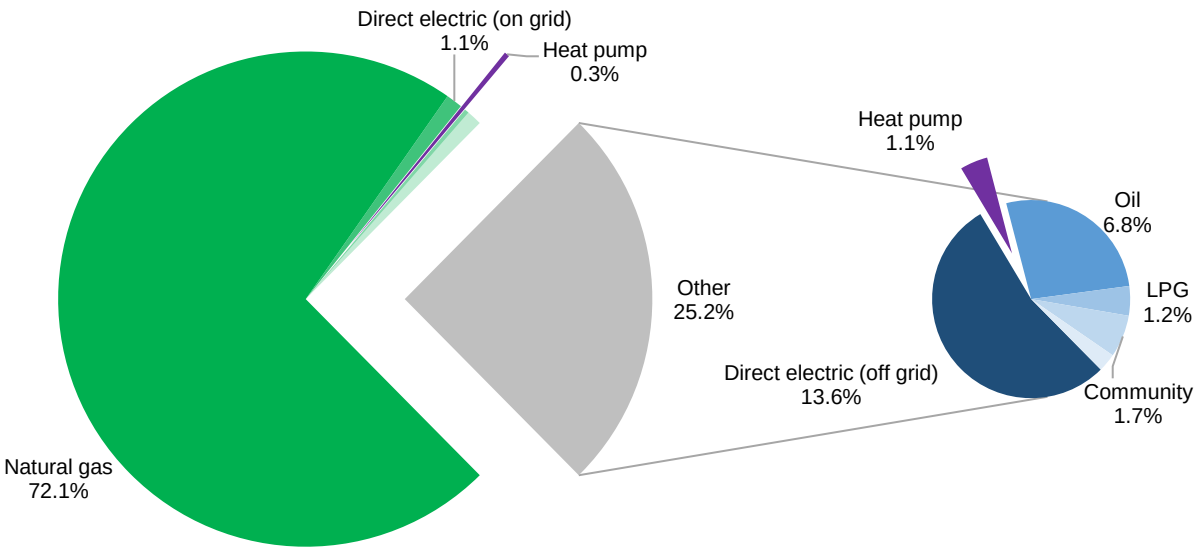


Figure 10 - Primary heating systems used in on and off grid homes[50]

[50] DLUHC (2023) Energy Performance of Buildings Data; MCS (2023) The MCS Data Dashboard

CURRENT DEPLOYMENT RATES

The current deployment rates in the region are generally higher than those in the whole of the UK. The deployment of air source heat pumps (ASHPs) and double glazing are relatively high, with more than 10,000 of each estimated to be installed last year in the region. As demonstrated previously in Figure 10, ASHP installation rates in rural areas are greater than in urban areas. For example, around 4 times more ASHPs and around 9 times more ground source heat pumps (GSHPs) were installed in the HotSW compared to the Solent area last year.

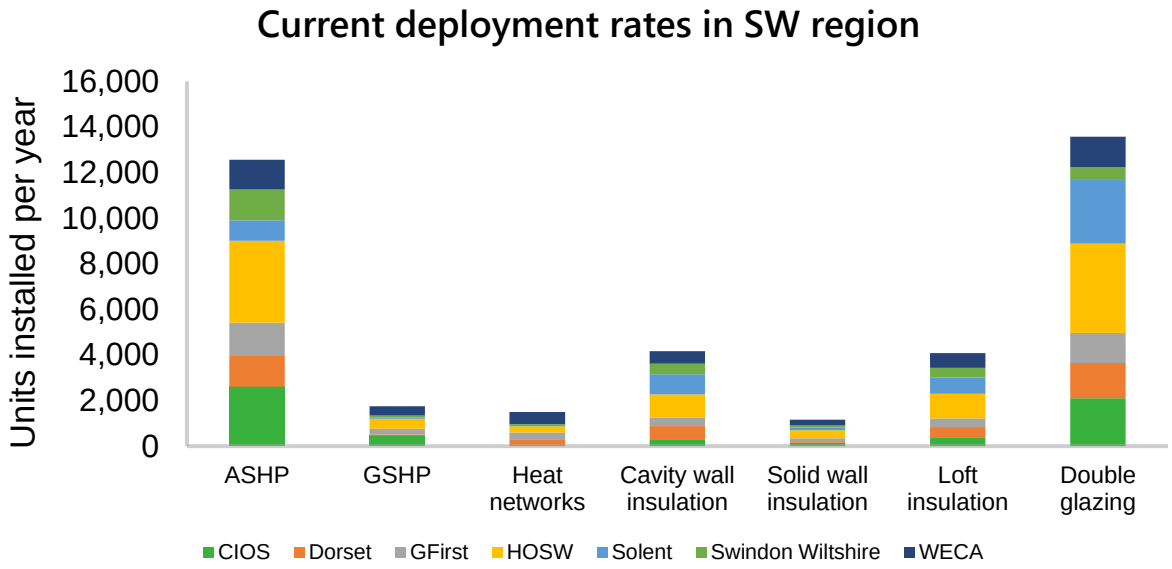


Figure 11 - Current deployment rates in SW region[51]

There is evidence to suggest that the South West is ahead of the rest of the UK in terms of total low carbon heating system installations. Analysis of data on accredited low carbon heating installs shows that the region has an average deployment rate of 11 installs per 1,000 households, which is greater than the UK average of 7[52]. The area with the highest deployment rate is Cornwall and the Isles of Scilly, with nearly four times the deployment rates of the UK average at 28 accredited installs per 1,000 properties, followed by the Heart of South West and Swindon and Wiltshire with 14 and 13 respectively. However, even the highest installation rates in the region fall far short of what is required

[51] MCS (2023) The MCS Data Dashboard; DLUHC (2023) Energy Performance of Buildings Data; BEIS (2022) Household Energy Efficiency; Trustmark (2022) Advanced Search; ONS (2022) Low Carbon and Renewable Energy Economy (LCREE) Survey QMI

[52] Installations between 2009 and 2022

to reach net zero within the time required, as does the UK wide deployment rate. Solent and the West of England perform the worst within the region, with 4 and 6 installations respectively, below the UK average.

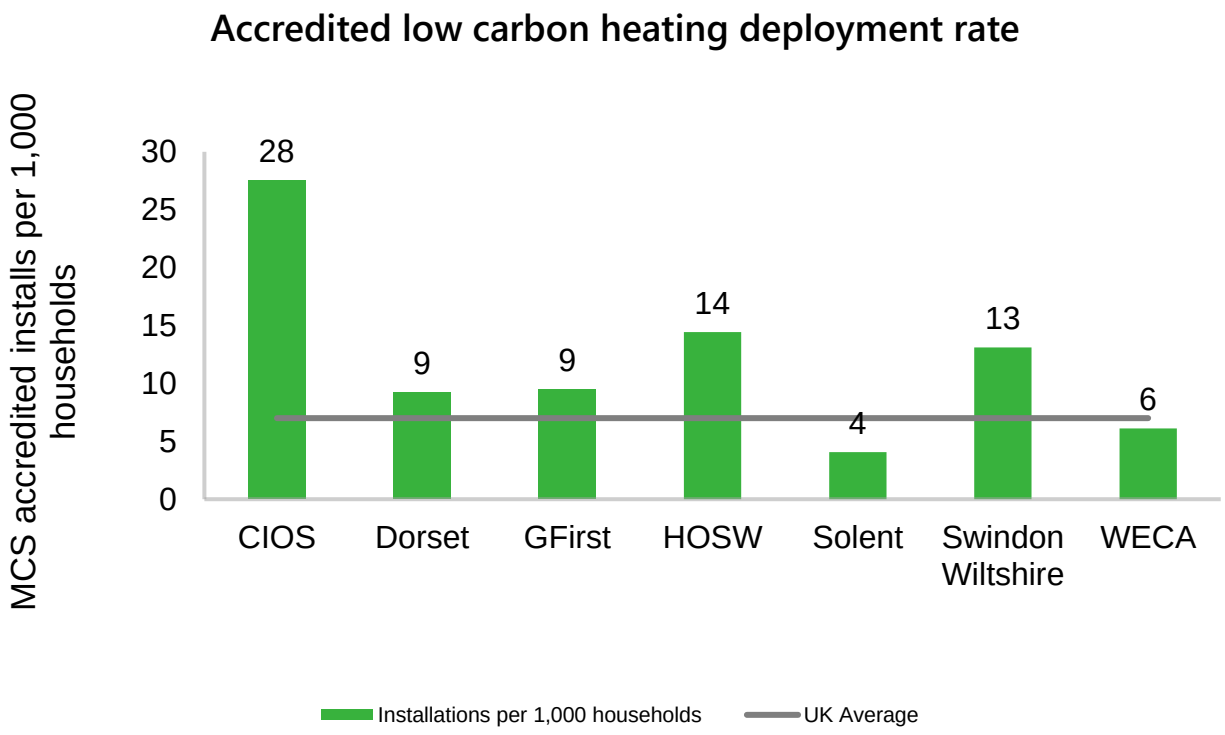


Figure 12 - Accredited low carbon heating deployment rate[53]

[53] MCS (2023) The MCS Data Dashboard; low carbon heating defined as: air source heat pumps; biomass boilers; ground/water source heat pumps; other heat pump types; solar thermal and micro CHP.

CURRENT RETROFIT BUSINESSES AND LABOUR AVAILABILITY

Analysis of the existing insulation skills base in the South West generated interesting results. The insulation skills analysed were across insulation installation (double glazing, loft insulation, cavity wall insulation and solid wall insulation) and insulation services (retrofit assessors and retrofit coordinators). The region has significant numbers of businesses providing retrofit assessment services and this is the most common service provided, with 184 businesses offering retrofit assessment services. The second most common service offered is double glazing installation in all regions except Swindon and Wiltshire, where it is the third most common after loft insulation installation. There are at least 97 businesses that offer double glazing installations services in the region and 64 that offer loft insulation services.

In almost all regions except Swindon and Wiltshire, and to a lesser extent, the West of England Combined Authority, there were significant differences between the availability of double glazing and retrofit assessors and the rest of the services available in the region. Just 25 businesses offer cavity wall insulation services and just 27 offer solid wall insulation installation services. This lack of businesses that install wall insulation is not common across the entire region. In the Solent LEP area, there are 10 businesses offering cavity wall insulation services, accounting for 40% of the total businesses offering cavity wall insulation, and 8 offering solid wall insulation installation services[54].

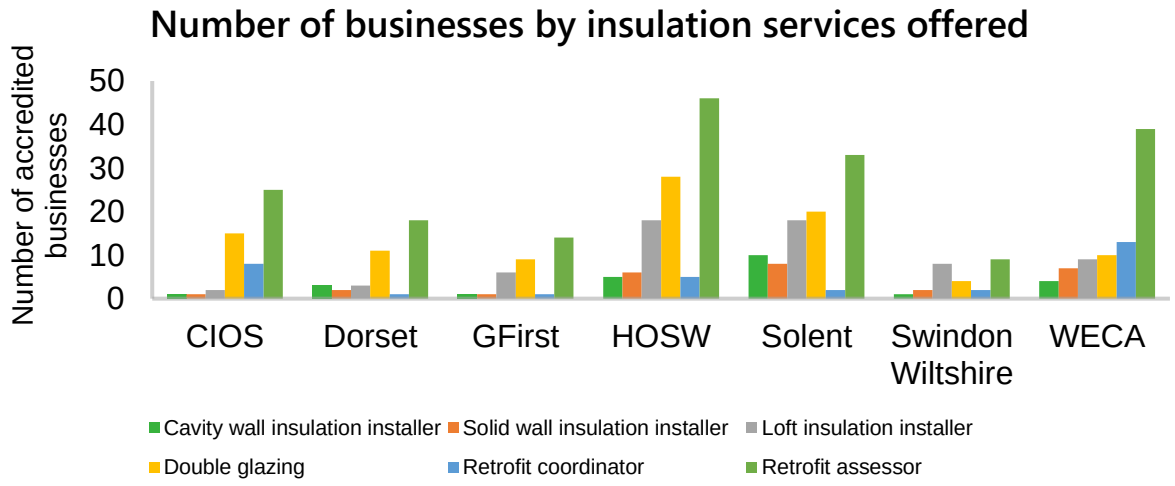


Figure 13 - Number of businesses by insulation services offered[55]

Similar trends were evident when analysing the availability of jobs in the region. Double glazing installer was the most common skill, with 1,622 people (FTE[56]) working in the installation of double glazing across the region, corresponding to 23 people per 100,000 inhabitants. Across all jobs there is an estimated 3,890 people (FTE) working in insulation installation and services across the region. The Heart of the South West LEP area has the highest current provision of labour with 1,031 people (FTE) working across the sector. Despite the high share of retrofit assessment businesses in the region, many businesses are sole traders and so they make up a small share of the existing workforce. There are an estimated 49 retrofit coordinators and 280 retrofit assessors across the region.

[54] Number of businesses is limited to those who are accredited or part of other trade bodies.
[55] Trustmark (2022) Advanced search; NIA (2022) Find an installer; IAA (2022) Installer list; data accessed December 2022
[56] Full time equivalent – actual amount of people able to install double glazing is likely higher but this is an indication of available labour in terms of time.

Solent has the highest density of insulation labour in the region, across the skills analysed, with 80 people working in the sector per 100,000 inhabitants. Conversely, Swindon Wiltshire has the lowest density of available labour with just 36 people possessing the analysed skills per 100,000 inhabitants. Across the entire region, there are 56 individuals who work in the installation or servicing of insulation per 100,000 inhabitants.

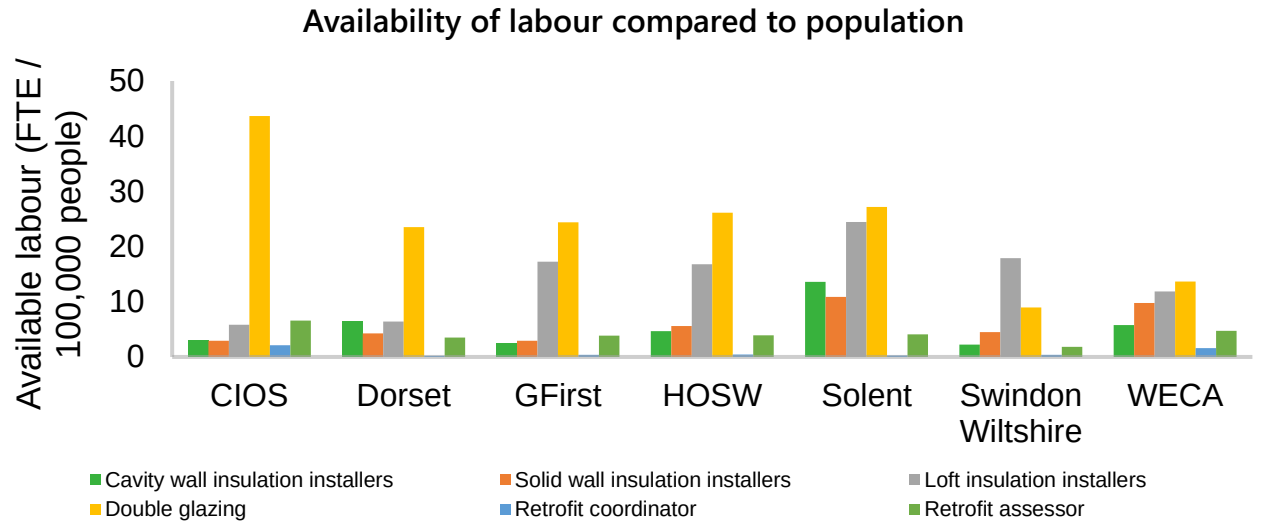


Figure 14 - Availability of skills compared to population[57]

Analysis of businesses offering heat pump installation services across the region showed significant geographic variation. There are 215 accredited heat pump installation businesses across the region with most of these offering both air source and ground source heat pump installations (124 businesses) but some specialising in just air source heat pumps (88 businesses) and ground source heat pumps (3 businesses). Analysis of accredited heat pump businesses indicates that the Heart of the South West region is a hub for heat pump installers with 66 accredited heat pump installer businesses located here.

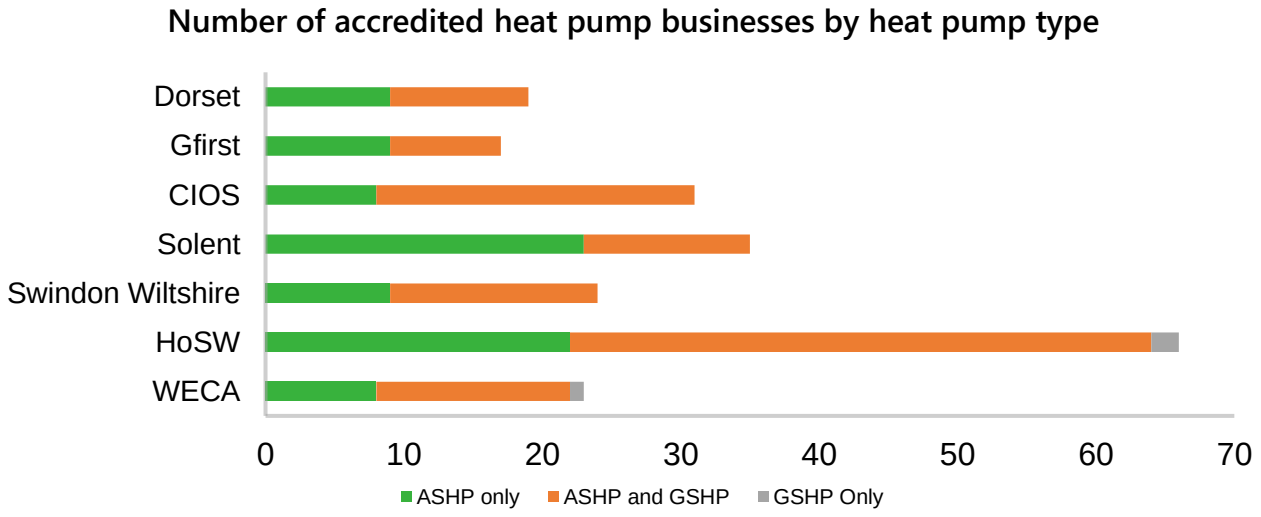


Figure 15 - Number of accredited heat pump businesses by heat pump type[58]

[57] ONS (2022) Estimates of the population for the UK, England, Wales, Scotland and Northern Ireland; ONS (2022) Exploring regional estimates of activity in the low carbon and renewable energy economy, UK and regions of England: 2020; ONS (2022) Low Carbon and Renewable Energy Economy (LCREE) Survey QMI

[58] MCS (2023) The MCS Data Dashboard. Data accessed: December 2022

Within these businesses, there are an estimated 647 accredited heat pump installers. The wider low carbon heating skills sector analysed included: accredited heat pump installers, other renewable heat installers and heating control installers. Following the ONS's definition for renewable heat[59], there are 332 people working in other areas of renewable heat installation. This includes non-accredited heat pump installers as well as heat network specialist installers. The data suggests that most heat pump installers in the region are accredited, as there are more accredited heat pump installers than other renewable heat installers. However, alternative survey data from the Department for Business, Energy, and Industrial Strategy (BEIS) (now the Department of Energy Security and Net Zero (DESNZ)), external to this analysis, suggests that just 17% of employers offering heat pump installation services are MCS accredited[60]. This discrepancy is most likely due to a combination of selection bias amongst the BEIS survey sample and a difference in definition around the activity of installers, with our analysis focusing on labour in terms of full time equivalent.

It is estimated that there are 23 people working in the defined low carbon heat sector across the region per 100,000 inhabitants, with 14 offering installation of renewable heating systems[61]. GFirst has the highest density of low carbon heating installers with 16 accredited heat pump installers and 6 heating control installers per 100,000 inhabitants. Despite having the highest density of insulation skills, Solent has the lowest density of low carbon heating installation skills with just 12 people working across the sector per 100,000 inhabitants.

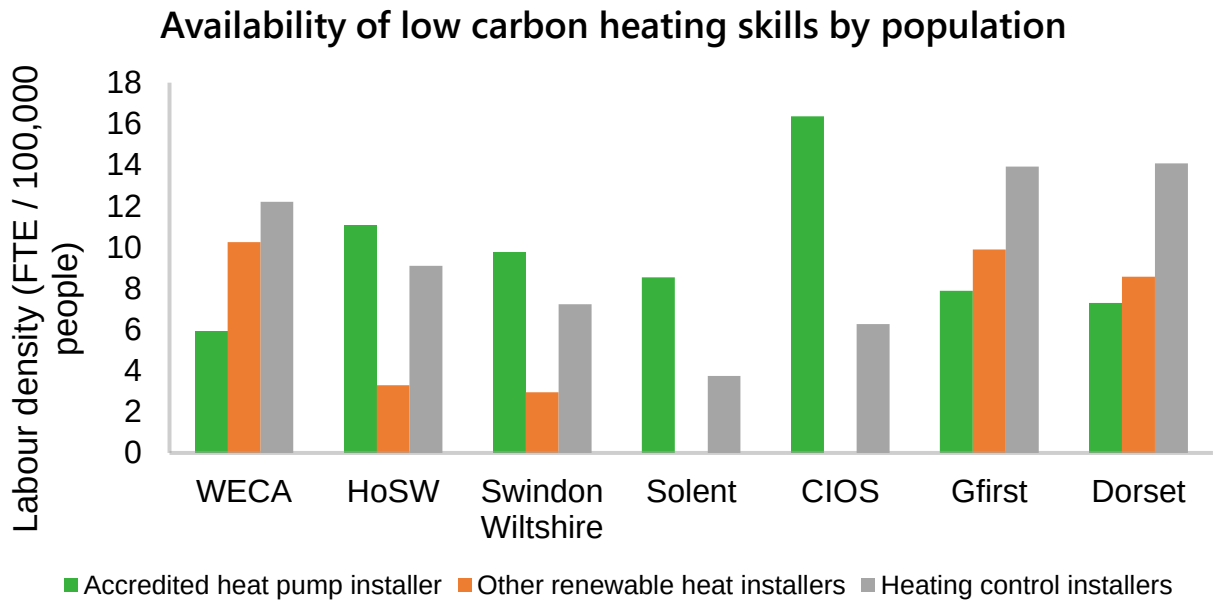


Figure 16 - Availability of low carbon heating skills by population[62]

[59] "The design, development, construction and/or production, specialised consultancy services and installation of infrastructure of low carbon heating systems. The operation and maintenance of infrastructure". Full description can be found here: ONS (2022) Low Carbon and Renewable Energy Economy (LCREE) Survey QMI ("4. Quality summary" section)

[60] BEIS (2023) Heating and cooling installer study

[61] Following the ONS definition for renewable heat.

[62] Please note that skills are purely for the construction of low carbon heating systems and do not include manufacture, services and trade. ONS (2022) Estimates of the population for the UK, England, Wales, Scotland and Northern Ireland; ONS (2022) Exploring regional estimates of activity in the low carbon and renewable energy economy, UK and regions of England: 2020; ONS (2022) Low Carbon and Renewable Energy Economy (LCREE) Survey QMI

Age of the workforce

Analysis of the ages of heating installers (boiler and heat pump installers for example) nationally shows that the sector has an aging workforce generally. As set out in Figure 17 below, in the South West, 61.1% of heating installers are over the age of 50. This is compared to 55% in London and 60% in the South East. This indicates a general challenge in the sector, requiring accelerated recruitment into the sector to replace skilled labour as they reach retirement age to sustain delivery over the next 10 -20 years and expand the sector to deliver upon the ambitious net zero targets. These findings suggest that without intervention, the workforce within the low carbon heat and retrofit sector will likely shrink.

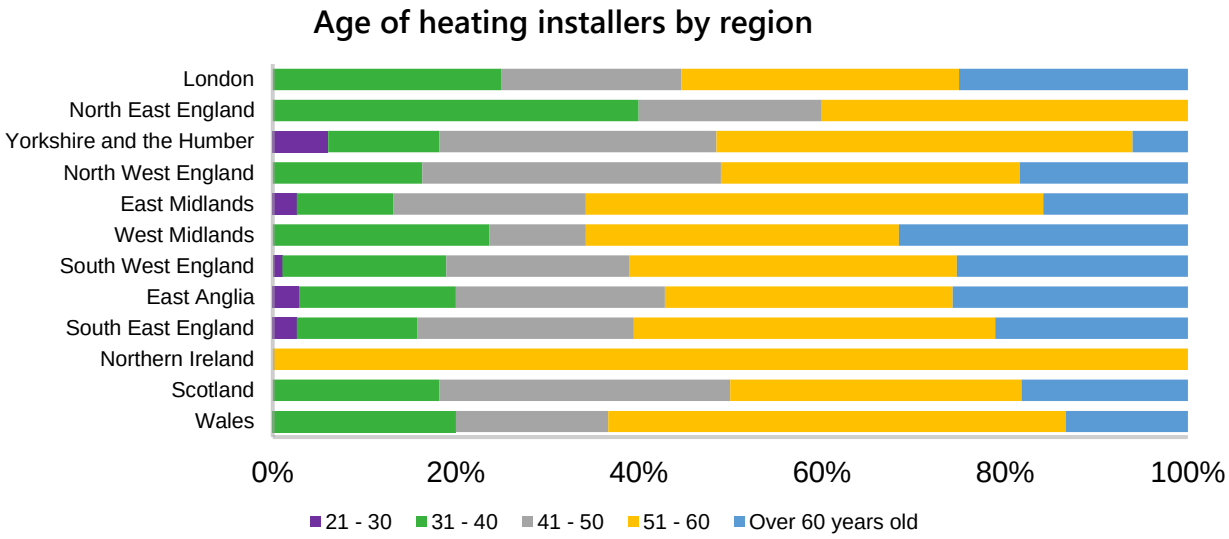


Figure 17 - Age of heating installers by region[63]

The aging workforce represents an issue that is two-fold. Firstly, older installers are less likely to retrain as they will have little time to use new heat pump installation skills due to retiring sooner. Secondly, the rate at which labour is leaving the heating market is greater than the rate at which labour is entering the market. Gemserv analysis completed on behalf of the Heat Pump Association (HPA) estimates that across the UK, significant increases in training are required to avoid a skills gap as the heating industry transitions to low carbon heating. The "baseline" line in Figure 18 below demonstrates the estimated future size of the heating installer labour market if the current training rate continues, considering the high expected retirement rate.

As the heating industry transitions to low-carbon heating systems such as heat pumps, a greater installer base will be required overall as heat pumps take longer to install than gas boilers and so installers cannot complete as many total installations per year. Therefore, not only do skills need to be replaced, but the labour market must grow. This growth in the size of the heating installer labour market is shown by the "required" line on the graph below. To accommodate the greater installation time of heat pumps and meet the Government's target of installing 600,000 heat pumps a year by 2028, the industry must grow by over 10,000 installers. With no intervention, the heating installer industry is

[63] Gemserv (2022) Heating system installers share their views on the opportunities and risks they face in the transition to low carbon

forecasted to decrease in size, resulting in a skills gap of over 20,000 engineers by 2030. The "high" line on the below graph shows the change in the training required to avoid a skills gap by 2030. To avoid this skills gap, a 78% increase in the number of heating apprentices is required.

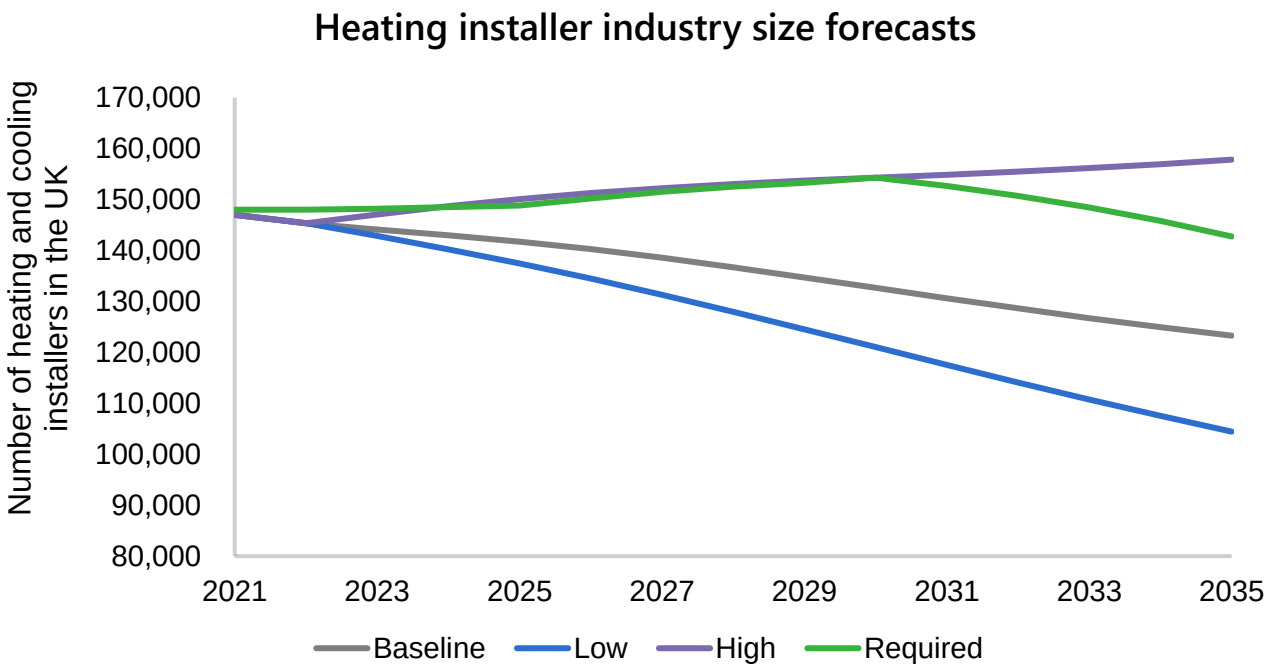


Figure 18 - Heating installer industry size forecasts[64]

Industry growth ambitions in retrofit skills

The local skills shortage evidenced in the economic analysis and stakeholder engagement coupled with the need increase annual installation rates indicates a need to grow the local workforce rapidly.

Figure 19 below shows the expected versus required growth rates in employment from industry respondents over the next 2, 5 and 10 years. Respondents were asked about growth rates for these time frames and to differentiate between what growth is expected versus what is required to achieve the skills needed to meet net zero. Figure 18 shows that most respondents expect actual growth to be the same as required growth. 30% of respondents state growth in skills in 10 years needs to be higher than what is expected. This represents a ramp-up in growth rates within the next 5-10 years. A caveat to this data is that one industry representative stated they do not want to grow their business, so their response represents no growth that is expected over the next 10 years which skews the results, rather than representing the entire industry.

[64] Required labour market size in line with government target of installing 600,000 heat pumps a year by 2028. Baseline Scenario is if current rate of training continues, low is with 50% reduction in training, high is with 61% increase in training as this is what is required to avoid a skills gap by 2030.

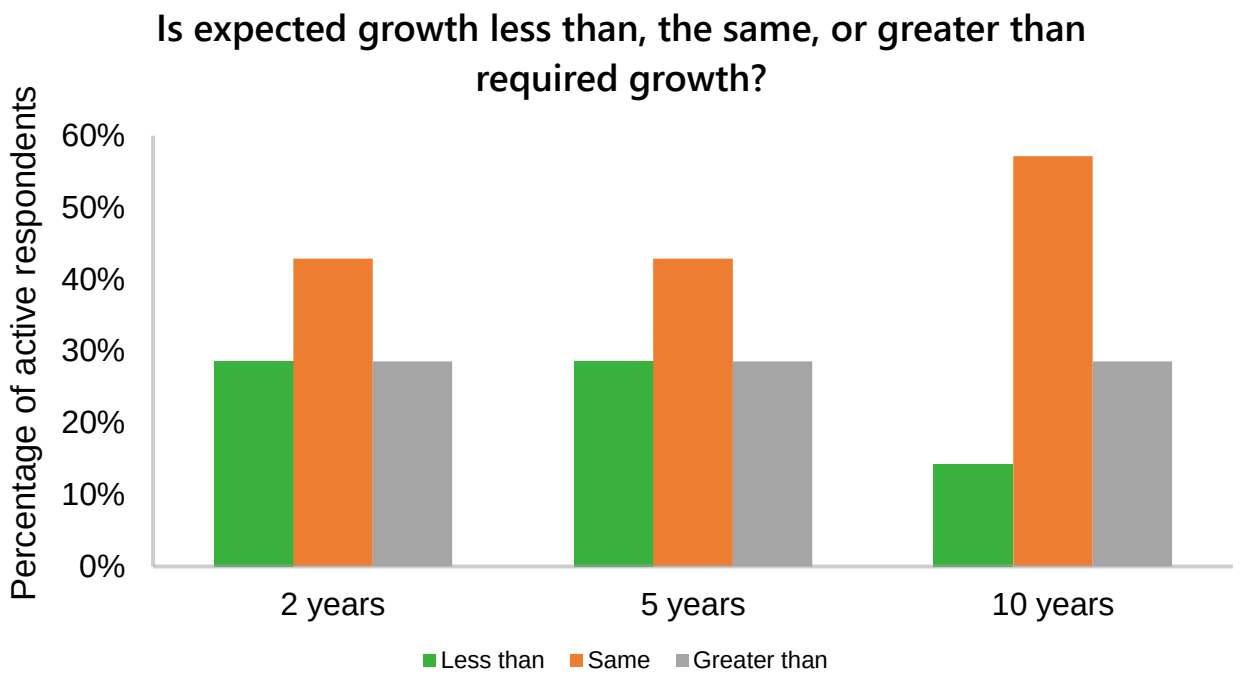


Figure 19 - Expected growth compared to required growth in 2,5 and 10 years' time

Focusing on the expected growth rates for specific qualification levels, from NVQ level 1 to degree level or above, respondents felt that high growth rates would be required in NVQ levels 2, 3 and 4 as shown in Figure 20 below. The lowest proportion of growth would be anticipated in NVQ level 1 qualifications, and the highest proportions are expected for NVQ level 3 qualifications. The latter reflects later economic analysis which shows the greatest growth in solid wall insulation and air source heat pump installation, which commonly require NVQ level 2 and 3 equivalent to install.

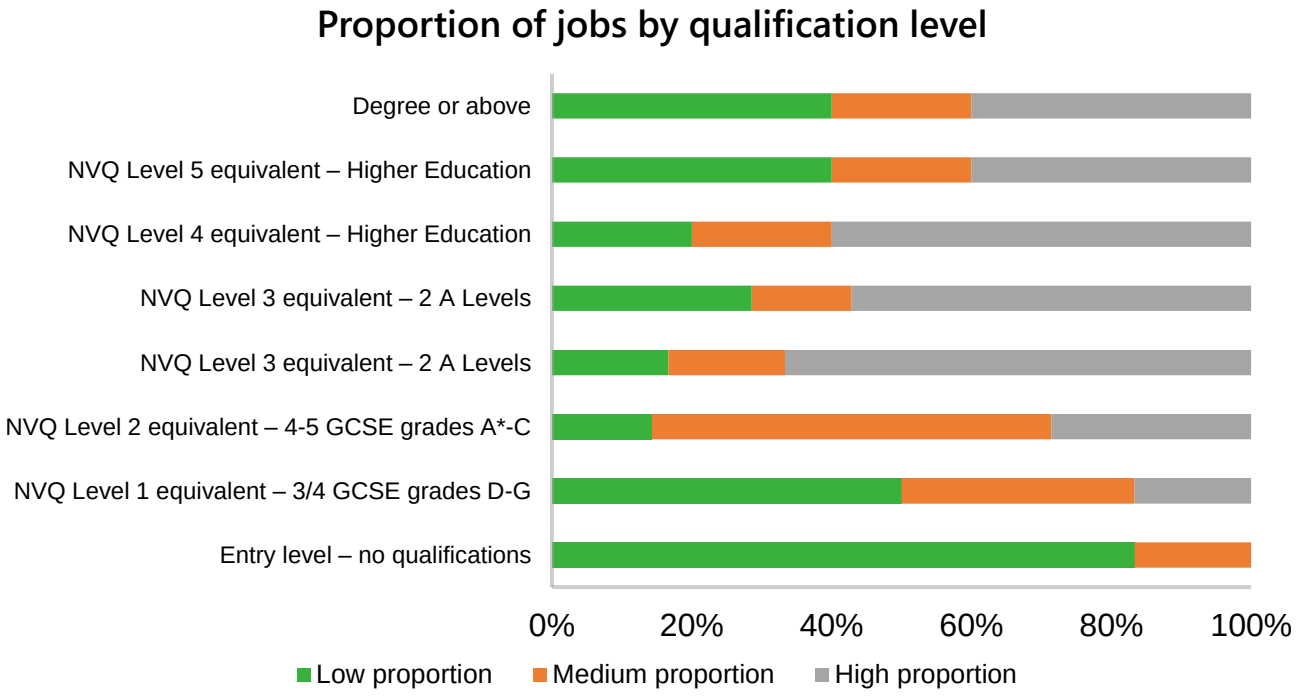


Figure 20 - Proportion of jobs by qualification level

Despite existing retrofit skills shortages being specific to qualification levels and types, some more general skills shortages were also identified. In many cases these skills exist in other areas of the economy, such as soft skills or IT/digital skills. Therefore, if a fall in demand occurs within one sector, focus could therefore be directed at enabling individuals to move into the retrofit sector, building upon their existing skills.

Perceptions of workforce skills

During the survey and interview process, installers were asked about the skill level in their sector, specifically relating to opinions on the prevalence of sufficient skills to meet demand, as shown in Figure 21 below. There was a mix of views from the retrofit and low carbon heating industry, with only one-third of the respondents agreeing that the workforce is sufficiently skilled. For those that commented on this question, they stated their personal business was sufficiently skilled.

The other two-thirds of respondents implied that the existing workforce is not sufficiently skilled to some degree. Reasonings from the stakeholders included that there are not enough people being recruited to fulfil demand, there are not enough people with the appropriate qualifications and more specific training needs to be developed for niche qualifications that fit within the retrofit sector. These respondents noted that the sector is also continually developing and ongoing training needs to be provided to all employees to allow for workforces to continue to develop and respond to retrofit need.

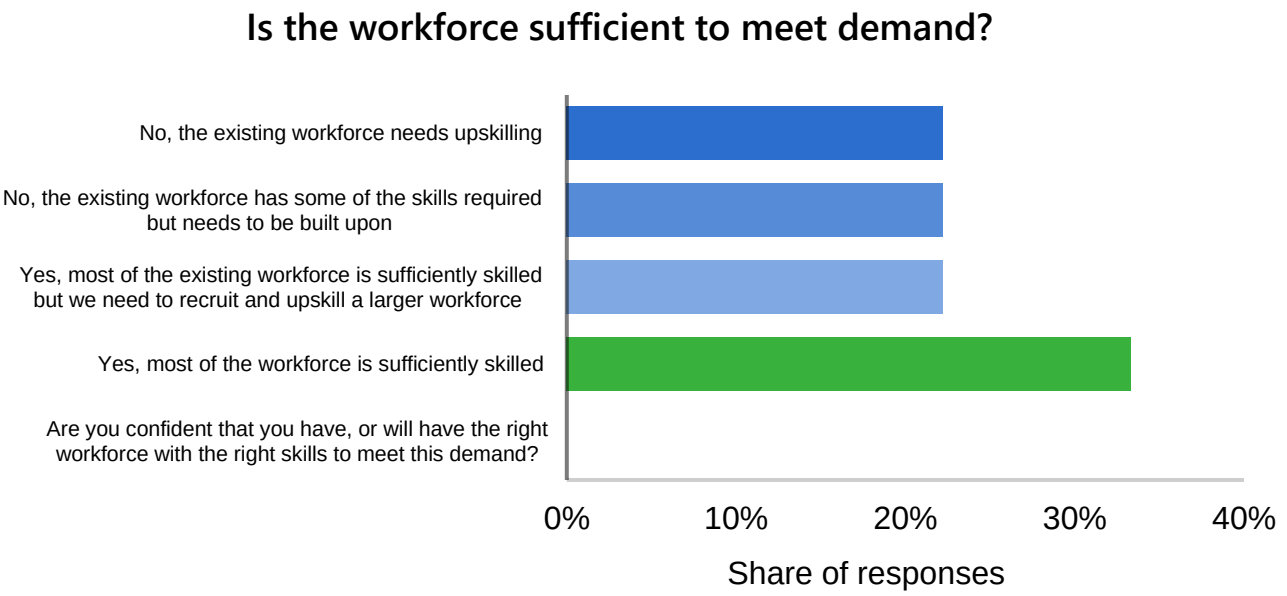


Figure 21 - Workforce sufficient to meet demand?

Survey and interview participants were asked which skills shortages they experience, or expected to experience, within the retrofit industry over the next few years (see Figure 22 below). Shortages were identified across formal qualifications, work experience, IT skills and soft skills. This suggests that there are a broad range of shortages across the formal technical skills but also across the soft skills. Specifically, responses indicate that there is a shortage of skills

across medium to high skill levels.[65] This aligns with interview responses that highlighted more retrofit coordinators and assessors are needed in the energy efficiency sector – mid and high-level qualifications respectively.

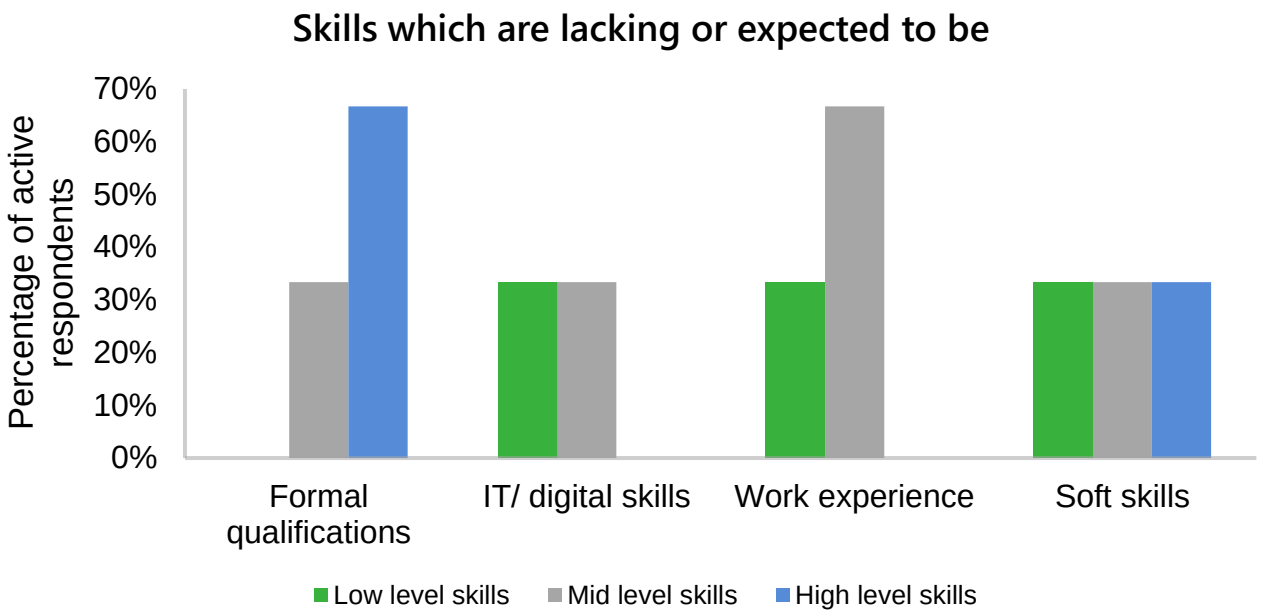


Figure 22 - Skills which are lacking or expected to be[66]

The survey of the retrofit and low carbon heating industry demonstrated that the retrofit industry is lacking or expect to lack a broad range of roles across retrofit space as seen in Figure 23 below. The key ones are retrofit assessors and coordinators; next are installers of insulation and heat pumps, plumbers, heating engineers and technicians. No respondents raised shortages of project managers, labourers, building envelope specialists, but a representative from the CITB we interviewed indicated that there are shortages of labour and skills "across all trades".

[65] Low level skills meaning levels entry level – 2, mid level skills meaning 2-4 and higher level skills meaning level 4 and above. This is consistent with the Department for Education's classification at https://www.gov.uk/what-different-qualification-levels-mean/list-of-qualification-levels

[66] Percentages are taken only from respondents who engaged with this question and show the share of active question respondents who indicated specific skills shortage.

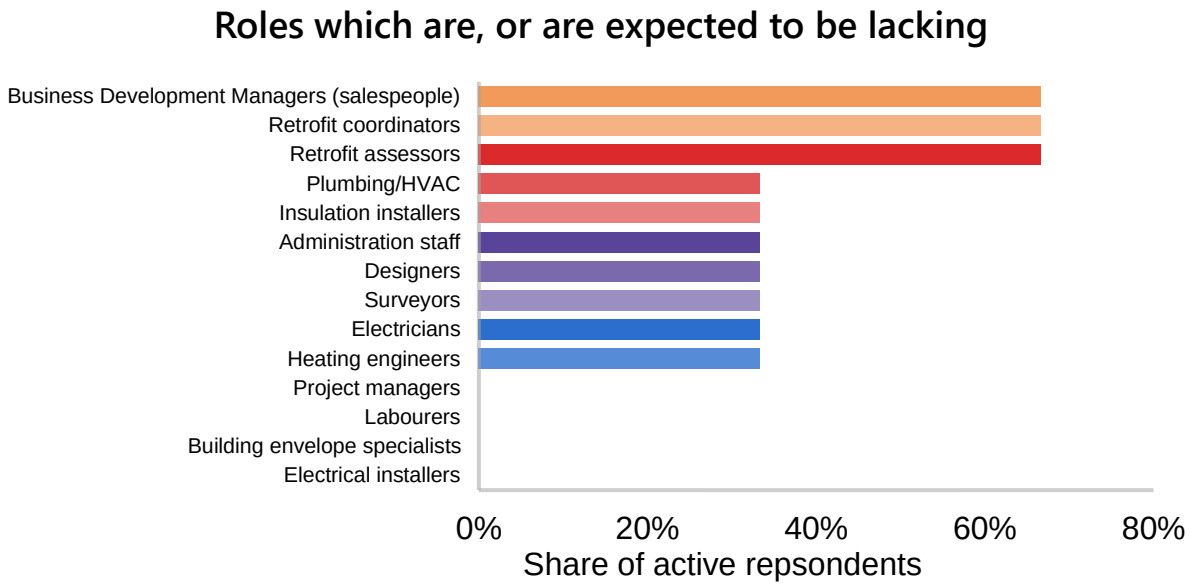


Figure 23 - Roles which are, or are expected to be lacking[67]

[67] Percentages are taken only from respondents who engaged with this question. Retrofit services defined as retrofit coordinators and retrofit assessors.

QUANTIFYING THE NET ZERO CHALLENGE FOR THE SOUTH WEST

Summary

Total required technology deployment

- The region requires installation of over 2.5 million air source heat pumps and 485,000 ground source heat pumps to reach net zero.
- The region requires 1.4 million installations of solid and cavity wall insulation to meet net zero.
- An estimated 350,000 air source heat pump installations per year are required to reach net zero by 2030. This is followed by insulation measures, with roughly 110,000 total installations a year each across loft, cavity, and solid wall insulation respectively.

Technology deployment rate by scenario

- **Insulation:** 600,000 individual measures are installed in 2028 alone across the region, retrofitting 320,000 homes with energy efficiency measures in the Urgent Action Scenario.
- **Low carbon heating:** 730,000 individual installations are required in 2028 alone under the Urgent Action Scenario.

Workforce requirement

- In the Urgent Action Scenario, the labour market peaks in 2028 requiring a total of 15,029 jobs (FTE) across the installation and servicing of retrofit measures.
- 10,700 additional solid wall installers are required by 2028 in the Urgent Action Scenario.
- 950 additional cavity installers are required by 2028 under the Urgent Action Scenario.
- 210 additional double glazing insulation installers are required by 2028 under the Urgent Action Scenario.
- Only 76 additional loft insulation installers are required by 2028 under the Urgent Action Scenario.

Workforce requirement (low carbon heating)

- In the Urgent Action Scenario the total required heat pump engineer labour market peaks at 18,000 FTE in 2028 and then falls to 6,546 by 2031 only to grow to 11,000 by 2043.
- 6,300 additional heat pump electricians will be required across the region by 2027 under the Urgent Action Scenario.
- 748 additional specialist heat network engineers will be required by 2028 under the Urgent Action Scenario.
- 841 groundworkers will be required by 2028.

DEPLOYMENT REQUIREMENTS FOR THE REGION

Targets for the number of installations required to reach net zero are formed through an analysis of the building stock in the region. The number of installations required to decarbonise the building stock is consistently high across all measures, however low carbon heating is dominated by the need to install air source heat pumps and insulation is dominated by both solid and cavity wall insulation with around 1.4 million installs required across both measures. Ground source heat pumps tend to be more expensive and require more space overall (including the proportion of the pump that is underground) than an air source heat pump, however for certain homes, the higher average efficiencies may make ground source heat pumps more suitable than air source heat pumps. Other models for ground source heat pumps are emerging, potentially making them as or more affordable than air source heat pumps. 485,000 ground source heat pumps are required by 2030, compared to over 2.5 million air source heat pumps.

As the deployment of heat networks is more gradual, the required deployment is lower up to 2030. However, by 2050 heat networks are expected to heat a larger share of the building stock. For example, around 30,000 homes could be heated by a heat network in the City of Bristol alone.

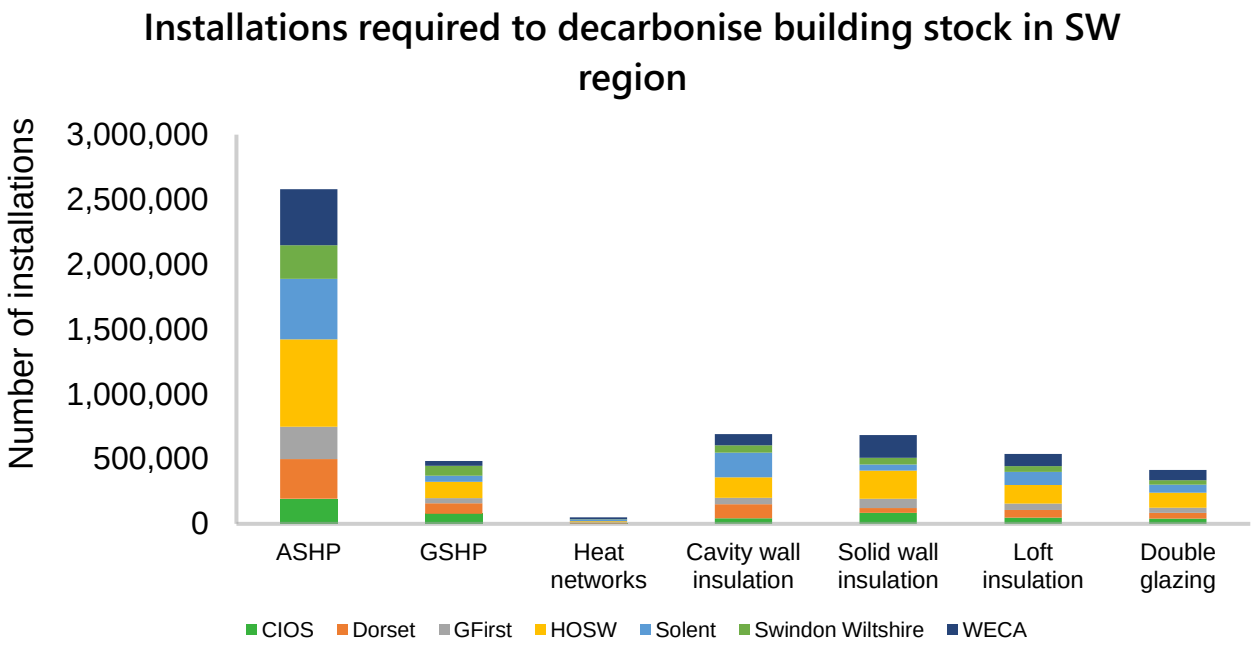


Figure 24 - Installations required to decarbonise building stock in SW region[68]

Current deployment rates are too low to meet even the national net zero target of 2050, let alone the region's more ambitious 2030 targets. Across all measures, if current deployment rates are not increased significantly, net zero targets will be missed. The large requirement for solid wall insulation combined with the low current deployment and available workforce, means that at the current rate, it would take up to 600 years to deploy enough measures to achieve the region's net zero target. Furthermore, in regions with high prevalence of uninsulated solid walls, this figure is even higher. For example, in the West of England Combined Authority area, it could take up to 673 years to meet the required deployment level for solid wall insulation.

Our analysis assumes that all properties with solid walls that have no wall insulation require solid wall insulation installs. Insulating solid walled properties is often expensive, labour intensive and difficult to do. Although low carbon heating is a requirement for the South West to reach net zero, insulation does not actually decarbonise the heating of buildings so not all solid wall insulation installs will be imperative for the region to reach net zero. Rather, it is a key enabler as well as a no-regrets energy reduction option.

The quantities of installations required under this analysis are a maximum threshold and demonstrates the potential of energy efficiency measures under a highly ambitious retrofit programme. Government has an ambition for all homes to reach an EPC rating of C by 2035, which for many properties will require solid wall insulation, however this is only where energy efficiency improvements are "practicable, cost effective and affordable"[69].

[68] DLUHC (2022) Energy Performance of Buildings Data. Installations based on those required between 2022 and 2030 of the Urgent Action Scenario and include low-carbon heating needed for new build properties.
[69] Climate Action Tracker (2022). Available at: Policies and Action

While the current deployment rates are higher in some regions, the pace of installation is still insufficient. At the current rate, CIOS will deploy the number of air source heat pumps needed to achieve net zero by 2096 and enough double glazing by 2041. Compared to some measures, in some regions this represents fast deployment. For example, it could take Dorset LEP an estimated 1,424 years to install sufficient ground source heat pumps at the current rate.

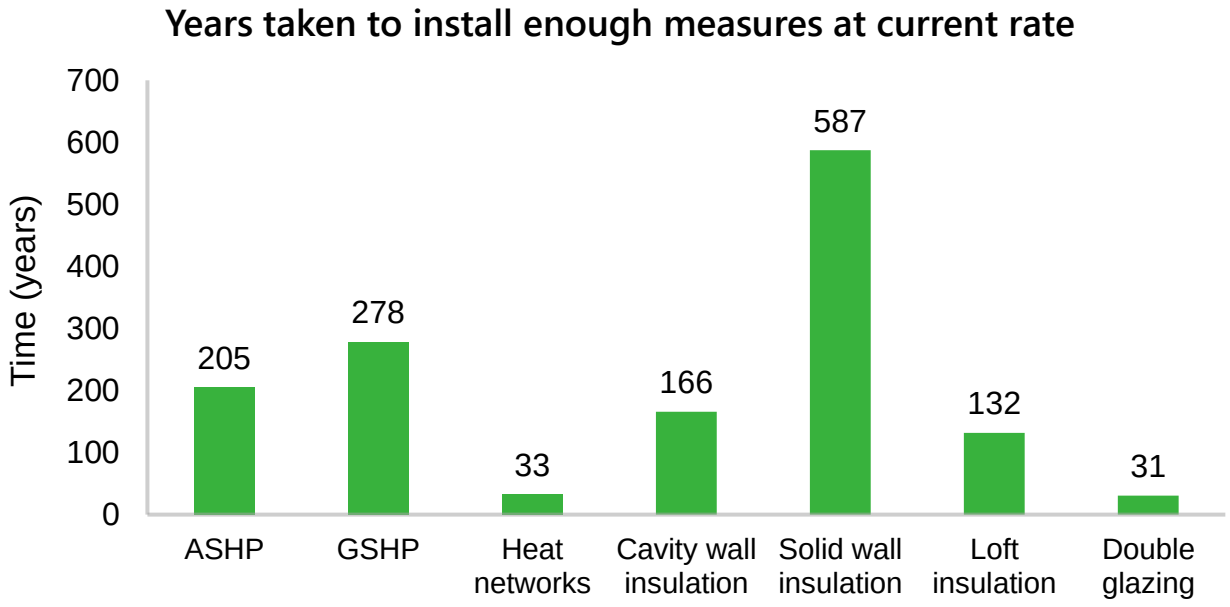


Figure 25 - Years taken to install enough measures at current rate for the South West region

Across both domestic and non-domestic properties, a deployment rate far higher than the current rate will be required to realise net zero by 2030. The requirement for installations of air-source heat pumps is greatest by far, with an estimated 350,000 installations per year to reach net zero by 2030. This is followed by insulation measures, with roughly 110,000 total installations a year each across loft, cavity, and solid wall insulation respectively.

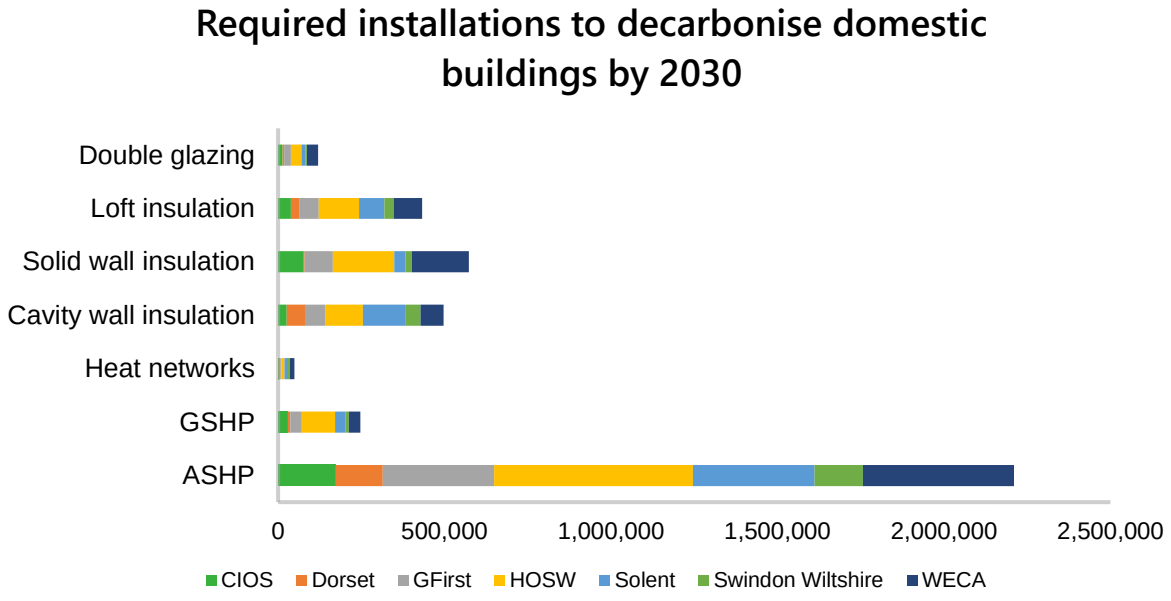


Figure 26 - Required installations to decarbonise domestic buildings by 2030

There are some notable differences in terms of the retrofit measures required between domestic and non-domestic properties which require far greater numbers and rates of installation of both double-glazing and cavity wall installation per property with over 290,000 and 175,000 respectively. The requirement for ground source heat pumps also tends to be higher for non-domestic properties compared to domestic properties. For example, in the largely rural Swindon and Wiltshire LEP area, more non-domestic GSHPs are required than ASHPs.

But due to there being more domestic properties than non-domestic ones, the requirement and corresponding deployment rate needed is greater for domestic properties. In domestic properties, 330,000 air source heat pump installations and 64,000 loft insulations installations are required per year for the region to reach net zero by 2030, compared to 20,000 and 13,000 for non-domestic properties respectively.

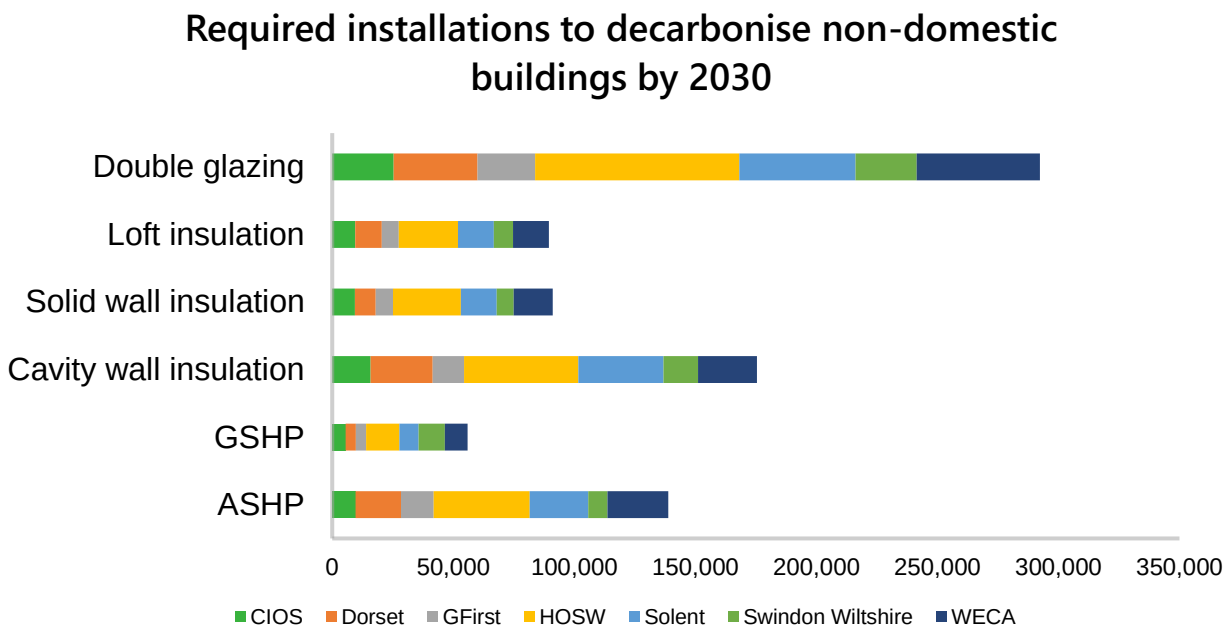


Figure 27 - Required installations to decarbonise non-domestic buildings by 2030

INTRODUCTION TO THE DECARBONISATION SCENARIOS

Gemserv have developed four decarbonisation scenarios to show the potential routes to decarbonising the building stock in the SWNZH region and the resulting skills requirement. It should be noted that the charts provided in this section are illustrative and that exact deployment curves will be influenced by local requirements and current skills provisions.

The development of the scenarios was underpinned by four criteria:

- **Localised –** Recognising the net zero targets and requirements of individual LEPs while considering local strengths, weaknesses and potential blockers.
- **Optimal –** Provide a route to net zero that is optimal in terms of cost, employment, and carbon.
- **Comparable –** Scenarios should allow for comparison between scenarios as well as with UK wide scenarios and targets.
- **Achievable –** To varying extents, targets were designed to be achievable with the correct intervention and also display the different relative ease at which different scenarios can be realised.

In general, the projected deployment follows an "S" curve. This allows time for the workforce, and hence the deployment rate, to ramp up and peak around halfway between the start and end date. This shape results in a skills "bell" curve, which minimises potentially distortionary effects on the labour market and reduces the risk of over- or under-training. Literature suggests that a skills bell curve is optimal[70], however some measure of skills surplus is largely unavoidable, especially with highly ambitious targets. The degree to which there will be surplus will vary between scenarios and technologies, with some technologies requiring a greater element of long-term operation and maintenance. The evidence displayed in Figure 28 shows that in a "business as usual" scenario, net zero targets will be missed. All the produced scenarios are net zero compliant and so will require some level of intervention to reach the higher deployment levels required.

Scenario 1 – LEP Net Zero

Under the LEP net zero scenario, all LEPs reach their net zero targets in a gradual fashion with the growing skills provision supporting an ever-increasing deployment rate. The technology deployment curve will allow for the calculation of the skills requirements needed for all LEPs to meet their net zero goals, considering local strengths and ambition. In the below graph, the two lines represent two different example LEP regions, with each reaching their own respective net zero target.

Scenario 2 – Urgent Action

As most local authorities and some LEPs in the region have net zero targets of 2030, this scenario was created to show what would be required to achieve this across the entire region. Because this scenario represents the ambitions of many local authorities in the South West, this has been selected as the central scenario. This is the most ambitious scenario and will likely require urgent action across both low carbon heating and retrofit to be realised.

[70] ESC (2022). Available at: Domestic Retrofit: Market Intelligence & Skills Assessment

Scenario 3 – Balanced Approach

Some local authorities and LEPs in the region have 2040 net zero targets, often with specific targets around buildings and heat. The balanced approach scenario demonstrates what could be required to achieve net zero by 2040.

Scenario 4 – Gradual Intervention

The UK has a legally binding target to reach net zero by 2050. This scenario allows for comparisons with UK wide projections and gives a benchmark for the achievability and practicality of more ambitious targets.

Please note, for the purposes of this report, we have chosen to include only the graphs for the Urgent Action Scenario as it most closely ties into the region's net zero targets. However, graphs for the other scenarios can be seen in Annex 3.

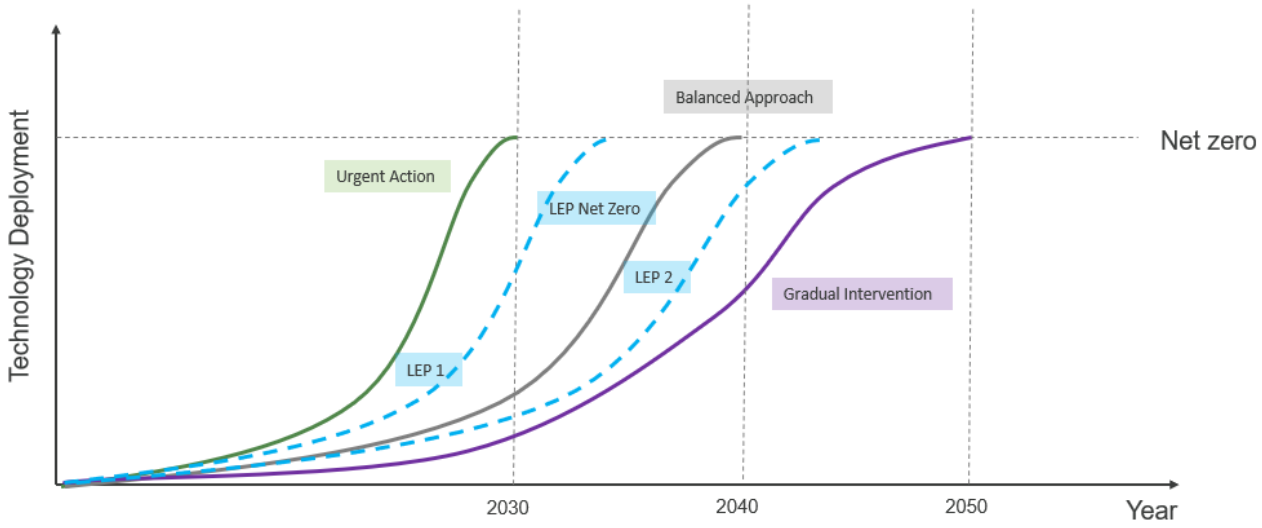


Figure 28 - Summary of scenarios used in retrofit and heat pump deployment projections

REQUIRED GROWTH IN ENERGY EFFICIENCY MEASURES TO ACHIEVE NET ZERO

Rapid growth in the deployment of insulation measures is required to reach net zero in the South West, as shown by Figure 29[71]. A description of the measures included with rationale is included in Annex 2. Across all scenarios, 1.6 million properties are retrofitted with energy efficiency measures. The need for acceleration is most apparent in the Urgent Action Scenario where nearly 600,000 individual measures are installed in 2028 alone across the region, retrofitting 320,000 homes with energy efficiency measures. In the Balanced Approach Scenario, the peak installation rate is in 2034, when 152,000 properties are retrofitted through the installation of 268,000 individual measures. The Gradual Intervention Scenario requires a far less urgent ramp up in skills and the peak installation rate is far lower. 114,000 properties are insulated in 2036 alone with just over 200,000 total individual measures installed, around a third of what is required under the Urgent Action Scenario.

The LEP Net Zero Scenario considers the individual targets of LEPs in the area and therefore is a balance between the 3 prior scenarios. 163,000 measures are installed in 2030 under the LEP Net Zero Scenario with up to 33,000 of these being solid wall insulation installation. The split of installations is consistent across areas within the region with total installations differing mostly based on relative populations. One key outlier is the Solent, who have a more modern housing stock that other LEPs which tends to require less insulation measures per property, especially when considering solid wall insulation. Just 47,000 of the up to 700,000 total solid wall insulation installations are in the Solent.

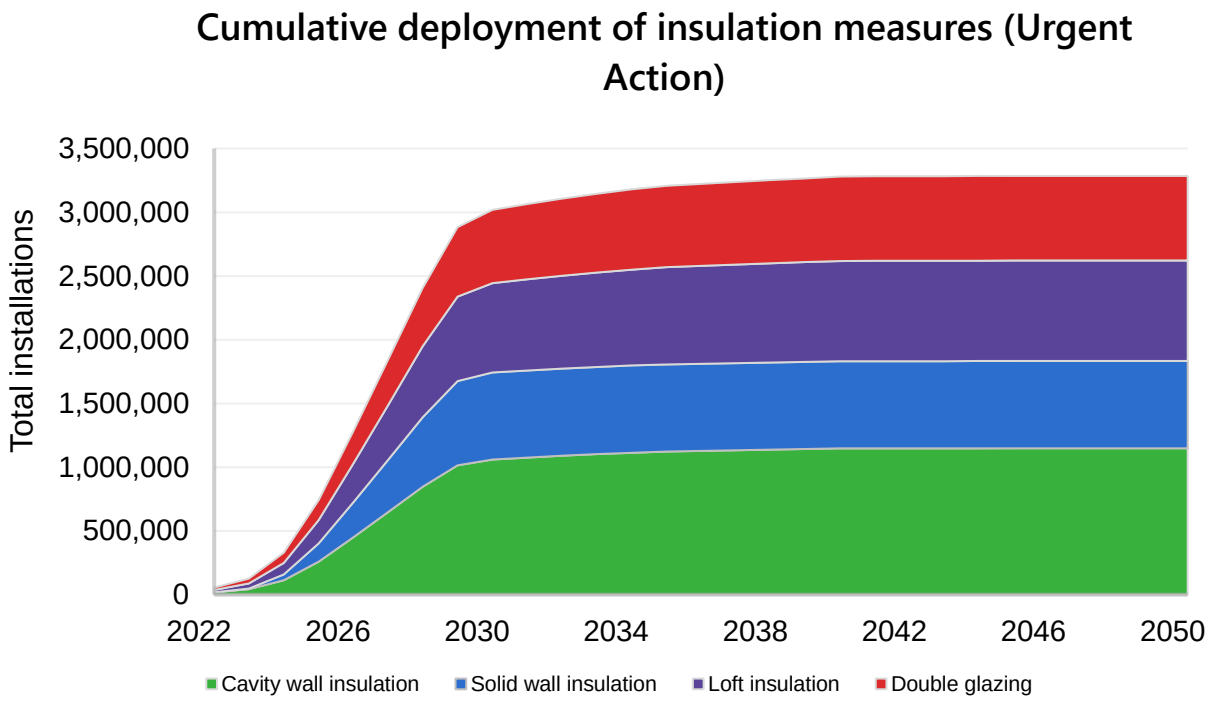


Figure 29 - Cumulative deployment of insulation measures (Urgent Action)[72]

[71] Retrofit and new build installations included.
[72] Deployment graphs for remaining scenarios available in Annex 3.

REQUIRED GROWTH IN LOW CARBON HEATING FOR NET ZERO

The high reliance on fossil fuel heating systems means that similarly to insulation, the deployment rate for low carbon heating systems will have to grow considerably to reach net zero in line with local targets. Figure 30 below displays the required deployment across the low carbon heating measures required to reach net zero under the Urgent Action Scenario[73]. 730,000 individual installations are required in 2028 alone under the Urgent Action Scenario. In the other scenarios, the peak deployment rate is more muted. 353,000 individual low carbon installations are required in 2034 under the Balanced Approach Scenario and 263,000 in 2037 under the Gradual Intervention Scenario.

Across all areas and scenarios, air source heat pumps are expected to be the most deployed measure, followed by heating controls and ground source heat pumps. A total of 2.7 million air source heat pump installations are required across the entire building stock, with these evenly split across the region. The installation rate for air source heat pumps will need to rise significantly to meet peak deployment periods under the Urgent Action Scenario. Over half a million air source heat pumps will need to be installed in 2028 alone under the Urgent Action Scenario.

Due to the South West being a largely rural area, heat networks only play a small role in the final heating mix. However, in some of the more urban areas, there is expected to be significant take-up of heat networks. Under the Urgent Action Scenario, there are 156,000 heat network connections across the region by 2050, with 95,000 of these deployed between the West of England Combined Authority and Solent LEP regions.

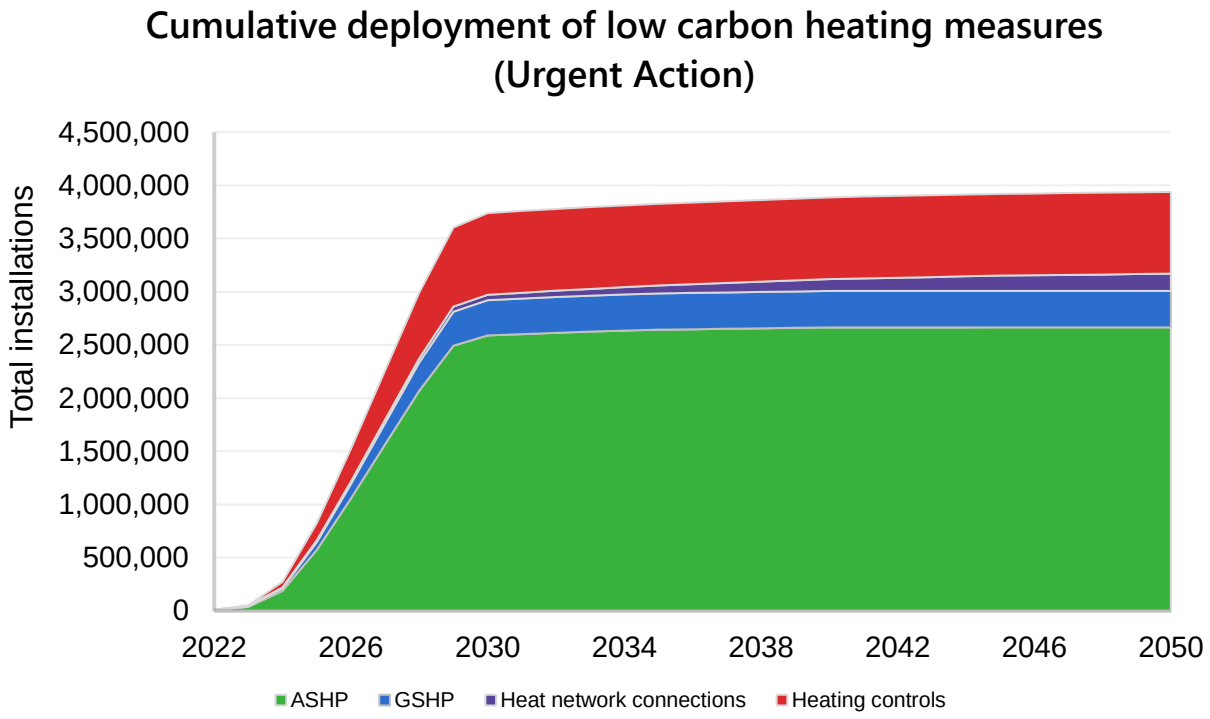


Figure 30 - Cumulative deployment of low carbon heating measures (Urgent Action)[74]

[73] Retrofitted installations and installations in new builds are included however replacements and refit are not.
[74] Remaining scenarios can be seen in Annex 3

Insulation and retrofit

To achieve the high installation rate detailed in the scenarios above, mass retraining of personnel across both the servicing and construction of retrofit measures will be required. This is dominated by installers of retrofit measures, especially solid wall insulation. In the Urgent Action Scenario, the labour market peaks in 2028 requiring a total of 15,029 jobs (FTE) across the installation and servicing of retrofit measures. This will require the current labour market to grow by 286% between now and 2028, an average of 48% growth per year on current labour market for the sector.

Solid walled properties tend to have been neglected by previous insulation efforts. Combined with the fact that solid wall insulation can take around 20 working days to install, there is a large requirement for solid wall insulation installers. The demand for sold wall installers is very significant with 10,700 additional[75] installers required by 2028 across the region under the Urgent Action Scenario.

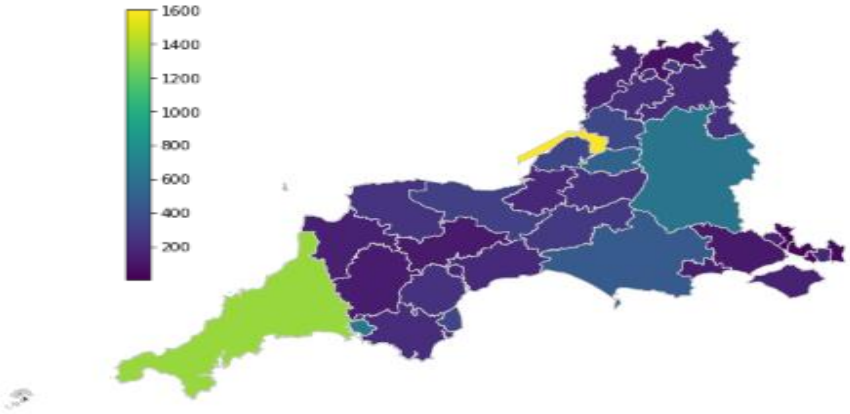


Figure 31 - Number of solid wall installers required in 2028 (Urgent Action)

Considering the current provision of solid wall insulation installers of 451, the labour market will need to grow by 2372%, training an additional 1785 installers per year on average. An additional 4,700 installers are required by 2035 under the Balanced Approach Scenario, an additional 3,400 by 2036 under the Gradual Intervention Scenario and an additional 2,700 by 2036 under the LEP Net Zero Scenario. In some areas this requirement is especially large owing to a large share of solid walled properties. Over half the requirement for new solid wall insulation installers in the region is from the West of England Combined Authority and HotSW.

The requirement for additional labour to install the other measures is less significant, owing to the lower installation time and the relatively high current provision of labour. Cavity wall insulation is the second most required skill across the South West region, with 950 additional installers required by 2028 under the Urgent Action Scenario, 290 by 2034 under the Balanced Approach Scenario and 182 by 2035 under the Gradual Intervention Scenario. Under the Urgent Action Scenario, the size of the cavity wall insulation labour market will need to grow by 227% on current levels, training an additional 158 installers per annum on average. Around a half of the required cavity wall insulation installer training under the Urgent Action Scenario is across the Dorset and Solent LEPs.

[75] Note that "additional" refers to new installers that must be trained. These figures do not include current labour provision.

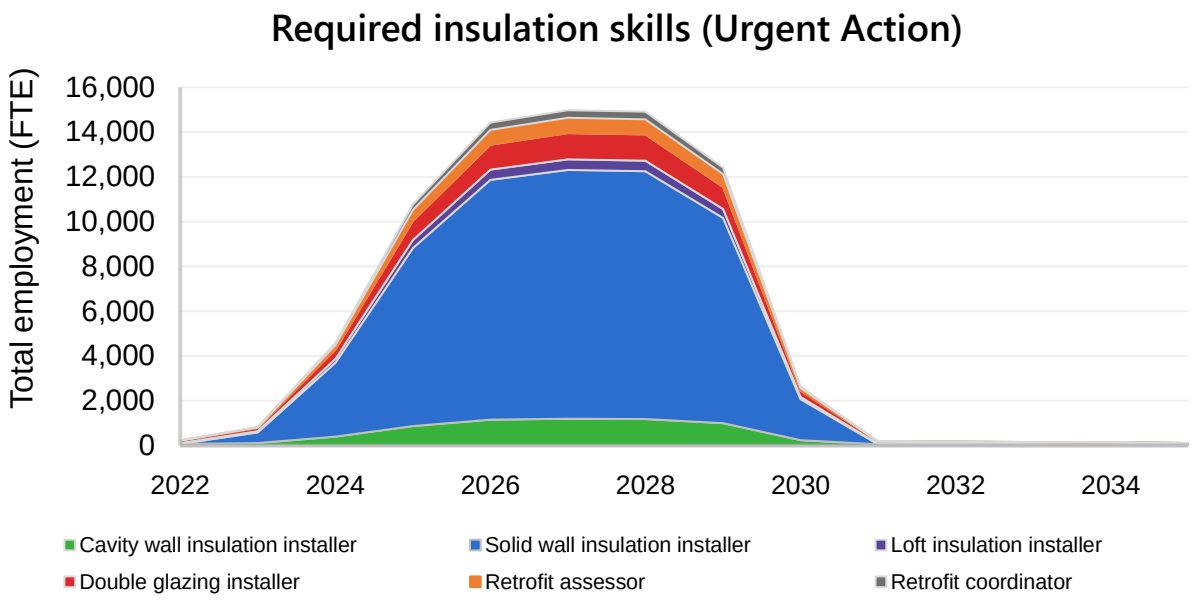


Figure 32 - Required insulation jobs (Urgent Action)[76]

The smallest requirement by far is for double glazing and loft insulation installers. The number of double-glazing installers currently in the region is relatively high and the requirement for installations is not as high as the other measures. However, it is labour intensive and so around 210 additional installers are required by 2028 under the Urgent Action Scenario, 48 additional installers are required by 2035 under the Balanced Approach Scenario and just 25 by 2037 under the Gradual Intervention Scenario. Under the LEP Net Zero Scenario, an additional 25 installers are required by 2033. Under the Urgent Action Scenario, the double-glazing installer must grow by 13% between 2022 and 2028, requiring 35 new installers to be trained per year on average. The requirement for double glazing installers is minimal across the Solent, CIOS and Swindon & Wiltshire LEPs and concentrated in the remaining LEPs.

Loft insulation is not very labour intensive, especially if consumers can assist the installation process by clearing out attic space. Only 76 additional loft insulation installers are required by 2028 under the Urgent Action Scenario and less than 10 across the Balanced Approach, LEP Net Zero and Gradual Intervention Scenarios.

To accompany the installer on the ground, retrofit coordinators and retrofit assessors are needed. These service providers are required per home retrofitted as opposed to per measures installed and so generally the requirement is lower. However, due to the short lead in time of the Urgent Action Scenario, 440 retrofit assessors are required by 2028 and 292 retrofit coordinators. This will require the retrofit assessor labour market to grow by 157% and the retrofit coordinator labour market to grow by 613% between 2022 and 2028.

Under the Urgent Action Scenario, 73 new retrofit assessors will need to be trained per year on average and 50 retrofit coordinators. Under the Balanced Approach Scenario, an additional 48 retrofit coordinators are required and 127 retrofit assessors across the region by 2034. Under the Gradual Intervention Scenario, 86 additional retrofit assessors and 35 additional retrofit coordinators are required by 2037. The LEP Net Zero Scenario will require an additional 25 retrofit assessors by 2033 an additional 90 retrofit coordinators by 2036.

[76] Remaining scenarios can be seen in Annex 3

Because insulation installations require a negligible level of operation and maintenance, once initial retrofit installations are completed the requirement for labour is minimal and confined to working in new build properties where there is lower demand. Therefore, especially under the Urgent Action scenario there is significant surplus labour following the initial peak of installations could be used outside of the region, as is shown in the “economic case for net zero” section.

Heat pumps and low carbon heating

As shown in the “age of the workforce” section, the heating installer labour market will need to grow to accommodate the greater installation time of heat pumps compared to gas and oil boilers, especially when retrofitting heat pumps. Combining this with the context of an aging heating industry, significant efforts will be required to upskill labour to deploy low carbon heating systems at the required rate. Figure 33 displays the low carbon heating skills required under the Urgent Action scenario. The most significant workforce requirement across all scenarios was for heat pump engineers. As the primary labour requirement for the install, refit (reinstallation at lifecycle end) and maintenance of air and ground source heat pumps, the requirement for heat pump engineers was sustained over the course of the scenarios.

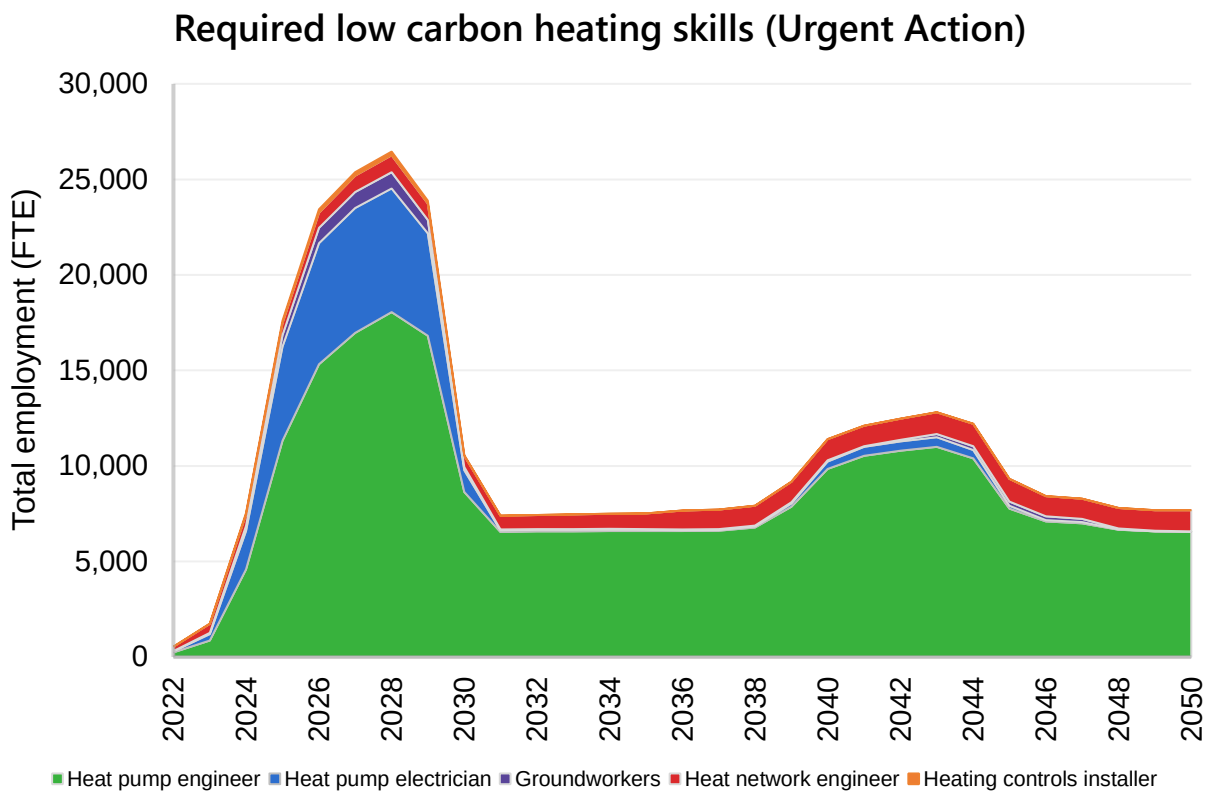


Figure 33 - Required low carbon heating skills (Urgent Action)[77]

In the short-term scenarios, there are clear distinct waves of demand due to the lifecycle of heat pumps being around 15 years for air source units and 18 years for ground source units. The first wave of installations is characterised by the requirement for retrofitted installations, replacing fossil fuel heating systems. The second wave of installations is a result of the requirement to replace the first wave of installs upon their breakdown. This results in a “boom and bust” behaviour in the heating industry. For example, in the Urgent Action Scenario the total required heat pump engineer labour market peaks at 18,000 FTE in 2028 and then falls to 6,546 by 2031 only to grow to 11,000 by 2043.

[77] Remaining scenarios can be seen in Annex 3

In the other scenarios, this effect is less severe. At the peak of the LEP Targets Scenario, an additional[78] 17,577 heat pump engineers would need to be trained by 2028, an additional 10,720 by 2037 under the Balanced Approach Scenario and an additional 8,786 by 2040 under the Gradual Intervention Scenario[79]. Under the Urgent Action Scenario, an additional 2,929 heat pump engineers will need to be retrained per year on average.

At the peak under the Urgent Ramp-up Scenario, across the South West, on average, 10% of newly trained heat pump engineers will need to be able to install ground source heat pumps. This is higher in some areas, with 14% of engineers in the HotSW and CIOS required to install ground source heat pumps. Most engineers are trained to install air-source heat pumps or both air source and ground source heat pumps. Just 1.4% of accredited businesses that offer heat pump installation services, only install ground source heat pumps[80]. Evidence suggests that heat pump engineers do not specialise by type of property either, working between non-domestic and domestic as well as new builds and existing homes[81]. Currently, the market for ground source heat pumps is limited and so installers must diversify the services they offer. However, as the market matures and the demand for ground source heat pumps reaches a critical mass, installers may find merit in specialising their service towards either ground or air source heat pumps.

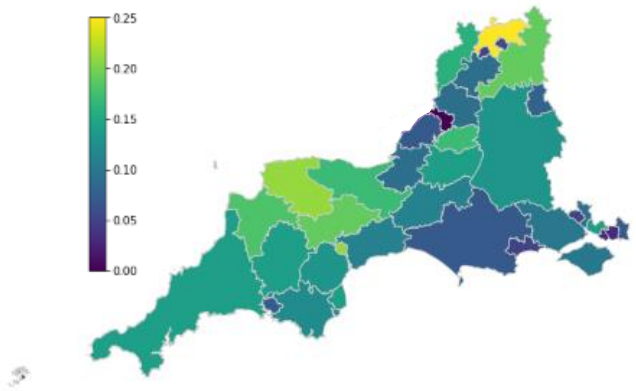


Figure 34 - Share of heat pump engineers required to install ground source units in 2028 (Urgent Action)

Many of these engineers will need to be new entrants whereas others can be upskilled from current skills in the region. Under the Urgent Action Scenario, it is estimated that as much as 66% of the initial wave of demand for heat pump engineers can be met by upskilling fossil fuel heating engineers in the region.

However, because the heating industry has an aging workforce, many will retire in the coming years so around 40% of the second wave of additional workforce demand in the Urgent Action Scenario will need to be met through new entrants to the market. These are conservative estimates for the share of new entrants as some engineers will leave the market for reasons other than retirement and some will be unwilling to retrain (potentially due to age, financial or temporal reasons, or doubts around the technology). It is likely that the requirement for new entrants will be greater than these estimates.

The obvious source for this additional labour is through heating apprenticeships, potentially through new low carbon heating focused courses.[82] However, as demonstrated in the "age of the workforce" section, heating apprenticeship take-up is far below what is required. Under the Urgent Ramp Up Scenario, by 2040, at least 3,789 new entrants to the

[78] Note that "additional" refers to new installers that must be trained. These figures do not include current labour provision.
[79] Total industry size includes newly trained installers and current labour provision. "Additional" refers to newly trained installers only.
[80] MCS (2022)'The MCS Data Dashboard. Available at: The MCS Data Dashboard
[81] BEIS (2023) 'Heating and cooling installer study. Available at: Heating and cooling installer study
[82] Institute for Apprenticeships and Technical Education (2022) 'Low Carbon Heating Technician'. Available at: Low Carbon Heating Technician

heating industry will be required to have sufficient heating engineers. This is roughly 200 more than the total heating and plumbing apprenticeships completed across the whole of the UK in 2022[83].

Electricians will also be required to assist in the installation process of heat pumps, both in new builds and existing properties. It is projected that 6,300 additional heat pump electricians will be required across the region by 2027 under the Urgent Action Scenario. Under the Balanced Approach, an additional 2,700 will be required by 2034 and under the Gradual Intervention Scenario, just 1,900 additional electricians will be required by 2035. As engineers, not electricians, are the primary provider of maintenance and operation services, the requirement for electricians falls off significantly once retrofit installations are complete, although these skills are widely transferable, especially in the context of a net zero economy.

The rollout of heat networks is likely to be more prolonged and concentrated in urban areas. 748 additional specialist heat network engineers will be required by 2028 under the Urgent Action Scenario, with over half of these in the Solent and the West of England Combined Authority LEP areas. This will require the heat network engineer labour market to grow by 450% an additional 125 installers to be trained per year on average. Under the Balanced Approach Scenario, an additional 896 will be required by 2038 and under the Gradual Intervention Scenario, an additional 819 will be required by 2045.

Groundworkers will be needed to prepare ground loop arrays for standalone ground source heat pumps and heat networks that utilise ground source heat pump technology. Under the Urgent Action Scenario, 841 groundworkers will be required by 2028 with over a third of these in the HotSW area. Under the Balanced Approach Scenario, 423 will be required by 2036 and under the Gradual Intervention Scenario, 323 will be required by 2037. The provision of heating control installers is relatively high in the region and the installation time is low meaning less than 10 additional installers are required across all scenarios.

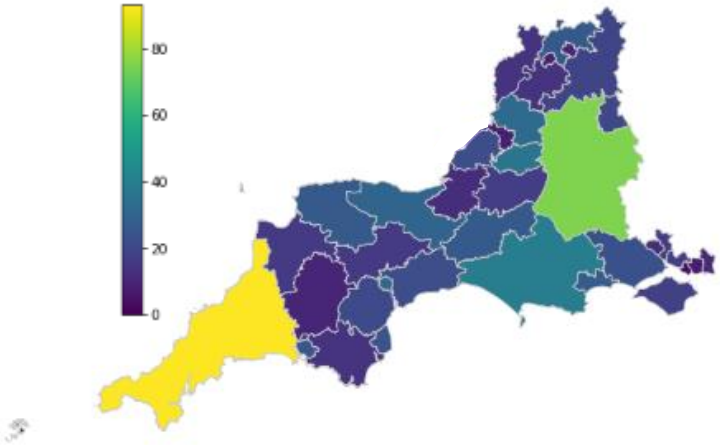


Figure 35 - Number of groundworkers required in 2028 (Urgent Action)

[83] Ofqual (2023), 'Vocational qualifications over time'. Available at: Vocational and other qualifications over time

Availability of qualifications and training in the region

The map below sets out the key qualifications and their availability within the region. A full description of the relevant qualifications on offer, the technology or role to which the course pertains, the level of the qualification, and whether the qualification is regulated by Ofqual[84] is in Annex 4[85].

For the purposes of this research, Gemserv have prioritised courses that are accredited and part of a recognised pathway to delivery of the key roles in the insulation retrofit and heat pump sectors we project will experience shortages if the region is to meet its net zero targets. Other courses are available, and may be of value, but are excluded because they are unlikely to be utilised given the reliance of the industry on government funded schemes. The implications of this research are summarised below.

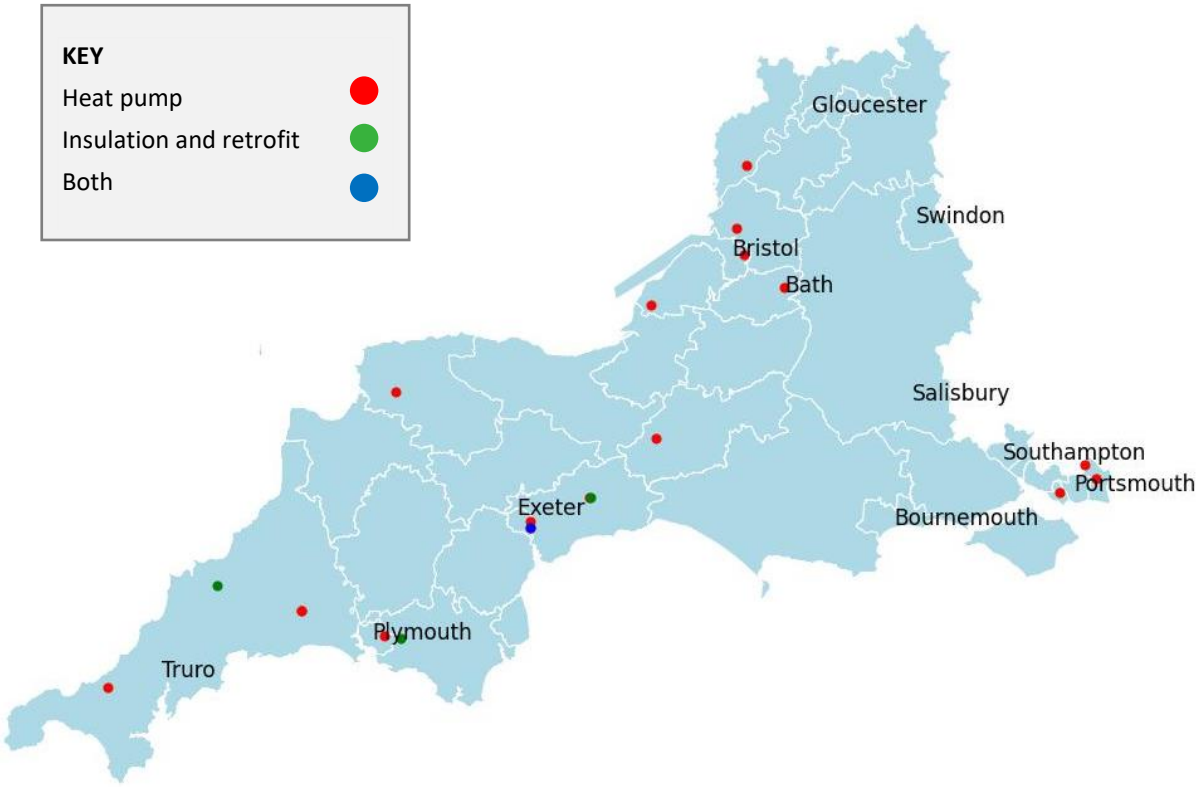


Figure 36 - Training centres in the South West

[84] The importance of Ofqual is they are the independent qualifications regulator for England. Ofqual regulate so that qualifications are sufficiently valid and trusted. Ofqual make clear and considered judgements for the benefit of those who study, and rely on, regulated qualifications. This is particularly important in the context of heat pump qualifications which have less onerous requirements than retrofit because PAS:2035 is not required.

[85] Ofqual (2023) 'About Us'. Available at: https://www.gov.uk/government/organisations/ofqual/about#responsibilities

Summary and recommendations

There is a reasonable spread of training provision across the region with training centres offering relevant courses distributed widely throughout the South West except in Wiltshire and Dorset, where there are no relevant courses offered. These areas are provision cold spots and would be ideally supported with additional provision. There are a greater number of centres that offer heat pump qualifications than insulation retrofit qualifications, but this is explained at least in part by the greater number of courses.

Gemserv's research suggests several core gaps in provision in the region. These are as follows:

1. There are no providers in the region that offers the City and Guilds Level 2 and Level 3 NVQ in Insulation and Building Treatments (Construction)[86]. As we have set out, these courses are critical on the pathway to key insulation installer roles across cavity, solid wall, and loft insulation.
2. Provision of relevant heat pump and retrofit apprenticeships in the region is low, with only two providers demonstrated as publicly offering apprenticeships locally. Although challenges in primary data gathering have caused difficulties in determining the true extent of the offer in the region.
3. There are only three providers that offer the Level 2 diploma in fenestration installation which is key for PAS 2030 certification.

For example, there are a number of apprenticeships that cover the installation of heat pumps, within the course syllabus which are directly related to heat pumps, for example: Plumbing and Heating, Heating and Ventilation.[87] While City and Guilds do provide details of the centres that offer these apprenticeship routes, and all centres on the list do have full approval to deliver the course, they may not be running them.

Recommendation 1: That the region prioritises filling the skills gap locally by funding delivery of the following qualifications.

- City and Guilds Level 2 and Level 3 NVQ in Insulation and Building Treatments (Construction)
- GQA Level 2 diploma in fenestration installation
- Level 3 Apprenticeship in refrigeration air conditioning and heat pump engineering technician
- Level 3 Apprenticeship NVQ Diploma in Domestic Plumbing and Heating (6189-31) (600/1122/1) heat pumps pathway.

[86] City and Guilds, (2022), 'Insulation and Building Treatments (5931)'. Available at: https://www.cityandguilds.com/qualifications-and-apprenticeships/construction/construction/5931-insulation-and-building-treatments#tab=information

[87] City and Guilds, (2022) 'Plumbing and Domestic Heating (6189). Available at: https://www.cityandguilds.com/qualifications-and-apprenticeships/building-services-industry/plumbing/6189-plumbing-and-domestic-heating#tab=information&acc=general-info

BARRIERS TO NET ZERO IN THE SOUTH WEST

Summary

- The biggest perceived challenges to the region meeting its net zero targets were UK government support (38%) and policy and recruitment (31%).
- There is little confidence in the region meeting its net zero targets. 35% were unsure and 65% had no confidence they would meet their net zero targets.
- 65% of respondents felt that skills funding was insufficient to meet demand.
- Respondents struggled with funding bureaucracy, including the number of funds, the bureaucracy of applying and the short turnaround time for applications.
- Education and training providers struggle with a lack of demand for courses and installers face a lack of demand for retrofit measures.
- There is a lack of labour supply for retrofit of insulation measures and heat pumps.
- There is a problem with a lack of relevant qualifications, outdated existing qualifications and lack of awareness of qualifications.
- There is an issue with quality of installations across the heat pumps and insulation retrofit sectors.
- COVID-19 and the cost-of-living crisis present challenges for the region with their impacts on labour supply and affordability.

INTRODUCTION TO THE RESEARCH

To understand some of the challenges and opportunities for deployment of insulation measures and heat pumps in the region, Gemserv conducted stakeholder research between December 2022 and February 2023. This had two elements including surveys and interviews with key industry stakeholders. Additional information on the process can be found in Annex 7. Responses from the surveys and interviews are quoted in the sections below.

PERCEIVED CHALLENGES

The most identified challenges for the sectors in the region were around recruitment and policy stability from government.

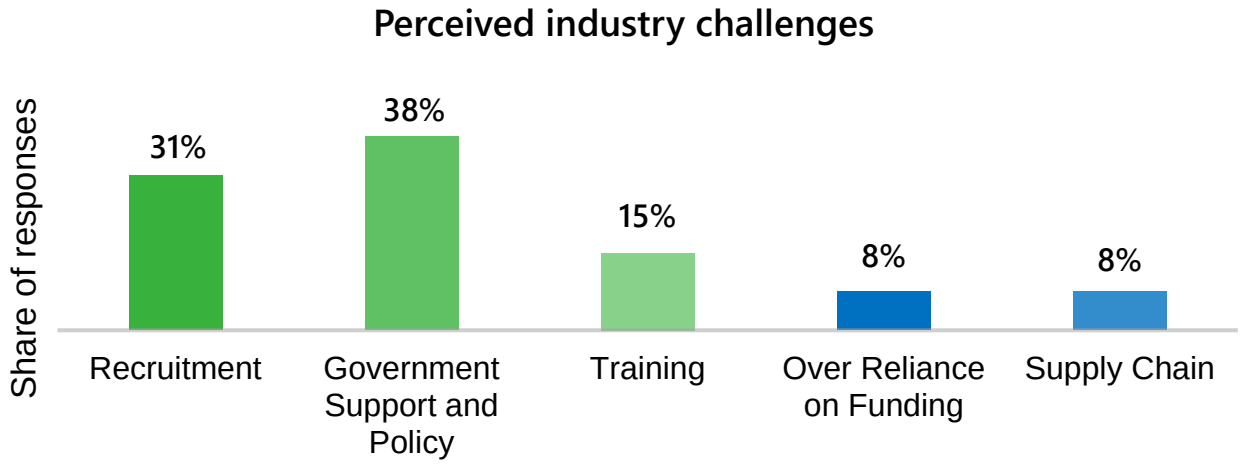


Figure 37 - Perceived industry challenges

Lack of policy certainty and support from government was a frequently mentioned problem within the interviews. A simple interpretation is that political changes over the last 18 months, as well as fragmented and incomplete policy, have caused a lack of certainty in the long-term direction of policy. This was well expressed by the respondent below:

"Recent political change may slow progress as well as the transition into the new unitary model [for local authorities] so it is vital to maintain momentum and provide certainty to investors regarding continuity of support as well as financial administration and prioritisation."

As one representative from a local housing provider told us, the housing sector has chosen to meet the 2050 decarbonisation target, in part because of delays to regulation requiring landlords to retrofit their properties to at least an EPC C rating, and delays and fragmented funding has left them in a position where it is "*the only realistic target".* Skills and recruitment challenges have been substantiated in the quantitative analysis for this report but were also identified by respondents to our survey as the main challenges for the region.

"We have a climate change emergency [and], a clear skills shortage to deliver the installation of low carbon heating."

This challenge was typified by a local social housing provider who told us that they lacked the workforce locally to deliver the retrofit programme of work beyond the latest round of funding meaning there was no capacity in the system to accelerate the rate of retrofit. This was just for one social housing provider in the region and does not consider the broader demand or requirements of the private, or social sectors.

Strikingly, none of the respondents to our survey felt that the region was likely to meet its net zero targets as seen in Figure 38 below.

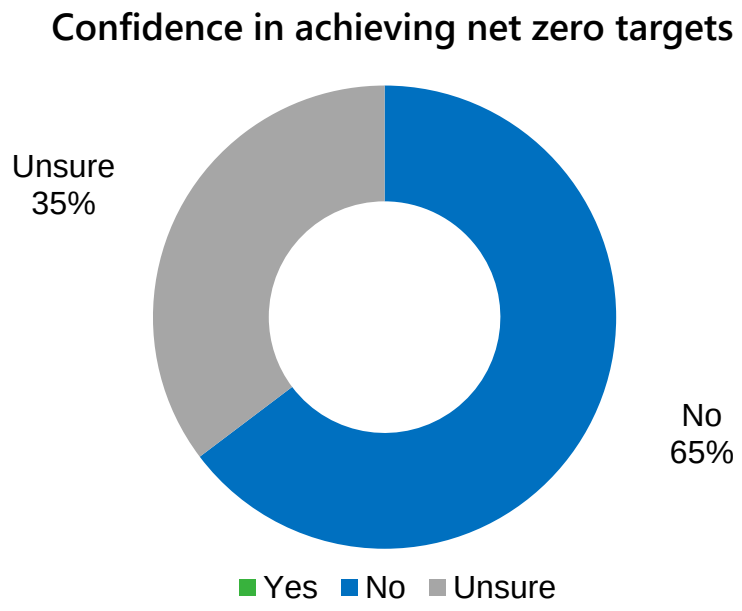


Figure 38 - Confidence in achieving net zero targets

LACK OF FUNDING FOR SKILLS

The most frequently mentioned barrier to rolling out the training needed for jobs in retrofit was lack of funding for green skills courses. Of all the respondents to our survey from within the skills and education sector, two thirds said that there was insufficient funding for skills training. See Figure 39 below:

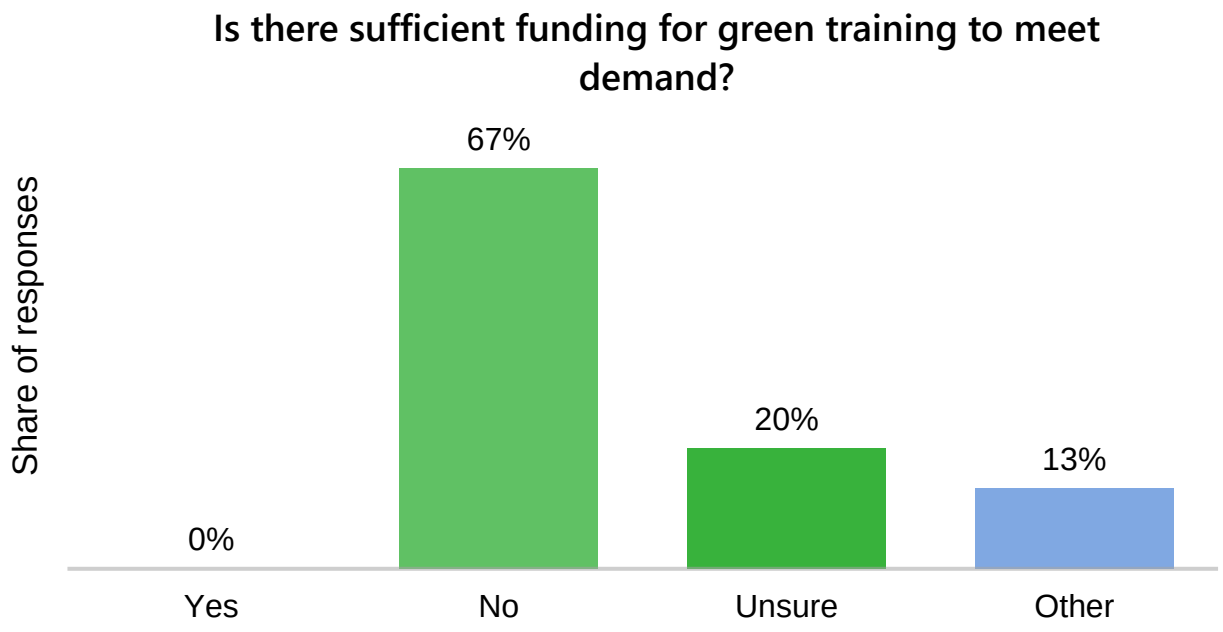


Figure 39 - Is there sufficient funding for green training to meet demand?

One interpretation may be that there is insufficient funding to deliver the courses for free. For example, one local training provider claimed that:

"*We have successfully received an SDF [Strategic Development Fund] bid, allowing for free course delivery until March 23. after this the affordability aspect will appear. We also have limited space in which to deliver. We have a concept build but securing funds for this is problematic.*"

We heard from some providers that they deliver courses at "full cost recovery", so that their customers fully fund the training. However, offering courses at full cost recovery introduces a further cost barrier to those operating in the retrofit sector and is unfeasible for new, young entrants into the industry who do not typically pay for education and training. The other interpretation of this may be that there is lack of demand for the courses and willingness to pay for them from industry and therefore lack of funding for the provision. For example, one representative from a local training provider suggested that cost was a barrier to engaging employers stating that:

"Many courses are full cost recovery and companies must be incentivised to invest the time and money in training".

This concern about the affordability of courses was reflected in the responses to our surveys, where it was the most referenced barrier to the uptake of green courses as shown in Figure 37.

Local skills providers also have lack of dedicated green skills budgets, so must either dedicate 'core' skills budgets to the task such as their Adult Education Budget, or European Social Fund allocations, fund the courses at risk, or seek smaller, innovation funding pots such as those listed as 'Levelling Up Funds' or innovation funds. This creates challenges for institutions that are often cash strapped and need to dedicate funding to courses that can demonstrate clear outcomes and results, leaving them less flexibility to allocate funding innovatively, or to new, or emerging markets. As one leader at a local college in the region told us:

"We need safety to deliver green skills courses… I cannot dedicate my AEB to green skills courses if I'm not sure I'm going to get value from them".

This picture of falling and low funding for skills is supported by data on adult education spending nationally. The Institute for Fiscal Studies suggests that total spending on adult education and apprenticeships fell by 38% between 2010–11 and 2020–21, with a 50% fall in spending on classroom-based adult education[88]. This has particularly impacted training provision for courses at lower levels, with a 50% fall in numbers taking qualifications at Level 2 and below, and a 33% fall in the number of adults taking Level 3 qualifications[89]. In our research, employers told us the most important qualification level for courses was Level 2 – 4. On this basis it is unsurprising that providers facing constrained finances are unable to prioritise providing free green skills and retrofit courses over more 'secure' sources of income.

ASSESMENT OF TRAINING COSTS

The training costs associated with the skills required to reach net zero for each job type have been estimated and are shown on Table 3. The timing of the net zero target has a significant impact on annual deployment of measures and employment required in the sector. Higher employment results in increased training costs, therefore earlier net zero targets have much larger costs associated with training. Earlier targets also have costs that occur in a much more concentrated manner resulting in a significantly higher peak annual cost.

As an example of this, the total training cost for the 2030 scenario is almost £22.6 million with an annual peak of £9.4 million which occurs in 2025. Whereas in the 2040 scenario, total training cost is £11.4 million with a peak annual cost of £1.6 million which occurs in 2029. This analysis does not mean the 2030 target should not be pursued; however, it does raise the increased challenge and cost of delivering in this timeframe.

Table 3 - Training costs broken down by job type for each net zero scenario

	Net Zero Scenario			
	2030	2040	2050	LEP TARGETS
Low Carbon Heating				
Heat pump engineer	£10,440,505	£6,367,870	£5,218,736	£5,863,952
Heat pump electrician	£2,834,556	£1,209,455	£868,324	£1,122,583

[88] Institute for Fiscal Studies. 2022. Adult Education: The past, present and future. Available at https://ifs.org.uk/publications/adult-education-past-present-and-future
[89] Ibid

Groundworkers	£587,895	£295,444	£226,429	£268,458
Heating controls installer	£3,280	£808	£318	£318
Insulation				
Cavity wall insulation installer	£542,459	£190,505	£119,696	£174,663
Solid wall insulation installer	£6,960,225	£3,082,636	£2,240,583	£3,615,695
Loft insulation installer	£72,079	£4,592	£0	£34,955
Double glazing installer	£157,807	£35,769	£18,903	£85,118
Retrofit assessor	£570,395	£62,000	£32,765	£160,934
Retrofit coordinator	£506,428	£215,277	£146,824	£221,523
Total Training Cost	£22,675,630	£11,464,357	£8,872,580	£11,548,199
Peak Annual Cost	£9,424,697	£1,608,104	£1,062,257	£3,180,597
Year of Peak Annual Cost	2025	2029	2030	2025

FUNDING BUREAUCRACY AND COMPLEXITY

A related issue to lack of funding is funding bureaucracy and complexity. First, was the issue with the number and duration of funding streams. Education providers told us that there are too many competitive funding skills streams. This adds costs to applications in terms of time and cost of the effort for the application process and acts as a disincentive to apply as it often requires providers and local areas to invest in bid managers and bidding rather than focussing on delivery. This is amplified when applied to competitive funds, which also brings the risk of losing the bid. Taken together, this can add significant cost and risk to bidding, which can act as a disincentive to invest.

One training provider noted that allocation methods for funding is an issue for delivery of growth and changes of provision, particularly for new, or alternative courses:

"Funding for colleges is based on the cohort size for previous years. If the demand for training increases the next year, there is not enough funding available to fulfil the demand. This has an impact on the number of individuals we can train for the year."

Another compounding issue is the number and scale of funds. Multiple, small funding pots compound the issue of competitive bidding, by increasing risk and decreasing reward. It takes multiple bids to secure funding needed at the scale required for transformational change in provision of the kind that the retrofit market requires. It also undermines certainty for the sector, by requiring smaller providers in particular to live 'hand to mouth' from the income from the latest funding stream. It can also require small amounts of training to be delivered very quickly. For example, the UK

Community Renewal Fund, which funded retrofit training in Devon, had an initial delivery window of just over 8 months from receipt of funding to the conclusion of the project[90].

This can make it challenging to develop a long-term sustainable business model, particularly when constrained providers are reliant on shorter term funding to deliver retrofit skills, rather than core long term budgets. As we have seen in the case of Levelling Up Funding, this can be a benefit when combined with flexibility, fewer reporting requirements and outcomes driven measurements. This must be balanced by certainty, long term funding and a pipeline of projects commensurate to the challenges of the sector.

The number and complexity of funds is in stark contrast to the retrofit requirements of the region. Our research has shown that the skills and employment requirements across the South West are notably quite consistent, which undermines the case for small, targeted pots of funding. Skills priorities and budgets could be coordinated at a regional level. This would simplify the system, enable meaningful targeting on priorities rather than salami slicing and it would create a larger quantum of funding overall for retrofit skills and training, reducing complexity, and improving economies of scale.

Recommendation 2: Create a regional role for the SWNZH in coordinating bids for funding across green skills as well as for retrofit and installation.

It is principally the role of central government and employers to provide funding for skills provision, and ultimately, only greater investment in skills will be sufficient to facilitate the uptake of skills required.

However, lack of funding is compounded by local complexity. Responsibility for allocation of skills funding in general is diffuse and regionally distributed between different local government organisations. There are good reasons for this: Skills needs differ according to the differing needs of their populations and labour markets are often local, reflecting cultural and economic differences. However, our research shows that retrofit skills needs are generally quite consistent across the region.

Strategic coordination and leadership would mitigate the issues of fragmented, and low funding skills levels for green/retrofit skills by ensuring that the region maximises its resources by achieving strategic coherence over time and across the geographical extent of the region. It should also allow for greater economies of scale by pooling funding together targeting smaller funding pots strategically at areas of greatest need.

LACK OF DEMAND FOR SKILLS, RETROFIT MEASURES AND LOW CARBON HEATING

Perhaps paradoxically given the stated ambitions of the retrofit sector to expand, and the clear requirement to do so to meet the region's net zero targets a lack of demand for skills was given as a prominent barrier to expanding skills provision. Of those we interviewed from the skills sector almost all referenced lack of demand as an issue either directly or indirectly.

[90] Department for Levelling Up, Housing and Communities. 2021. UK Community Renewal Fund prospectus. Available at: https://www.gov.uk/government/publications/uk-community-renewal-fund-prospectus/uk-community-renewal-fund-prospectus-2021-22#timelines

This was reflected in the responses to our survey. Most education and training providers told us that only between 1 and 25% of their courses focussed on green skills. For a minority, green skills represented most of the provision offered, but most providers reported that green skills courses only represented between 1 – 50% of the courses they offer, suggesting that delivery of green skills is not yet a primary focus for education and training providers in the region.

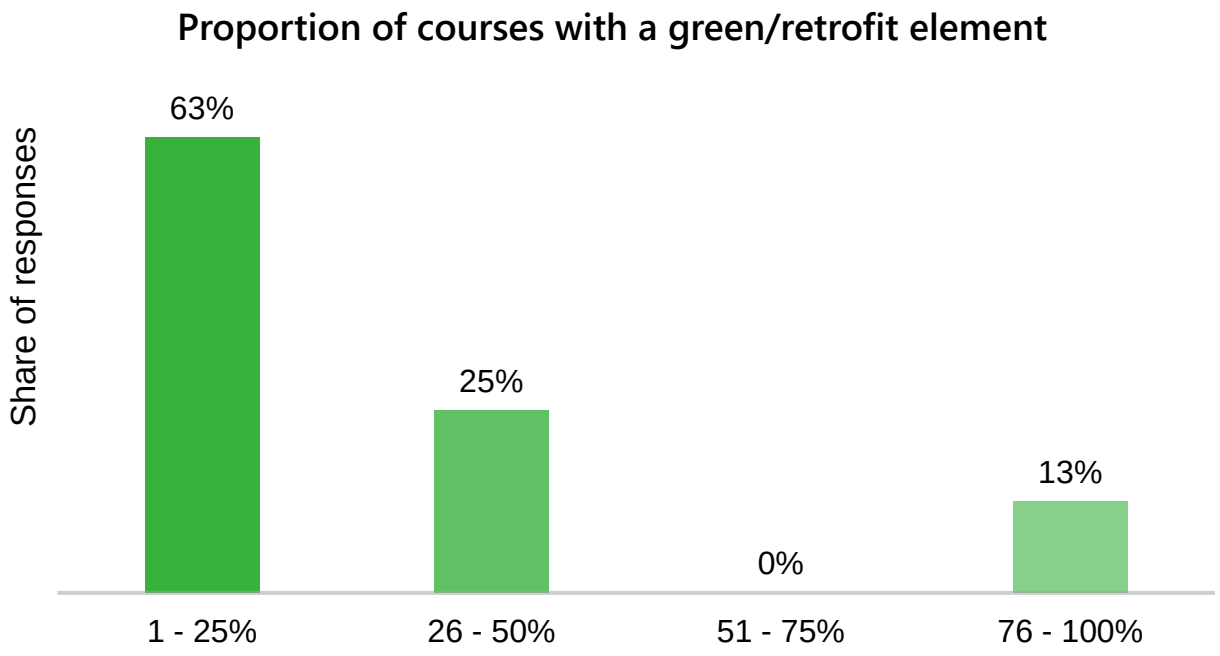


Figure 40 - Proportion of courses with a green/retrofit element

For example, one representative from a higher education institution told us that:

"The market is not large enough at higher education levels as yet for us to ensure we can sell our courses."

In this case it appears that there is lack of demand from industry, which is preventing education and training providers from investing in heat pumps and retrofit skills. As we have seen, there are issues with lack of funding can cause constraints to demand by requiring training providers to charge for qualifications and training. While this can present an issue when courses are priced poorly, in other markets, business are willing to pay for skills where there is a clear return on investment or where training will lead to economically productive skills. However, as one provider told us:

"It is very expensive to get trained as all provision is by money making providers and the cost has to be borne by the employer or the employee. Employers are disincentivised from paying for very expensive training as employees could then just leave. Employees typically can't afford it themselves…the training of staff in these areas should be subsidised significantly or fully to enable employers to "take the risk" of training their staff as fast and to the highest standard possible."

This lack of demand from employers is itself causing issues for education providers, in part because funding shortages mean it is counterproductive to fund courses that will not be filled or result in progression for learners into employment. As in other markets, education and training providers must be confident that their products will sell and in this case that means having employers willing to fund courses or fill places and demonstrate course completions.

"Whilst we are keen to innovate our provision rapidly to expand our low carbon offer, we are not seeing huge demand from our employer base and may need support in expanding into new retrofit employer markets."

But the demand problem is not just about filling courses, it is also regarding progression into work. Due to the way that education providers are paid, there are incentives to place students onto courses that are likely to result into progression into employment or higher skilled courses, as providers are increasingly paid by results.[91] [92] Additionally, lack of clear progression routes into jobs with employers are likely to disincentivise providers from putting on courses. When asked for their main barrier to expanding the number of courses for retrofit, one senior college leader in the South West told us:

"The issue is clear line of site of employment opportunities. We can't train students without the employment opportunities."

This was reflected in the feedback on barriers to uptake in courses shown in Figure 37. Lack, or perceived lack of employment opportunities was the second most selected barrier to uptake of retrofit and green skills courses. This demonstrates that there is an issue surrounding lack of demand with its origins in the installation industry itself, which reveals itself in terms of low demand for courses for training providers, and few prospective students.

This pattern is reflective of a circular feedback loop starting from low consumer demand, transferring across the installer base and resulting in the impact on quality and provision of courses. This is illustrated in the graphic below:

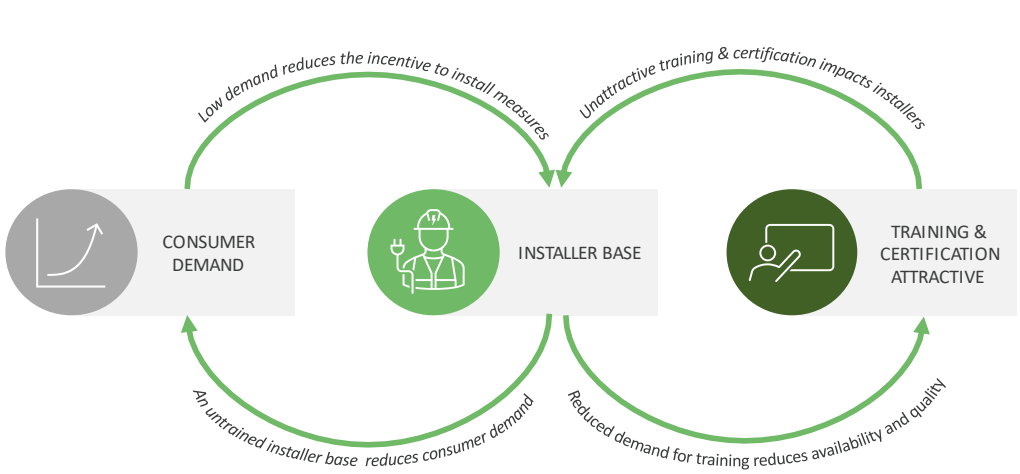


Figure 41 – feedback loop between consumer demand, the installer base and training & certification attractiveness

[91] Department for Education. 2022. Adult Education Budget Funding Rules. Available at: https://www.gov.uk/government/publications/adult-education-budget-aeb-funding-rules-2022-to-2023/adult-education-budget-aeb-funding-rules-2022-to-2023#introduction-and-purpose-of-the-document

[92] Department for Education. 2019. Funding Rules 2014 to 2020 ESF Programme ESF Specifications Deliverables Evidence Requirements. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/837634/ESF_Specifications_Deliverables_Evidence_Requirements_v2_September_2019.pdf

Addressing this issue requires collaboration between industry, local government and training providers to map the workforce requirements of the region in the short, medium and long term, to understand supply and demand in skills and labour markets for the retrofit sector. Specifically, that requires ensuring there is clarity about the roles and skills required by industry and the courses and training provision needed to meet that demand by training providers and the education sector and when they will be needed.

It also requires market intervention to break the cycle of low demand. As the cycle suggests, the demand problem in skills starts in the sector itself. Low demand from the public reduces demand for installers, which in turn reduces the demand for training and for skills. The solution then, at least in part, requires market intervention to stimulate demand, expand the industry and realise training opportunities. As we set out below in the sections on COVID-19 and the "Cost-of-Living crisis", there is latent demand, but it must be supported to emerge in both the commercial and residential sectors.

Recommendation 3: Consider funding for a 'fabric first' retrofit approach prioritising street by street wall insulation and heat pump programme for the South West

Given the shortage of solid wall insulation, the length of installation time and the technical challenges of installation combined with the region's aging housing stock, the region's most acute skills shortages and retrofit challenges are in solid wall insulation. It is also a prerequisite in many cases for installation of low carbon heating, particularly heat pumps. It therefore makes sense to prioritise it.

Heat pumps could be installed in properties deemed appropriate and with sufficient energy efficiency to do so. Evidence from Energy Systems Catapult suggests this could be a significant number of properties[93], perhaps as high as 40% of properties in the South West with the remaining 60% of properties focussed on insulation measures[94].

Recommendation 4: Connect public and social sector organisations with a similar requirement for retrofit to commission provision jointly to stimulate demand in the sector.

To stimulate the commercial market for retrofit, we recommend that organisations committed to net zero, with a similar requirement for retrofit, in the public sector (for example, NHS trusts, social housing providers and local government) could jointly commission retrofit for their building estates. This would have the following effect:

1. It would share the risk of commissioning and delivering alone
2. It would create scale large enough to provide meaningful regional growth
3. It could deliver economies of scale for those organisations involved
4. It would position the public sector in the South West as a leader in this area, and signposting action consistent with its commitments.

[93] Energy Systems Catapult. 2022. Mass rollout of heat pumps feasible, but innovation needed to accelerate take up. Available at: https://es.catapult.org.uk/news/mass-rollout-of-heat-pumps-feasible-but-innovation-needed/

[94] Based on the findings from ESC that properties with an EPC rating of C are appropriate for heat pump installation, this represents 40% of the region's recorded EPC ratings.

TRAINING AND LABOUR SUPPLY

Demand for heat pump skills has increased, so upskilling and retraining within the low carbon heating sector has increased commensurately, creating challenges around labour supply. This is supported by the quantitative analysis in this report which suggested a shortage of skills in a range of key roles and sectors. This was exemplified by a housing provider in the South West who stated that:

"The current delivery of the SHDF is reaching the limit of the skills that are available, as there are not enough skills to utilise the funding beyond the next phase."

Retraining and upskilling of the existing workforce is a challenge. Installers interviewed noted they have found it difficult to attract over 40s to heat pump training, as generally they tend to stick to what they know, and do not want to change and learn new technologies. This creates a considerable barrier to scaling the workforce as a significant proportion of the workforce (61% of heating installers) fall into these age brackets.

An additional challenge is recruiting and training people from outside of the industry. Here, respondents frequently spoke about a problem with the perception of green construction jobs. In interviews it was relayed that the sector struggled to attract young people, in particular due to the perceptions of the sector as offering roles offering manual labour, outside, with poor opportunities for progression.

"Jobs in construction aren't seen as desirable by young people – when they think of construction sites they think of muddy boots, and manual labour. They don't think there are opportunities to progress… No one wants to work outside for 30 years."

This perspective is supported by national studies which found that nearly two fifths of young people would not pursue a career in construction[95]. Given the significant increase in roles in the sector that will need to be created to reach net zero, it is imperative that the region focusses on attracting young people into careers in green construction, retrofit and low carbon heating if it is to meet its targets.

Recommendation 5: Develop an information campaign on green construction careers locally to be delivered at local schools, colleges and job centres. This could build on the West of England's Green Futures Fund[96] for the whole region.

Efforts should focus on the perception of green careers and dispelling myths around the types of roles, opportunities and progression that is available. It should focus on emphasising the range of skills and work environments required, as well as highlighting the earning potential for prospective roles.

[95] WSP. 2022. Students not drawn to careers in sectors crucial to UK's net zero ambitions, new research suggests. Available at: https://www.wsp.com/en-gb/news/2022/students-not-drawn-to-careers-in-sectors-crucial-to-uks-net-zero-ambitions

[96] West of England Combined Authority. 2023. Green Futures Fund. Available at: https://www.westofengland-ca.gov.uk/what-we-do/employment-skills/green-futures-fund/

There is another challenge for attracting new recruits to the sector around routes to competency which are complex, unclear, and costly. A full explanation of the routes to competency is set out at Annex 1. Put simply, the issue is that people who want to work in the sector but will have to change career must start at the bottom via a formal apprenticeship, or low-level qualification (typically Level 2) to ensure they are suitably qualified. In addition, there is currently no specific low carbon heating apprenticeship, so new starters may have to go through a formal plumbing apprenticeship before they can upskill to heat pumps.

There is merit in training individuals to be multidisciplinary experts. Many installations require multiple plumbing and electrical skills and having individuals with multiple capabilities is a benefit to organisations in terms of being able to take on a greater variety and complexity of jobs with fewer staff. But being forced into longer qualifications can be time consuming for the individuals and with unnecessary additional information, and costly for businesses.

These issues were reflected in the manufacturer side of the industry. In our interview with a leading heat pump manufacturer who trains installers to carryout maintenance under their warranty programme, they raised concerns about the number of qualified persons involved in the overall heat pump installation journey. Other key vocations including designers, sales personal and surveyors were not only in short supply, but the manufacturer struggled to find a suitable government approved courses.

Recommendation 6: Development of new qualification for sector specific roles (designer, salesperson, surveyor etc).

One key outcome of this report could be the launch of a specification and sales apprenticeship that covers all the pre-installation journey. For example, a dedicated training route could be set up for those who have some installation experience in other areas with transferrable for example smart meter installers, who will need employment on completion of the Smart Meter rollout programme

The final issue with labour supply mentioned in our research was the lack of trainers available to deliver courses.

Recommendation 7: Provide targeted 'train the trainer' courses to support scaling up of the delivery of courses locally

QUALITY AND AWARENESS OF QUALIFICATIONS

A common concern was issues with both the quality and completeness of qualifications. This is a sector wide problem, with particular emphasis on heat pumps and insulation installation qualifications. For example, as one industry respondent to our survey told us:

"We do offer [training] as it's the only way to get staff certified but the courses are generally poor."

Generally, industry representatives felt that there was a need for a clear national curriculum or syllabus to give clarity and consistency for the training provision which could be supplemented by employers locally.

"Provision of better renewables training through local FE providers to a standardised country wide syllabus would be best so the employee gains a certificate, and we can input from within the company over time."

Responses generally indicated a lack of confidence in the existing system of qualifications despite the various accreditation of qualifications that exist. it is indicative of an attitude of some in the industry towards the training providers whereby they lack confidence in the quality and basic standards of the qualifications.

"The key elements missing are 1, an industry standard renewables apprenticeship to bring new talent to the sector and 2, an industry standard training scheme for bringing capable new people and existing engineers with open minds up to the standard required to deliver quality heat pump installations. The existing training for plumbers is not satisfactory and absolutely should NOT be left to the training provider companies. It's too important and should be managed centrally by a body like the MCS or central government."

Others stated a need for more innovative provision that addresses future training needs, rather than on historical, traditional systems. This was typified in the response below:

"What the industry needs is a real focus on training staff to work with renewables, not simply rely on the historical (it has always been done that way) training that most of the colleges deliver."

This was reflected in some of the interviews we conducted, where there was a recognition of a limitation of qualifications for traditional trades such as plumbers and electricians as well as architects and surveyors not containing enough substantive content with a retrofit element.

"It is an issue that mainstream qualifications for traditional occupations such as trades but also surveyors and architects do not have a retrofit element. This needs they need to be trained almost as soon as they have qualified."

This creates an issue whereby thousands of people qualifying each year have qualifications and skills that need updating the moment that they are completed. According to our projections in this report, these are the people that will need to be scaling up retrofit projects now. This is problematic for the obvious reasons that it imposes additional costs on employers, both through the need to fund additional training to plug gaps, and in terms of the time cost of taking employees out of paid work to take the training.

Energy efficiency

During the stakeholder engagement process of this research, those involved in the energy efficiency sector indicated that a large barrier to increasing the installation of these measures was in the lack of workforce. Stakeholders stated that there is a lot of demand from consumers that cannot be fulfilled due to a lack of employees to deliver the services required across the energy efficiency space.

Attracting new students to train in energy efficiency courses and upskilling the existing workforce is key to allow for demand to be met. One stakeholder noted that Local Skills Improvement Plans should contain a retrofit or net zero inclusion, as training providers must respond legally to enable these elements to be included in all training courses, raising further awareness for the need for these skills.

A familiar trend observed nationally and across other sectors is an ageing population, where the existing workforce is unwilling to invest temporally and financially in upskilling. This highlights the importance of attracting young people to the industry to ensure the energy efficiency industry can not only maintain its size but also increase to meet growing demands with the need to achieve net zero. One stakeholder mentioned:

"This sector is continually developing and ongoing training is required for all staff in our business, to ensure that both quality training and installations are delivered."

This point is key as quality training will ensure that installations of energy efficiency measures are delivered to the highest quality, preventing the need to go back and remediate them later – tarnishing views of the industry. Initial training needs to be delivered to a high standard, with bespoke courses to fulfil the needs of the sector, and ongoing training should continue to this high standard as the industry continues to evolve.

Low carbon heating sector (heat pumps)

Stakeholders quoted that many in the existing workforce are "stuck in their ways" with an unwillingness to adapt to the changing landscape. Mandatory training would enable the entire workforce to meet industry standards to maintain quality installations of measures. Ongoing training should also not be limited to installers but provided to those delivering the training courses as the sector develops.

As highlighted in our survey results, a number of those who responded and interviewed were concerned about the quality of heat pump qualifications. Most of the current courses offered including those on the MCS website[97] are outdated and are not Ofqual approved (Section 6 provides further details). In addition, prerequisites qualifications to undertake the heat pump courses for plumbers and heating engineers to upskill in the main only rely on a Level 2. But-in effect a Level 2 plumbing qualification does not cover in any detail in heating systems. The idea of these upskilling courses is more related to the heat pump specific installation requirements. It does not cover the heating systems specifics required for a low temperature heating system.

Nevertheless, the Heat Pump Association along with the Chartered institute of Plumbing and Heating Engineers have developed two Level 2 courses which allow entrants to be confident that the courses are both up to date and cover off low temperature heating system installation[98] [99].

Currently the Department for Levelling Up Housing and Communities (DLUHC) are conducting a review of the minimum technical competency, and this will change to Mandatory Technical Competency (MTCs) with an anticipated introduction date of April 2024. The review has been put in place following the publication of the Building Safety Act.

[97] Department for Levelling Up, Housing and Communities. 2022. Building Safety Act 2022. Available at: Building Safety Act 2022 (legislation.gov.uk)
[98] LCL. 2022. LCL Awards Level 3 Award in Low Temperature Heating and Hot Water Systems in Dwellings. Available at: LCL Awards Level 3 Award in Low Temperature Heating and Hot Water Systems in Dwellings
[99] LCL. 2022. LCL Awards Level 3 Award in the Installation and Maintenance of Heat Pump Systems (non-refrigerant circuits). Available at: LCL Awards Level 3 Award in the Installation and Maintenance of Heat Pump Systems (non-refrigerant circuits) - New

"*The current landscape for ensuring competence is fragmented, complex and inconsistent - different disciplines have various routes for assessing competence which are not always clear or consistent*."

The review of the MTCs will determine how certification schemes will assess the ongoing competence of their members, shaping the competency criteria that operatives must demonstrate that they meet to self-certify that their work complies with the applicable requirements of the Building Regulations. This is an industry-led initiative, with the intention of improving the competence of installers across all the sector specific retrofit disciplines including heat pumps[100].

Clearly, existing qualifications must be updated, and if necessary, replaced. But addressing this challenge is complex and requires a balanced approach. As the Department for Education's review of post-16 qualifications sets out, the adult education qualification system has issues of "complexity and variable quality"[101]. As such, the Department is engaged in an extensive programme of simplification, to remove unnecessary, or overlapping qualifications. To mitigate against this, industry input is required to ensure new qualifications have quality, and lead to jobs.

Recommendation 8: Update existing qualifications to include relevant focus on green skills and retrofit.

Existing qualifications from plumbing, electrical and heating, to surveyors, assessors, architects and design must be updated to include relevant retrofit components so that people qualifying from them are equipped with the skills and expertise to work on retrofit projects including heat pump installation and insulation programmes without requiring further additional training.

This will save employers and individuals time and money and ensure that any additional training undertaken by staff contributes to personal development and the value of the company.

Good quality qualifications do exist however, and part of the solution exists in raising awareness of this. Respondents to our survey found they lacked awareness of available provision, for example:

"I do not know of any training assistance for the types of training we need for our staff."

This could suggest that improvements in signposting in relevant provision, including certification and accreditations of both the qualifications and providers could be of value to ensure that industry is directed to the qualifications, training and provision it needs, as well as receiving assurance of the quality of that provision.

[100] These are: installation of insulation in existing buildings; installation of combustion appliances; installation of electrical installations in dwellings; installation of plumbing, water supply, heating and hot water systems; installation of mechanical ventilation and air-conditioning systems;installation of replacement windows, doors, roof windows or roof lights; installation of replacement of roof covering on a pitched and flat roofs as necessary additional work (not including the installation of solar panels);and installation of micro generation and renewable technologies.

[101] Department for Education. (2023. Guide to the post-16 qualifications landscape at level 3 and below for 2025 and beyond. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1128144/Guide_to_the_post-16_qualifications_landscape_at_level_3_and_below_for_2025_and_beyond.pdf p3

Recommendation 9: Provide a regional database of training and qualifications locally for employers in the retrofit sector.

Green Skills training and provision will be promoted by the West of England Combined Authority via the Skills Connect programme as a specific searchable function. This could be a fruitful initiative to expand across the South West.

QUALITY OF INSTALLATIONS

Our research found that one of the barriers to uptake in heat pumps and insulation within the South West region was a concern about the quality of installations. One large SME heat pump installer told us that due to the growth in low carbon heating and the lack of skilled labour, in 2021 they made the decision to buy a ready-made training centre to ensure that they can scale installer capacity to meet demand and guarantee the quality of training and standards for their workforce.

Although there is a large training presence with the South West region particularly for low carbon heating, the skill shortage does accelerate poor installations. Our interview with a certification body who provide MCS and CPS accreditation for heat pumps indicated it was clear that while complaints and issues are low relative to the number of installations, funded work is often driven by a "race to the bottom" attitude, whereby providers deliver the greatest number of projects at lowest cost. As one training provider, familiar with practices in the region told us:

"The energy retrofit sector has become a race to the bottom. It is short term and funding led – not delivery focussed but funding focussed."

Part of the mitigation of this is through more robust quality auditing, and accreditation of installers. Research shows that nearly half of all employees in the low carbon retrofit sectors in the region have some form of accreditation, suggesting that this is insufficient to guarantee quality. But this poor quality could equally be attributed to the share of the workforce/industry without accreditation.

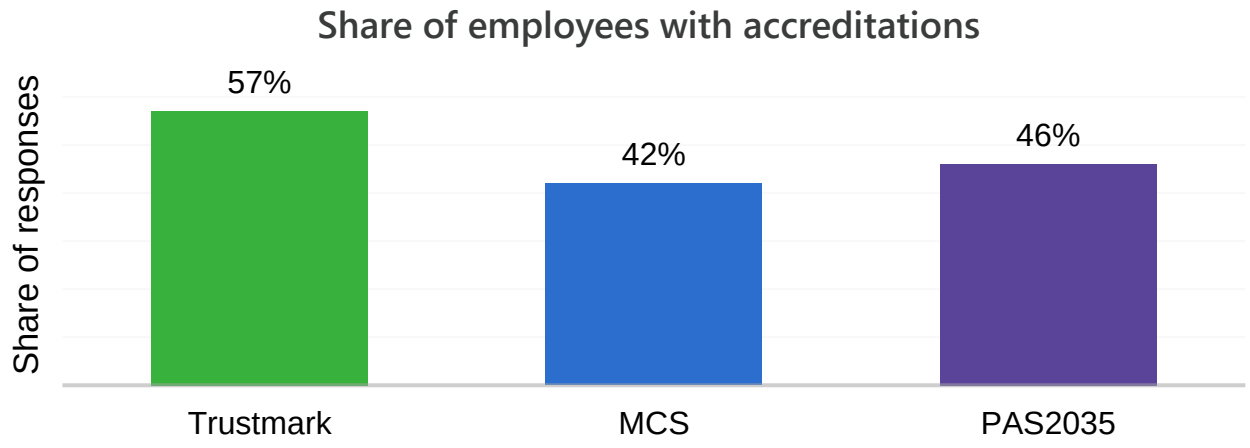


Figure 42 - Share of employees with accreditations

Our discussion with TrustMark who provide an auditing role for government funded installations, have taken the route of a risk-based approach to auditing rather than a set percentage as a way of maximising efficiency. This increased

auditing regime is positive for the industry in terms of and enforcing higher installation standards. There was also positive feedback from those we surveyed on the role of PAS2035 in developing the standards in the industry. However, this has the potential to exacerbate the skills shortage as installers will be minded ensuring a first-time right installation, which would have the likely impact of adding time to each installation.

The difference in the auditing of government funded schemes for heat pumps comes under the boiler upgrade scheme. Installers are not required to be TrustMark registered, the inspection regime falls under the standard MCS journey, which is one install per year per installer, regardless how many installations that are carried out. It is appreciated that installers must also provide evidence of internal audits of installations at their annual inspection by the certification body, the internal auditing regime is as follows:

> *1.17. b) Supervise and assess the work undertaken to ensure the requirements of the MCS Installation Standard for the technology installed are met. The number of installations assessed should not be less than the square root of the total number of installations rounded up to the nearest whole number (e.g., a new build site of 50 installations then a minimum of 8 should be assessed).* [102]

Recommendation 10 – Ensure that all new qualifications developed are linked to an industry recognised accreditation such as MCS, TrustMark or PAS2035. This will embed high standards in the industry and promote consumer confidence through ensuring quality of installations.

[102] MCS, (2020) The MCS Contractor Standard. Available at: Microgeneration Installation Standard (mcscertified.com)

COVID-19

The COVID-19 pandemic was seen as a challenge for the region, although views were mixed, with a range of responses – most respondents thought that COVID had either not impacted their business or were unsure about the impact.

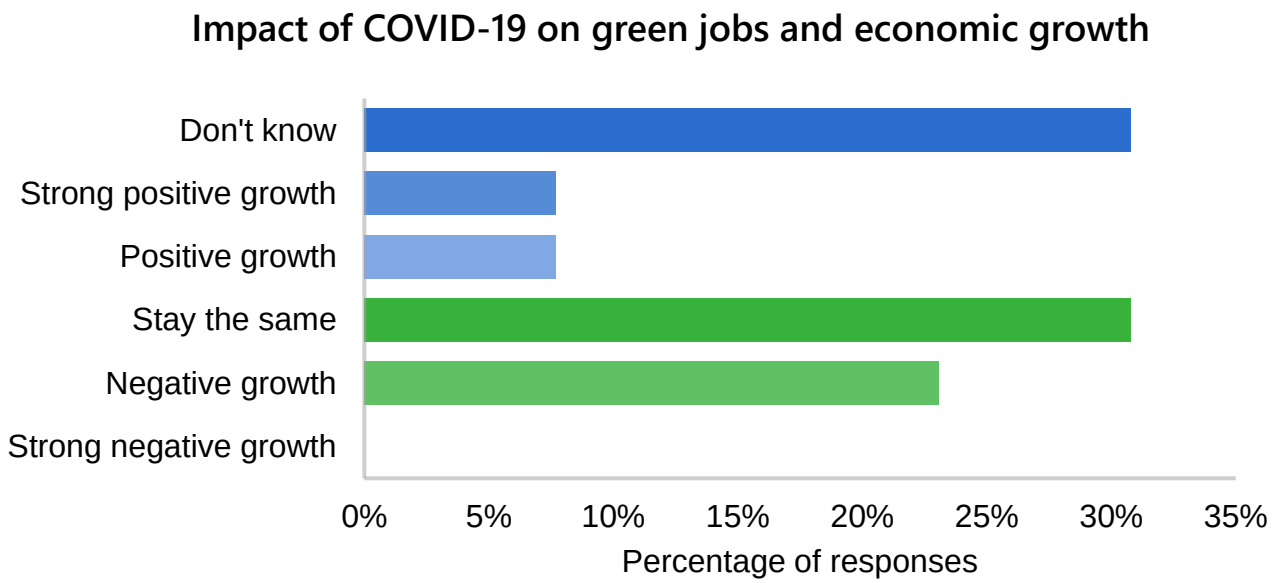


Figure 43 - Impact of COVID-19 on green jobs and economic growth

Respondents saw the increase in time people spend in their homes and home working as potentially increasing demand for energy efficiency and low carbon heating measures as people invest more into their homes generally. Another positive was that the pandemic had been seen to encourage government to release more funding for grant led retrofit. It was suggested that the pandemic had increased demand in the region for retrofit as people have relocated to the South West.

These benefits were generally contextualised against the disruption of the pandemic to the jobs market in the region by moving people out of the sector and into other careers, causing shortages of labour for the sector. Taken together, this indicates that there is demand for retrofit in the region, but it is frequently constrained by the labour supply and skills shortages.

COST-OF-LIVING CRISIS

Another challenge for the region is the cost-of-living crisis. Characterised by rising energy prices internationally and in the UK, it has increased average energy costs considerably for average households impacting the retrofit and low carbon heating markets as well as energy markets in general.

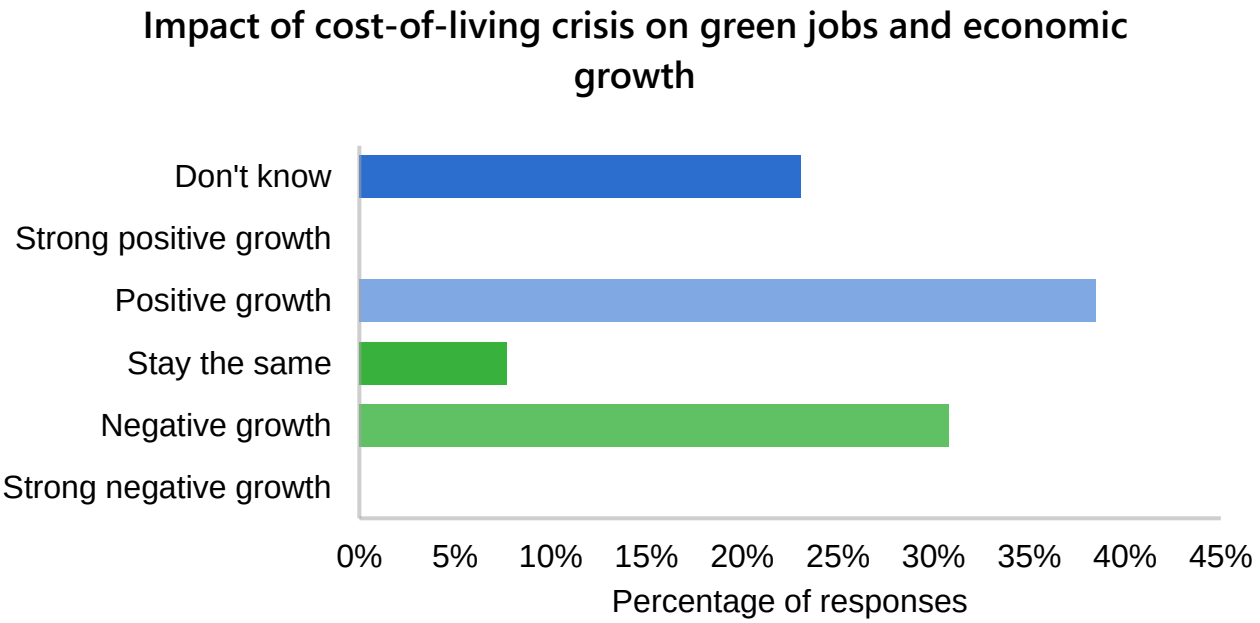


Figure 44 - Impact of cost-of-living crisis on green jobs and economic growth

Views from the sector were mixed on this, but consistent opportunities were identified through the increase in demand for energy efficiency measures as people seek to save money on rising energy bills by insulating their homes and switching to more efficient and cheaper sources of heating. This was exemplified in the comment below:

We are seeing substantial increases in appetite for home improvement. For the least well off this is finding any way to retain some warmth. The other growth market seems to be moderately well-off younger people (Generation X, Millennials) that have become homeowners, have a values led affinity to 'greening their home' but are being triggered by the concern of losing their security and lifestyle due to energy bills and are able to access family money/have sufficient incomes to invest in protecting their way of life by mitigating any increase in energy bills.

To ensure that this latent demand is realised, the region should look to ensure that residents are clear on the range and type of support available to them. Gemserv have summarised the support and funding available in the region, but the responsibility for support is diffuse, the landscape is constantly shifting and consumer confidence can be impacted by lack of, or fragmented and partial information.

Recommendation 11: Provide a regional online tool, which will help individuals in the region to access funding or support to install heat pumps or retrofit their homes.

The availability of support for retrofit measures is frequently unclear and often confusing, with different regional organisations offering different funding for the same measures, referred to by different names. When you consider that one person could be covered by a district council, a county council, a LEP and an LSIP all at the same time, there is clear potential for overlapping and duplication of information. This adds complexity and potential confusion to the process of seeking support which would be addressed by making access to a portal with support possible.

NET ZERO OPPORTUNITIES FOR THE SOUTH WEST

Summary

- The region has engaged insulation retrofit, heat pumps and skills sectors who are keen to collaborate and are aware of the challenges of meeting net zero and the need to address them collectively.
- Education and training providers are investing in local training and education facilities.
- Provision of training, particularly of heat pumps is widespread throughout the South West, and there is latent demand for retrofit and heat pump skills, suggesting there is scope for the sector to expand under the right conditions.
- Skills devolution and levelling up funding gives the region important levers to address gaps in skills provision.
- Gemserv estimate that the low carbon heating and insulation sectors could contribute up to £21.8 billion to the South West's £164 billion economy between 2023 and 2050. This is an increase of over 13%.
    - We estimate that the construction, servicing, and trade of insulation could contribute £4.4 billion towards the South West's economy in cumulative regional gross value added (GVA) between 2023 and 2050.
    - We estimate that the construction, servicing, and manufacture of heat pumps, could contribute £17.4 billion towards the South West's economy in cumulative regional GVA between 2023 and 2050.

Despite obvious challenges that rapid change presents, there are also opportunities from the net zero transition. These opportunities will be explored in detail below based on evidence from this study's surveys and interviews. Solar PV was also viewed as a potential strength by respondents to this question, but they provided little supporting detail explaining why. We will not explore the role of solar further, as it is out of scope for this report (See Annex 2 for a full list of technologies and roles in scope).

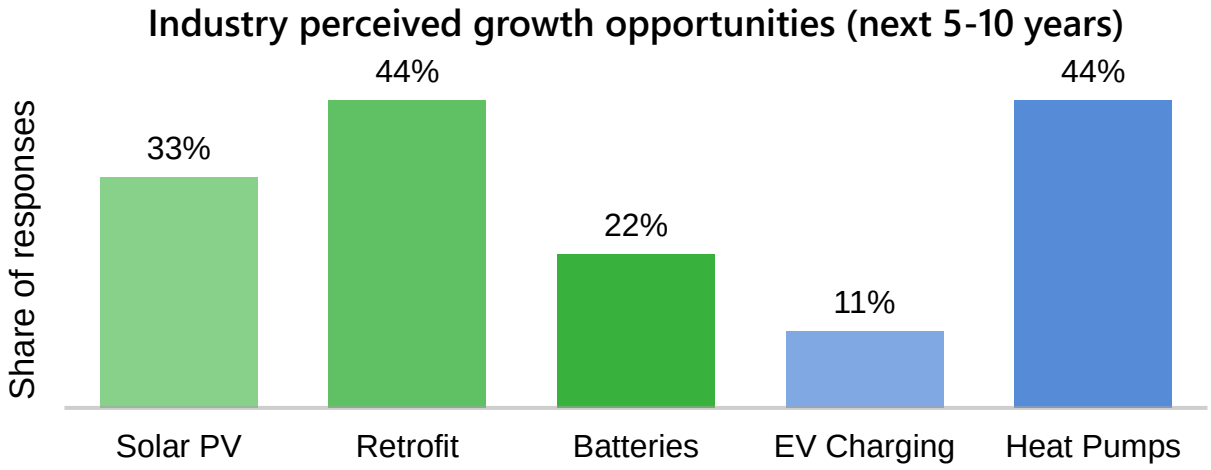


Figure 45 - Industry perceived growth opportunities (next 5-10 years)[103]

[103] Note that this was an open-ended question and respondents were able to select multiple growth opportunities.

This pattern was reflected in our survey of local government officials who largely concurred with the conclusions of industry in seeing heat pumps, insulation, energy efficiency and solar as priority opportunity for the region over the next 5 – 10 years. See Figure 46 below.

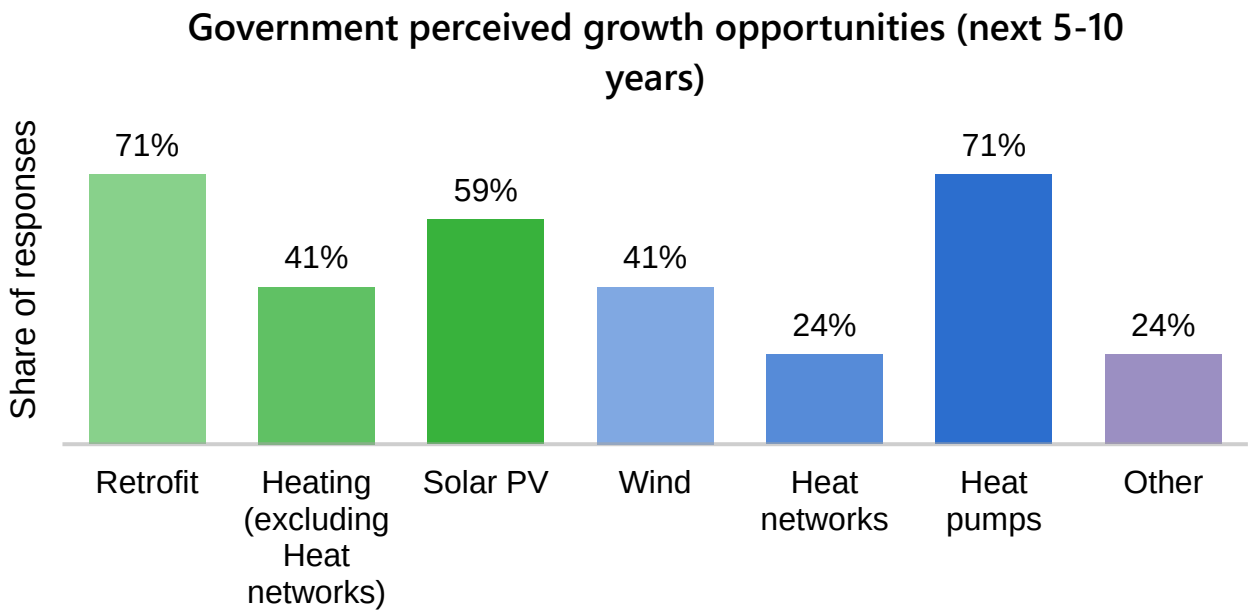


Figure 46 - Government perceived growth opportunities (next 5-10 years)[104]

[104] Note that respondents were able to select multiple growth opportunities. "Other" includes hydrogen and hydropower. 6% indicated hydropower and 12% indicated hydrogen.

Both current and emerging research suggests that investment in the green economy, can spur economic growth. For example, the ECIU report 'Mapping the UK Net Zero Economy' found that "the net zero economy is also highly productive, generating £112,300 in GVA per employee, 1.7 times higher than the national average of £64,400"[105]. Gemserv estimate that the low carbon heating and insulation sectors could contribute up to £21.8 billion to the South West's economy between 2023 and 2050.

Insulation and retrofit

The development of the insulation sector in the region has the potential to encourage a thriving economy across multiple industries. This is made more likely if all the supply chain can be maintained in the region, especially the manufacture of insulation materials, although this was not modelled[106]. We estimate that the construction, servicing, and trade of insulation could contribute £4.4 billion towards the local economy in cumulative regional GVA between 2023 and 2050 under the Urgent Action Scenario. This figure is marginally lower for the remaining scenarios. As insulation does not require significant operation and maintenance, once retrofit initial installations are completed, the potential for regional economic contributions of the industry is limited. Below is a snapshot of the potential peak annual regional contributions from different parts of the insulation supply chain.

Table 8 - Summary snapshot of peak regional GVA contribution of insulation sector

SCENARIO	PEAK YEAR	INSULATION CONSTRUCTION GVA (MILLION £ P.A)	INSULATION SERVICES GVA (MILLION £ P.A)	INSULATION WHOLESALE AND TRADE GVA (MILLION £ P.A)
Urgent action	2028	743	57	67
Balanced approach	2035	353	27	31
Gradual intervention	2037	261	20	23

Surplus labour could be used to service national demands for insulation construction in the short term once local targets are met. This is especially the case for areas on the perimeter of the region. By using internal survey data on willingness to travel of labour, Gemserv were able to estimate the share of surplus labour by local authority (see Figure 41)[107]. An additional £111 million in national GVA could come from the insulation construction sector in 2031 under the Urgent Action Scenario. Due to the lower amount of surplus labour, this figure is lower for the other scenarios with around £33 million in national GVA contribution in 2040 under the Balanced Approach Scenario and £14 million in 2044

[105] ECIU, (2023) 'Mapping the UK net zero economy. Available at: https://eciu.net/analysis/reports/2023/mapping-the-uk-net-zero-economy

[106] No accredited insulation manufacturers in the region according to: Insulation Manufacturers Association (2022) Members list

[107] Gemserv (2022), Heating system installers share their views on the opportunities and risks they face in the transition to low carbon. Available at: Heating system installers share their views on the opportunities and risks they face in the transition to low carbon

under the Gradual Intervention Scenario. As national demands also drop, so does the potential for national economic contributions and using this modelling approach, a total economic contribution of £1 billion is estimated between 2028 and 2050 under the Urgent Ramp-up Scenario.

Combining national and regional GVA estimates to form estimates of annual turnover, a picture of annual turnover across each scenario can be formed. Under the Urgent Action Scenario, turnover peaks at £1.8 billion per annum, although this reduces significantly as local demand for retrofit insulation installations decreases. Between 2023 and 2050, an estimated £35 billion in cumulative turnover could be generated through the insulation construction industry in the South West. This is marginally lower for the other scenarios, with £29 billion in cumulaitve turnover under the Balanced Approach Scenario and £26 billion in cumulative turnover under the Gradual Intervention. This difference is due to the lower potential for turnover from servicing national demand in the less ambitious scenarios.

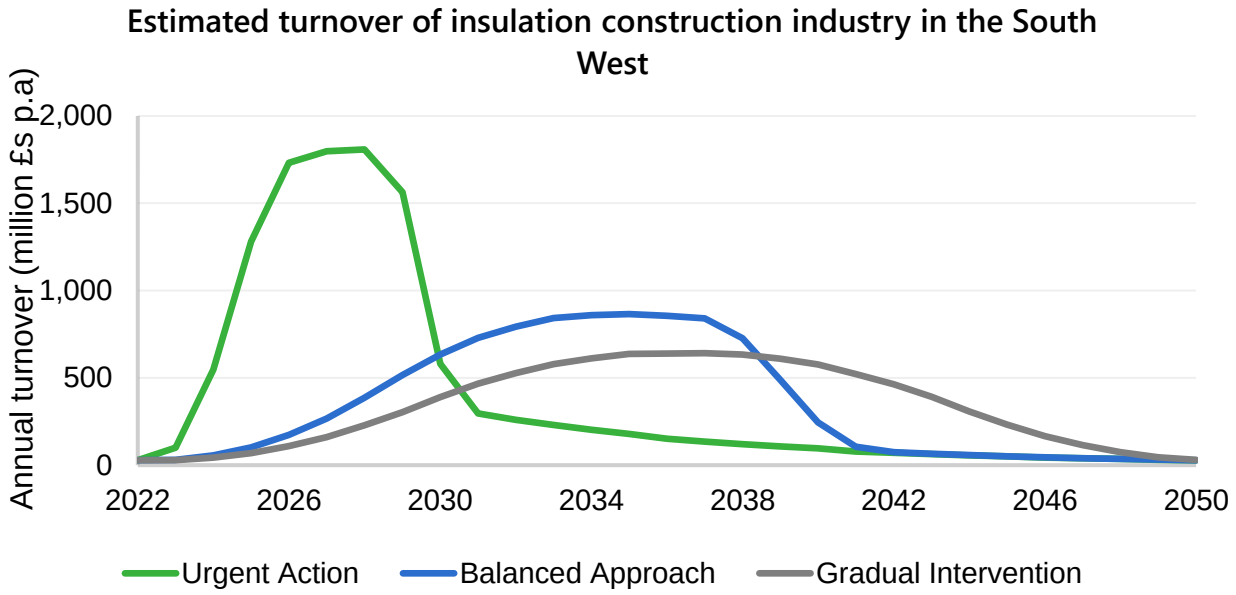


Figure 47 - Estimated turnover of insulation construction industry in the South West

Heat pumps and low carbon heating

Our analysis suggests that the promotion of labour in the heat pump sector within the region could spur a thriving low carbon heating economy across the supply chain. Gemserv have identified construction, services, and manufacture, especially of ground source units, as the three key sectors that will contribute towards the regional economy. Below is a summary of contributions to the regional economy across the three sectors at peak years. We estimate that the construction, servicing, and manufacture of heat pumps, could contribute £17.4 billion towards the South West's economy in cumulative regional GVA between 2023 and 2050.

Table 9 - Summary snapshot of peak regional GVA contribution of heat pump sector across industries

SCENARIO	PEAK YEAR	HEAT PUMP CONSTRUCTION GVA (MILLION £ P.A)	HEAT PUMP CONSTRUCTION GVA (MILLION £ P.A)	HEAT PUMP MANUFACTURE GVA (MILLION £ P.A)
Urgent action	2028	1,179	90	47
Balanced approach	2037	759	58	34
Gradual intervention	2040	628	48	29

Similar to the insulation sector, surplus heat pump installer labour can be used for installations outside of the region. This is simpler for areas at the perimeter of the region such as Hampshire and Gloucestershire that are closer to regions outside the South West. The evidence suggests that installers are willing to travel outside of their area for work. We used this to form an estimate of the share of usable surplus labour by local authority (see Figure 48)[108]. Using surplus labour for installations outside of the region will help to mitigate against the "boom-and-bust" nature of the more ambitious scenarios. This could be achievable given the fact that neighbouring regions such as the West Midlands and Herefordshire have less ambitious targets of 2040 and 2050 respectively.

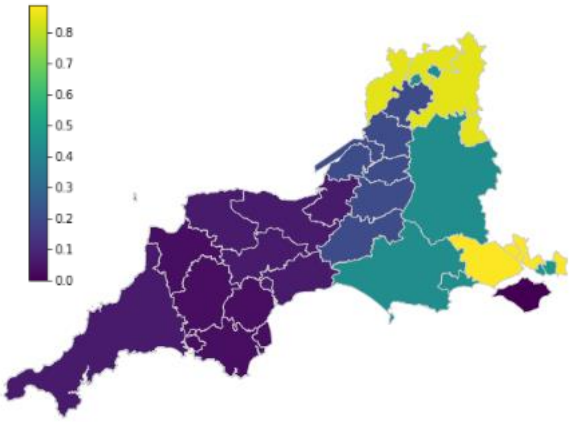


Figure 48 - Share of surplus labour usable nationally[138]

In 2030, under the Urgent Action Scenario, we project that heat pump retrofit measures could contribute £200 million in GVA to the national economy outside of the region. In the other scenarios, there is less surplus labour caused by the boom-and-bust cycles associated with the Urgent Action Scenario, and so there is £36 million in national GVA in 2039 under the Balanced Approach Scenario and £6 million in national GVA contribution in 2046 under the Gradual Intervention Scenario.

[108] Gemserv (2022) Heating system installers share their views on the opportunities and risks they face in the transition to low carbon

Through servicing both the national and regional economy, the annual turnover of the heat pump construction industry in the South West could be over £2.5 billion by 2026 under the Urgent Action Scenario. Due to the lower peak in required labour, the peak annual turnover for the remaining scenarios is slightly lower with the annual turnover peaking at £1.67 billion under the Balanced Approach Scenario and at £1.39 billion under the Gradual Intervention Scenario.

The number of retrofit installations is largely similar between the scenarios, however the more ambitious scenarios bring a quicker ramp up in the demand for maintenance and refits as well as greater opportunity for contributions to the national economy through surplus labour. Therefore, cumulative turnover is greatest under the Urgent Action Scenario. Between 2023 and 2050, £35 billion in turnover could be generated under the Urgent Ramp-up Scenario from the heat pump construction industry in the South West. Under the Balanced Approach Scenario, this is slightly lower at £29 billion and under the Gradual Intervention Scenario, lower still, at £25.7 billion.

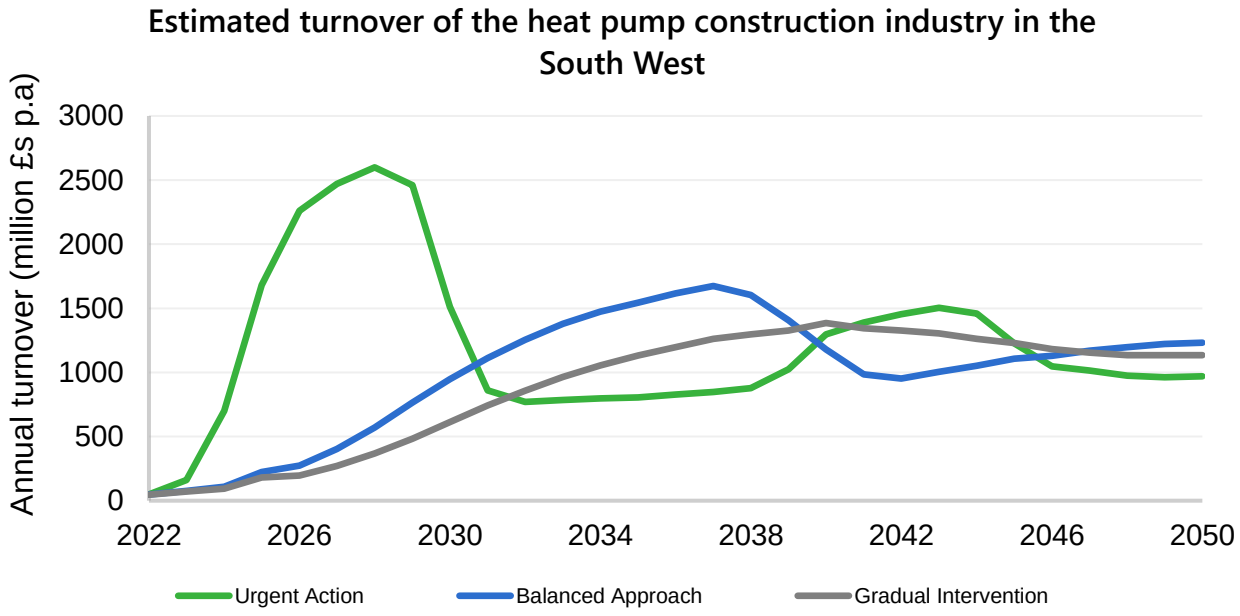


Figure 49 - Estimated turnover of the heat pump construction industry in the South West

Ground source heat pumps manufactured in the region, for example through Kensa who are based in Cornwall[109], could also be exported to the rest of the UK to contribute towards the national economy. Once installations have been completed in the region, surplus manufacturing capacity could be used to support the export of ground source heat pump units. 25 million pounds in national GVA contribution could be brought about through exports using surplus manufacture capacity by 2031 in the Urgent Action Scenario. If the heat pump manufacture industry can service regional demand and use 75% of its surplus manufacture capacity for exports, the industry could have an annual turnover of over £100 million by 2031 under the Urgent Action Scenario. This could result in £3.1 billion in cumulative turnover between 2023 and 2050 under the Urgent Action Scenario.

[109] Kensa. 2022. About Us. Available at: https://www.kensaheatpumps.com/about/?gclid=EAIaIQobChMI7qe_ltiz_QIVCbLtCh0MKg-YEAAYASAAEgKWq_D_BwE

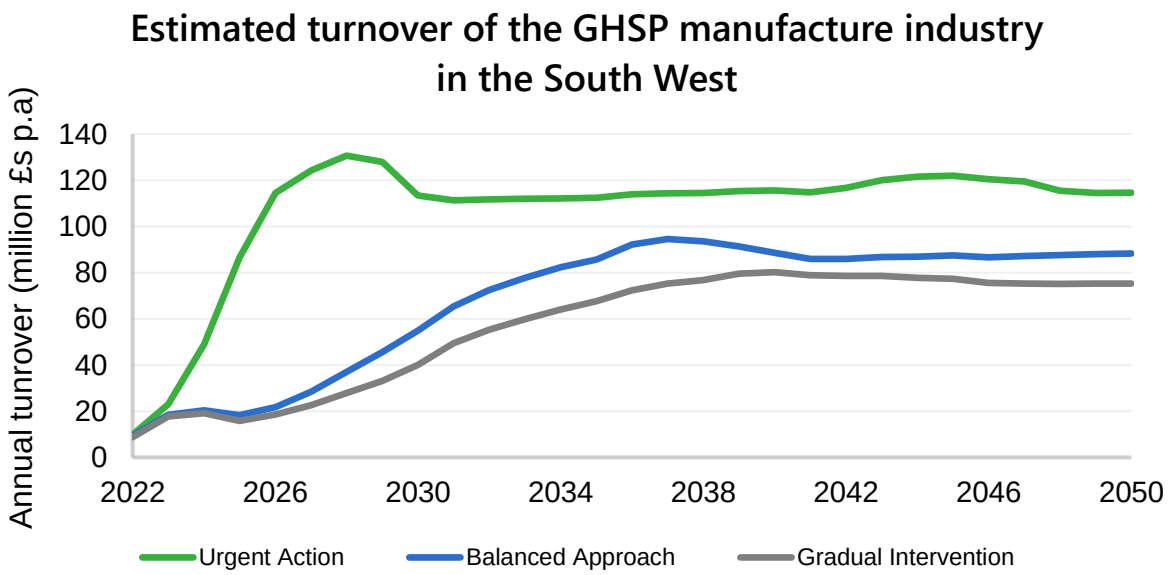


Figure 50 - Estimated turnover of the ground source heat pump manufacture industry in the South West

PAYBACK TIME OF MEASURES

As insulation measures reduce energy consumption, they save consumers money on their fuel bills and so pay off the installation cost after a few years – the timescales vary for different measures depending on the cost. Homes that require insulation measures that give the lowest payback time could be prioritised to lower bills and emissions at the greatest rate.

By prioritising properties with the shortest payback times and utilising the current workforce, short term bill reductions and carbon savings could be maximised. Across all scenarios, over £1 billion of consumer bill savings could be realised across the region if all the recommended insulation measures are installed. By prioritising measures with lower payback periods and maximising the capacity of current labour in the region, an estimated £200 million pounds could be reduced from consumer bills in the first year.

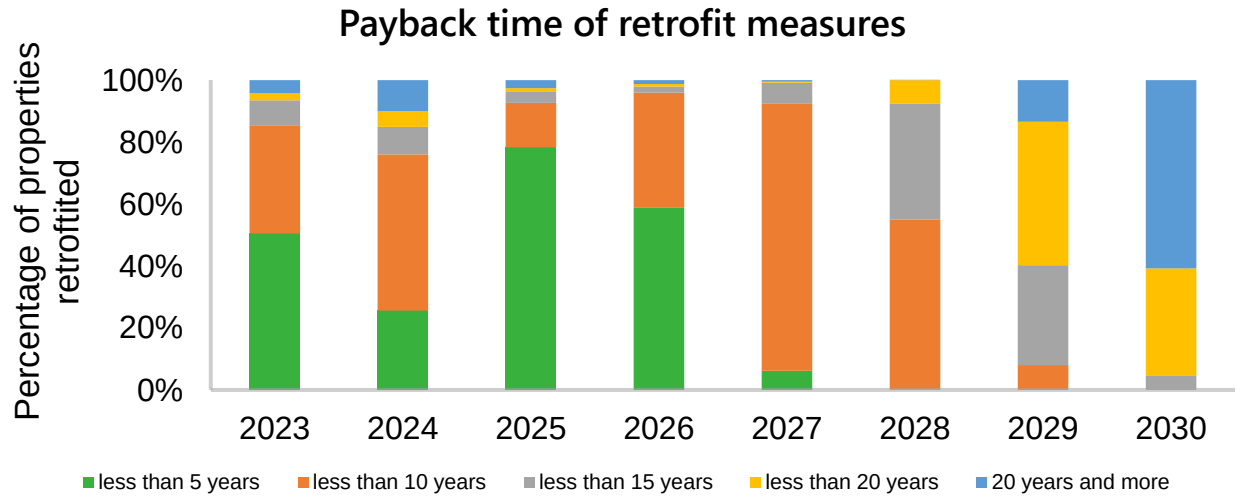


Figure 51 - Payback time of retrofit measures[110]

[110] Based on internal Gemserv modelling and simulation of low payback time home prioritisation approach.

Low-cost measures such as loft insulation can often yield large savings resulting in a low payback time. In a Gemserv simulation of this approach to retrofit, it was found that under the Urgent Action Scenario, the average payback time of energy efficiency measures was around 6 years in 2023, slightly more than a fifth of the average payback time in 2030 of 29 years[111]. There are an estimated 392,000 domestic properties in the South West that can be retrofitted with energy efficiency measures to give a payback time that is less than 5 years.

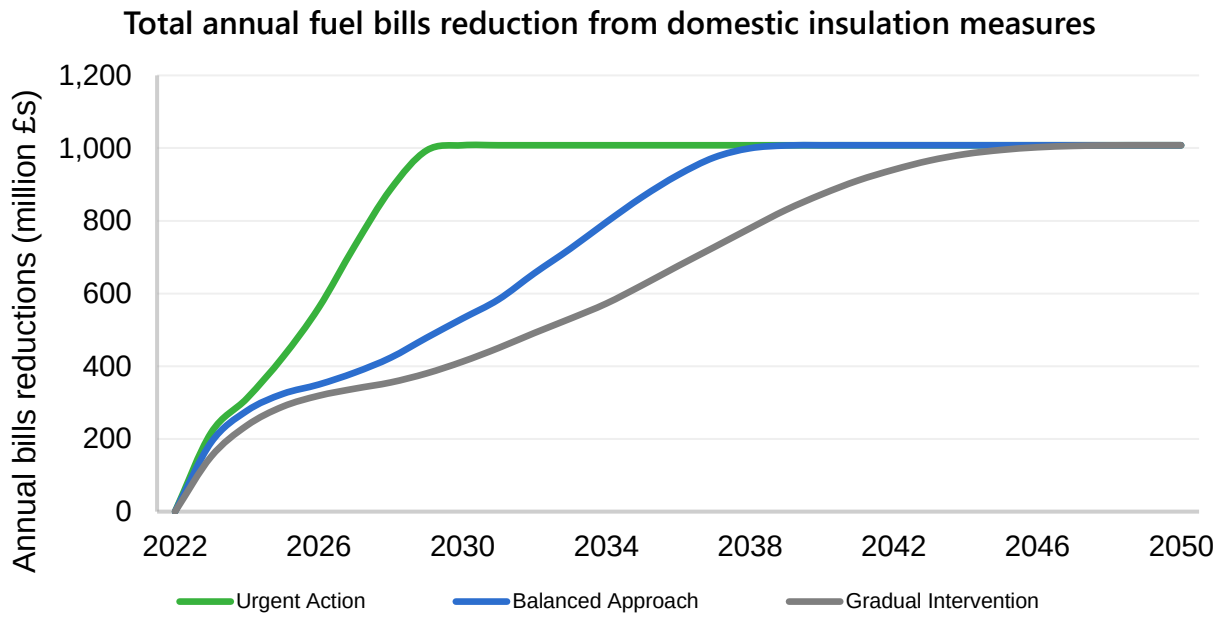


Figure 52 - Total annual fuel bills reduction from domestic insulation measures

[111] Simulation is separate to projections displayed in figures 49 to 52 and is for demonstration of potential of selective retrofit approach.

DEMAND FOR GREEN SKILLS AND GREEN JOBS

As the analysis in the previous section of this report has showed, there is clear latent demand for retrofit of insulation and heat pump installation skills among other associated trades in all net zero scenarios set out in this report. This represents an opportunity for the region to demonstrate leadership and capitalise on the economic gains set out in the previous section as well as additional income that could be generated through cultivation of regional specialism in insulation and heat pump retrofit installation.

An important point for this analysis and the recommendations in this report is to note that our research found that this demand is acknowledged by the industry (see Figure 53).

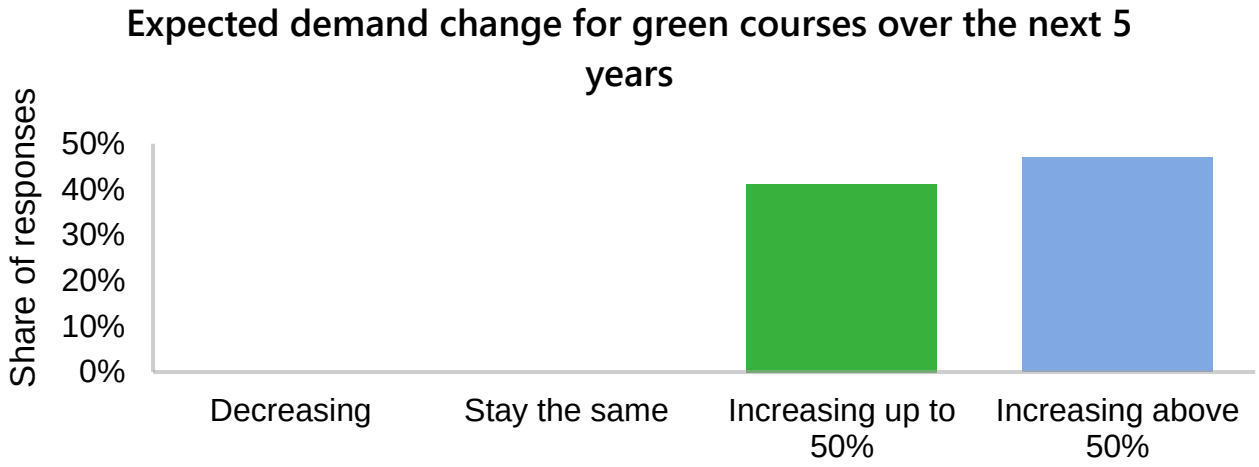


Figure 53 - Expected demand change for green courses over the next 5 years

All respondents saw demand for green courses increasing, with most viewing an increase of over 50% to be the most likely outcome. This growth creates business and innovation opportunities within the region, with capacity for the sector, and provision to grow along with it. This is usefully supported by the fact that the demand for roles was evenly distributed between the different trades and professions listed in our study. This indicates that growth is required across the board.

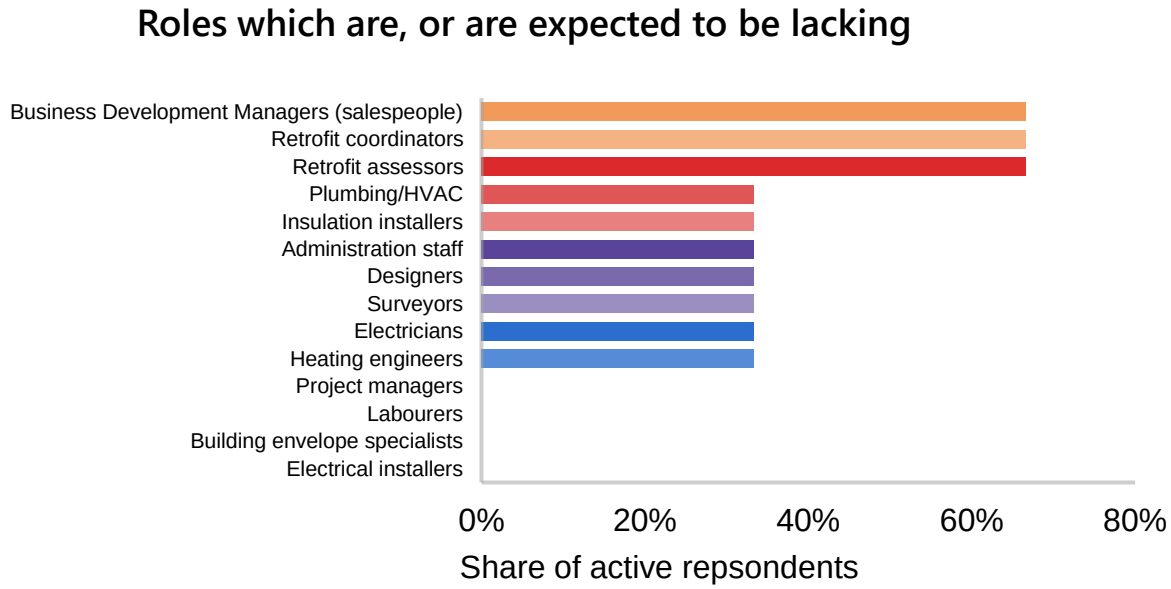


Figure 54 - Roles which are, or are expected to be lacking

Almost all respondents saw need for a broad range of skills, with a mix of technical, soft skills, IT skills and work experience as being needed to meet their workforce requirements. This indicates that core existing provision such as apprenticeships, work experience, and fundamental basic skills will continue to be required. Indeed, studies suggest that 'green jobs' tend to require higher level skills[112] than other industries. Our survey gave mixed results, suggesting greatest demand for qualifications between Level 2 and Level 4. This suggests that there are gaps at low to medium level qualifications that need filling and is consistent with the skills requirements for retrofit coordinators, assessors and heat pump engineers, all of which require skills obtained between Level 2 and Level 5 qualifications.

Green jobs themselves are a way to attract new talent into the retrofit sector. Examples from the surveys and interviews highlight that stakeholders see that there is a lack of interest from those under 18 when deciding their career path and for those who have the potential to upskill. But research by YouGov found that 78% of UK adults believe it is important to play a part in achieving net zero and that a career in tackling climate change was the second most popular choice for young adults (aged 18-24)[113]. Attracting a new pipeline of installers for the retrofit market can be achieved initially by providing the relevant courses, promoting the benefits of long-term job security and positive climate impacts. This is supported by a study and survey of around 1,000 respondents[114], with two-thirds of 'Gen-Z' employees highlighting they want to work for a sustainably conscious business. Evidence suggests that sustainable businesses have better talent attraction and retention[115].

The required investment in updating old skills to be fit for new technologies will require upskilling the current workforce. This is also important to retaining the existing workforce by creating job security and demonstrating a commitment to professional development. Workforce retention will be key, given that many core skills such as electrical skills will be required by other industries such as installing EV charging points and Solar PV.

Taken together, these points shows that if supported effectively, there are jobs in the sector that have the potential to attract a range of people with a range of skills into a growing market. Capitalising on this promise is key to making the most of the net zero opportunity to the retrofit sector by focussing on the benefits of the industry in terms of its environmental objectives, job security and opportunities for progression.

SKILLS DEVOLUTION AND LEVELLING UP FUNDING

One of the most frequently mentioned opportunity in the skills sector in the region was skills devolution and levelling up funding. The two are linked together, firstly because they combine the fundamental features of decentralising

[112] Grantham Research Institute on Climate and the Environment. 2023. Skills and wage gaps in the low-carbon transition: comparing job vacancy data from the US and UK. Available at: https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2023/01/Skills-and-wage-gaps-in-the-low-carbon-transition-Comparing-job-vacancy-data-from-the-US-and-UK-1.pdf

[113] Installer Online, 2022, 400,000 energy jobs needed to achieve net zero says new report. Available at: https://www.installeronline.co.uk/400000-energy-jobs-needed-achieve-net-zero-says-new-report/

[114] Play Studio, 2022, 'Corporate Climate Crisis. Available at: https://play-studio.com/insights/corporate-climate-crisis

[115] HR review, 2022, Younger employees prefer to work for sustainable companies. Available at: https://www.hrreview.co.uk/hr-news/younger-employees-prefer-to-work-for-sustainable-companies/140909#:~:text=Sustainability%20initiatives%20attract%20talent,them%20to%20become%20more%20sustainable.

decisions over skills funding from central, to local government (although the extent of this tendency varies between funding streams). The second reason is the reduction in bureaucracy and delays that this brings with it. Of the providers we interviewed or surveyed, all accessed either devolved AEB or a levelling up fund – typically UKSPF, Skills Bootcamps funding, or Strategic Development Fund.

There was praise for Skills Bootcamps and the UK Community Renewal Fund from training providers. They particularly valued the lack of bureaucracy relative to more traditional funding streams such as the AEB and ESF and recognised the focus of the funds on delivering outcomes such as qualifications, employment and progressions. As one training provider involved in delivery of projects funded by the UKCRF told Gemserv:

[There is] "less bureaucracy compared to the AEB and ESF. There is less overhead with administrators and a greater focus on employing people to create jobs, deliver training and do market research."

The flexibility of the funding gives areas the ability to innovate and invest in local priorities. The combination of funding objectives across both skills and net zero, particularly in funds like the UK Community Renewal Fund allow development of propositions that span both and deliver dedicated funding to green skills projects. This allows a point of differentiation from sources of funding which are either exclusively focusses on retrofit, or exclusively focussed on skills.

There was a clearly articulated need across those we contacted in the education sector to create better links between themselves and industry. When asked what steps they were taking to prepare for the increase in green skills required by the region's net zero targets, almost all training providers referenced the creation of some forms of links with industry to develop courses or qualifications. There is a clear need for funding to create capacity to locally to develop not only skills plans, but to create the infrastructure that will underpin the capability and capacity for articulating skills needs developing and designing the provision required to meet them and creating the jobs for qualified individuals to deliver retrofit and insulation projects.

One provider we interviewed praised the Strategic Development Fund for: *"Helping us to put the structure in place to support collaboration between the education sector and employers. [What they have achieved] wouldn't have been possible without it".*

The availability of levelling up funding to develop regional and sub-regional capacity and capability for this in the region is a clear opportunity for the South West where there is appetite from both employers in the retrofit sectors and training providers to collaborate more closely together. To do this successfully over the medium to long term requires investment from central, and local government, as well as industry and education providers themselves. Targeting this funding wisely, across priority areas of skills shortages locally will be key to delivering successful outcomes.

A full list of skills funding streams and funding opportunities that can be used for insulation retrofit or heat pump installation courses can be found at Annex 5.

EMPLOYER AND TRAINING PROVIDER COLLABORATION

As set out above, collaboration between training providers and employers has been an undeniable success in the South West region. A striking finding of our research was the consensus within the education and retrofit sectors around the need to collaborate to develop a pipeline of learners and workers, develop qualifications and apprenticeships and meet the net zero ambitions of their region. For example, almost all training providers referenced the creation of some forms of links with industry to develop courses or qualifications. When asked about how they are adapting to the opportunities by the green economy, they told us:

"Partnering with more and more varied businesses to provide a broader range of training across more skillsets."

"[We are] working strategically with partner colleges to increase participation with low carbon courses and awareness training."

"Working with the LEP/Devon County Council on Bootcamps and creating better links with employers."

"Working with businesses to identify training needs and create line of sight to jobs. Partner with key stakeholders across the region to become a centre of excellence to host and train green skills and retrofit."

This indicates that training providers view collaboration with employers as key to their future business model and success. Employer confidence in the quality and relevance of training and education, as well as awareness of provision, is vital to creating and sustaining demand. But even where there was criticism of the industry, there was recognition of the importance of collaboration.

"Colleges and training providers are claiming they are listening to industry, and the same goes for industry, but we have observed industry does not understand the constraints of training providers. There is a need for open collaboration and acceptance, to move away from personal agendas and look more widely at how the industry can reach net zero together."

Collaboration is critical to ensuring that qualifications remain relevant to an industry where new skills must be developed and nurtured, and old skills must be applied to new contexts. This requires a continual process of innovation and development, facilitated by clear links between practitioners on the ground and those delivering the qualifications. One of the challenges for the sector is the lead in time to develop new qualifications and train new people.

There have been numerous examples of good practice brought to our attention in our research for our report. The Green Construction Advisory Panel (GCAP) in South Devon is one such example. Funded by the Strategic Development Fund (SDF), GCAP brings together representatives from across housing, retrofit installers, manufacturers of heat pumps and insulation and education and training providers to develop formal qualifications for these industries. Members of the group who responded to our survey praised the group highly and viewed it as a source of shared expertise and collaboration in South Devon as well as a repeatable model for other areas of the South West.

One stakeholder brought together the needs of many energy efficiency stakeholders engaged in this study through a 'local roadmap'. This could create a plan for the skills that are needed, those that are currently available and when new skills should be delivered. Currently, local training providers do not understand how demand must increase in order to

reach net zero targets and a detailed plan with deliverable actions will enable this. This could also incorporate the funding that is available in the energy efficiency space.

What is clear is the need to bring together the views of industry and employers together systemically supported by the correct infrastructure and governance to develop qualifications, fill courses and create job opportunities to install heat pumps and install insulation at the scale to meet the region's net zero targets. Where government funds this activity, it should be welcomed. In other circumstances it should be funded by industry and education providers.

Recommendation 12: Develop a regional forum for leaders across industry, training providers, colleges and local government to develop qualifications for the region.

This should have the remit of identifying gaps within the region, developing new and innovative qualifications, but also collaborating to understand the relevance of existing qualifications to ensure they are kept relevant and up to date, in line with current industry requirements.

INVESTMENT IN FACILITIES AND CAPABILITY

The final large opportunity presented in this report is the investments made locally by training providers,installers and manufacturers of heat pumps and insulation products within the South West. The region has clear strengths in terms of its expertise and provision of skills including the Centre for Sustainable Energy[116] based in Bristol, leading on the retrofit and community energy areas. The South West Institute of Technology[117], focussed on engineering and digital skills that are parallel and complementary to the green economy and will require integration of green and retrofit skills to ensure they remain relevant to future retrofit needs. The region is also home to several leading Universities including Bath, Bristol, University of the West of England, Plymouth, Portsmouth and the University of Gloucestershire[118].

But the biggest perceived barriers to uptake of green courses in our survey as reported by education and training providers was lack of facilities and access to provision. See Figure 55 below:

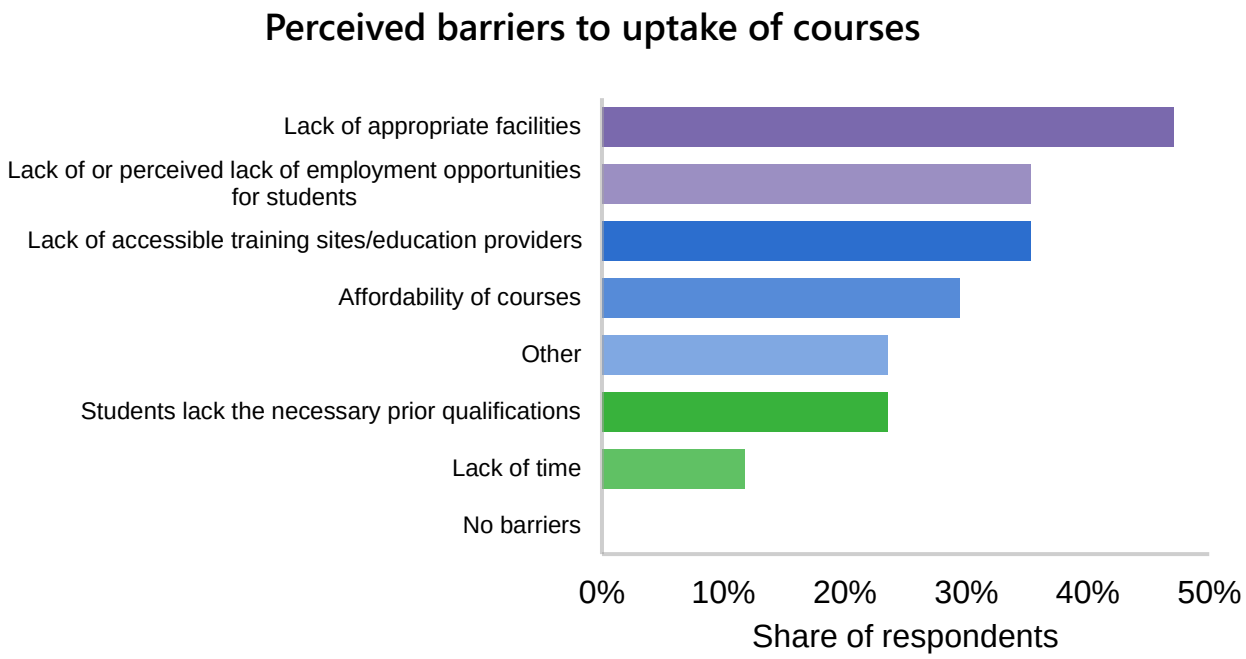


Figure 55 - Perceived barriers to uptake of courses

This perceived need from the sector is in line with the expectation of increased demand we described earlier in this section and will require increased investment in training facilities to keep pace. On the other hand, many of the respondents to our survey reported investing in facilities and training centres as a mitigating action. On training provider told us:

"We have created a purpose-built Retrofit training centre kitted out with the latest equipment from Heat Pumps, UF Heating, Solar, Chillers, battery Storage, EV, Ventilation and Insulation. We are in the process of building assessment

[116] The Centre for Sustainable Energy. 2023. Homepage. Available at: https://www.cse.org.uk/
[117] South West Institute of Technology. 2023. Homepage. Available at: https://www.swiot.ac.uk/
[118] Complete University Guide. 2023. University league tables 2023. Available at: https://www.thecompleteuniversityguide.co.uk/league-tables/rankings/south-west-england

centres for the accredited courses aligned to C&G and Bpec and are also building a purpose-built Retrofit property for students, apprentices, and employers to use."

This investment is clearly necessary for the region to meet the increase in demand for skills insulation retrofit and heat pump installations set out in previous sections of the report. It is a welcome development, but as we have seen, to reach its targets the region will likely need to go even further.

SOLID WALL INSULATION

As shown previously in the 'Regional Analysis', the need for solid wall insulation measures and installations would aid the energy efficiency of the South West's building stock. There are challenges with this, particularly with regards to the lack of skilled professionals to meet the needed demand to reach net zero by 2030 and the high cost of solid wall insulation. To overcome the lack of installers of solid wall insulation, this needs to be promoted as a valuable career path for those beginning their journey in the industry and as an additional skill for those looking to upskill.

Because solid wall measures are expensive, local councils should make the most of opportunities such as grant funding through schemes such as ECO that can cover the costs of this measure. This would make it beneficial for consumers, especially for those in fuel poverty and during the cost-of-living crisis. Installing solid wall insulation and other energy efficiency measures will reduce energy bills, the amount of fuel needed to heat homes and thus allow the South West to achieve net zero targets will a wider rollout of these measures.

Recommendation 13: Create a database of properties with multiple retrofit requirements indexed against Indices of Multiple Deprivation – this could be used to prioritise projects with short payback times and greatest need**.**

Building on the work in this report, it is important for the region to be able to target its funding and identify properties requiring retrofit. As stated in previous recommendations it is vital for the region to target and prioritise solid wall insulation. Collating EPC and property data, mapped against the IMD should help the region to identify eligible building stock and more efficiently target ECO and other funding for retrofit measures.

ANNEXES

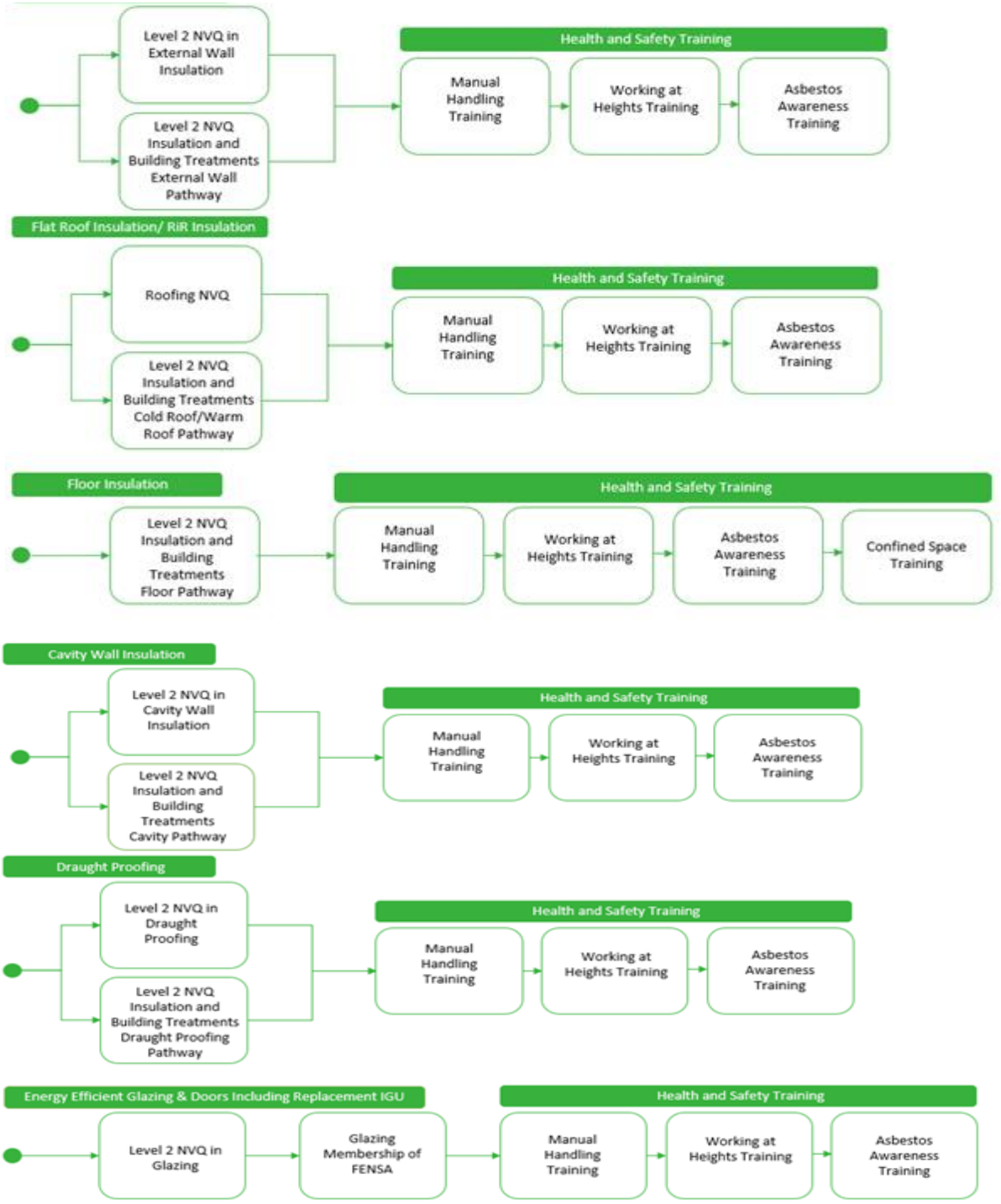
ANNEX 1: QUALIFICATION PATHWAYS FOR KEY ROLES AND COMPETENCIES

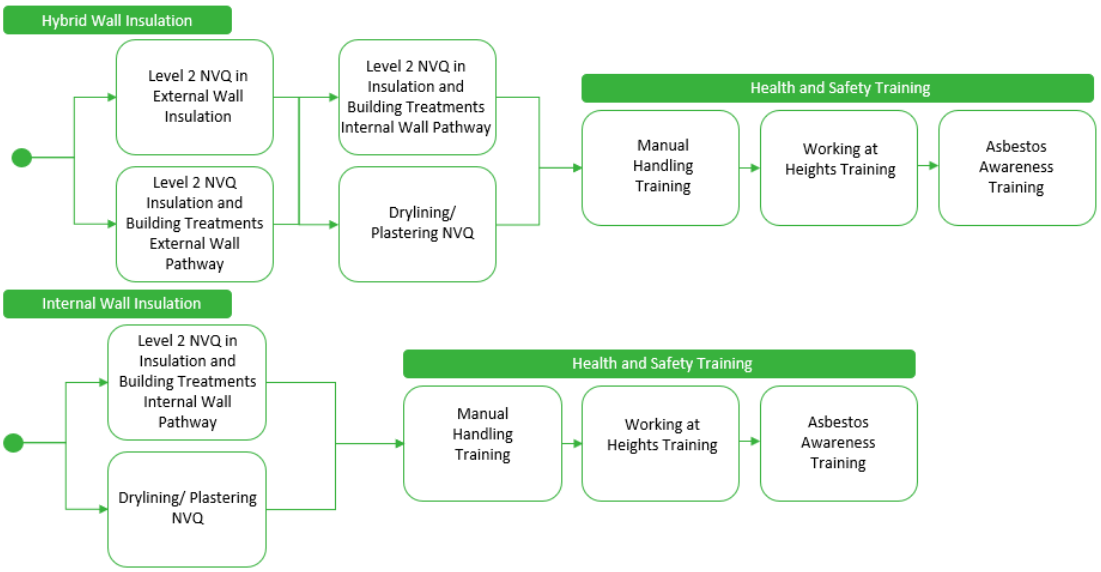
The following section sets of the qualification pathways for key competencies and skills for the retrofit, insulation, and heat pump sectors.

One of the challenges noted during interviews was the lack of clearly articulated common standards and qualifications for building trades operating in the sector who are parallel to, but not directly involved in, the installation of retrofit measures. Interviews with practitioners within the sector have indicated that this can lead to sub-optimal installations, due to lack of understanding of how to work with measures such as insulation or heat pumps. This can occur either directly during the installation itself, or more commonly post installation by for example, checking for issues with insulation by drilling into walls for example, and damaging the work. Certification of existing trades through comparable schemes such as Construction Isle of Man Accreditation Scheme (CIOMAS) and the Construction Isle of Man Certificate Scheme could be models for the UK or the region to follow.

Insulation, draught proofing, and energy efficiency

Figure 56 - Insulation role pathways under PAS2030 and PAS2035



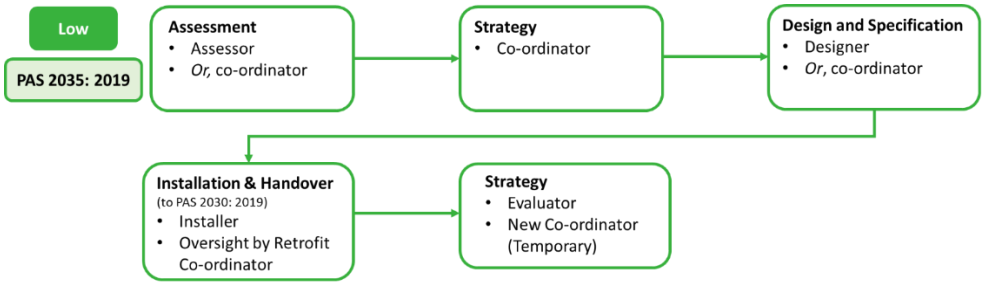


Please note the above pathways do not necessarily cover all routes but provide an illustrative route of the learning pathway that may be followed.

PAS2035 risk pathways

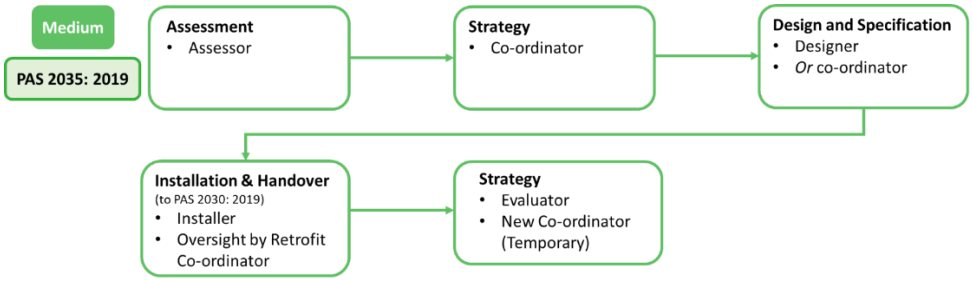
PAS2035 introduces different assessment processes dependant on the work taking place[119]. PAS2035 risk pathways are determined by several factors, including a building's age, size and the complexity of the work planned. An independent retrofit coordinator oversees each retrofit project and determines the risk pathway they should take at the outset. Each pathway is described below but the basic principle is that as projects become more complex, involving multiple units or complicated installations, the more in-depth the onsite assessment needs to be[120].

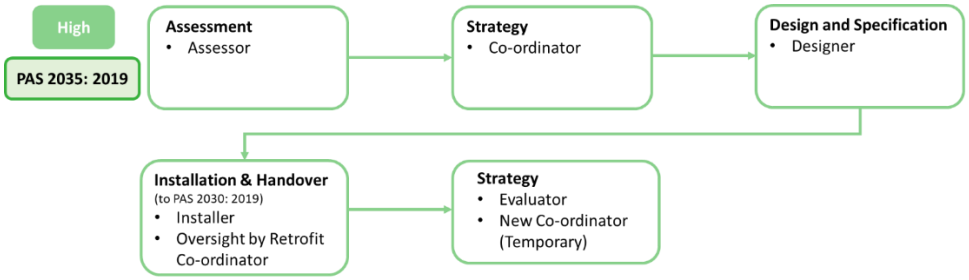
Figure 57 - PAS2035 risk pathways



[119] Yes Energy Solutions. 2023. PAS 2035: Understanding Retrofit Risk Paths. Available at: https://www.yesenergysolutions.co.uk/advice/pas-2035-understanding-retrofit-risk-paths

[120] AsBuilt Testing. 2023. What are PAS 2035 Retrofit Risk Pathways and which one requires an air test? Available at: https://www.asbuilttesting.co.uk/useful-information/what-are-pas-2035-retrofit-risk-pathways-and-which-one-requires-an-air-test


Medium
PAS 2035: 2019
Assessment
• Assessor
Strategy
• Co-ordinator
Design and Specification
• Designer
• Or co-ordinator
Installation & Handover
(to PAS 2030: 2019)
• Installer
• Oversight by Retrofit Co-ordinator
Strategy
• Evaluator
• New Co-ordinator (Temporary)


High
PAS 2035: 2019
Assessment
• Assessor
Strategy
• Co-ordinator
Design and Specification
• Designer
Installation & Handover
(to PAS 2030: 2019)
• Installer
• Oversight by Retrofit Co-ordinator
Strategy
• Evaluator
• New Co-ordinator (Temporary)

ANNEX 2: ANALYSIS METHODOLOGY, ASSUMPTIONS AND OTHER INFORMATION

Technologies in scope

We have focused our analysis on a selection of measures across both insulation and low carbon heating. For insulation, the measures within scope have been included as they are the most widespread and cost-effective solutions and offer the potential for vast energy consumption reductions across the building stock. The technologies included and assumptions around when required are detailed below:

Table 9 - Insulation measures included within scope

MEASURE	DESCRIPTION	INSTALLATION REQUIRED ASSUMPTION	
		Domestic	Non-domestic
Cavity wall insulation	Insulation in the wall cavity of properties with cavity walls.	Installed in cavity walled properties with either no insulation or thermal transmittance greater than 0.55 W/m2k from the property's walls.	EPC recommendation
Solid wall insulation	External or internal wall insulation for properties with solid walls.	Installed in solid walled properties with no wall insulation.	EPC recommendation
Loft insulation	Insulation rolled out over floor joists in loft to prevent heat loss from roof.	installed in all properties that are not maisonettes or flats with no loft insulation, loft insulation thickness below 100mm or roof thermal transmittance above 0.18W/m2k.	EPC recommendation
Double glazing	Two panes of glass installed in a pane separated by a vacuum.	Installed in properties with an EPC windows energy rating of "very poor", 0% of windows double glazed and available for window renovation (i.e., not a listed or protected building).	EPC recommendation

For low carbon heating, our analysis predominantly focuses on the need for air source heat pumps, ground source heat pumps, heat networks and heating controls. These technologies were seen as the low carbon heating systems with the most widespread technical and economic feasibility within the scenario timescales. The chosen measures offer low carbon solutions to a wide range of properties, allowing the scenarios to have widespread applicability. The low carbon heating measures chosen were:

Table 10 - Low carbon heating measures included within scope

MEASURE	DESCRIPTION	INSTALLATION REQUIRED ASSUMPTION
Air source heat pump (ASHP)	Suitable for most properties given that there is sufficient space and ventilation as well as no significant noise constraints.	Home has a fossil fuel heating system that requires replacing and not suitable for conversion to heat network. ASHP to GSHP split taken from current deployment by local authority and split by domestic and non-domestic.
Ground source heat pump (GSHP)	For larger properties and those unable to fully insulate, potentially due to being listed or facing restrictive planning permissions, however, require large amounts of space so more suitable for larger off grid homes.	Home has a fossil fuel heating system that requires replacing and not suitable for conversion to heat network. ASHP to GSHP split taken from current deployment by local authority and split by domestic and non-domestic.
Heat network	Most suitable for densely populated areas when used in blocks of flats, apartments, or other areas where heating systems can be shared or there is access to waste heat such as near industrial centres. These too could be ground source heat pumps if a ground loop array is shared between multiple users.	Retrofit deployment rates taken from WPD DFES and combined with assumptions around the conversion of current fossil fuel community heating schemes.
Heating controls	Accompanies other measures to allow users to fluctuate heat usage in line with prices, needs and grid carbon intensity.	Assumed to be installed in all domestic properties without any control of heating system. Installed in non-domestic properties with EPC recommendation.

Installation types in scope

Outside of retrofit installations, labour will be required to service retrofit measures across their lifetime and across a range of construction types. This will differ between technologies, for example, cavity wall insulation requires a negligible level of maintenance in comparison to air source heat pumps. Requirements for labour come from:

- **Retrofit –** Retrofitting a property with a new measure.
- **New builds –** Installing a low carbon heating or insulation measure in a newly constructed property.

- **Maintenance –** Servicing and repair of low carbon heating or insulation measures.
- **Refits –** Replacement of low carbon heating systems with new low carbon heating systems upon the end of the systems lifetime.

Jobs in scope

For the installation, servicing and maintenance of insulation measures, a series of different jobs will be required. For insulation, these jobs are the for the installation of the different measures, for example, a cavity wall insulation installer, and for retrofit services. A description of these jobs is below in Table 11.

Table 11 - Insulation jobs included in scope

JOB	DESCRIPTION
Cavity wall insulation installer	Labour possessing skills required for construction of cavity wall insulation.
Solid wall insulation installer	Labour possessing skills required for construction of solid wall insulation.
Loft insulation installer	Labour possessing skills required for construction of loft insulation.
Double glazing installer	Labour possessing skills required for construction of double glazing.
Retrofit assessor	Labour possessing skills to determine the whole house insulation requirements.
Retrofit coordinator	Labour possessing skills to provide oversight for the retrofit process of multiple properties.

For low carbon heating, the jobs requirements analysed within this analysis are in Table 12 below.

Table 12 - Low carbon heating jobs included

JOB	DESCRIPTION
Heat pump engineer	The primary installer of both ground and air source heat pumps. The heat pump engineer is responsible for preparing the unit, completing heat loss calculations and other design processes. An engineer is also the primary provider of maintenance and replacement services.
Heat pump electrician	Responsible for configurations for to the wiring required to install heat pumps. Predominantly required for

	retrofit heat pumps as opposed to new builds, refits and maintenance.
Groundworker	Manual labour required to install ground loops for ground source heat pumps and some heat networks.
Heat network engineer	Engineer responsible for installing and maintaining heat network connections.
Heating controls installer	Installer responsible for fitting heating controls such as smart thermostats.

Retrofit quantitative analysis methodology

As part of this study, multiple methods and data points were used to carry out the economic analysis. Some of the data sources drew on publicly available information, while others used a mixture of internal data and models developed by Gemserv specifically for understanding retrofit skills growth. The table below provides a high-level overview of how the major analysis pieces were conducted.

Table 14 - Quantitative analysis methodology

Analysis	Brief description of approach
Local EPC data summary	To account for properties without an EPC record, a stratified sample was formed to account for any selection bias caused by properties without an EPC record having different characteristics to those with an EPC record. For domestic homes, targeted EPC records were duplicated according to access to gas grid[121], floor area[122] and tenure[123]. For non-domestic properties, the sample was stratified based on total properties and access to the gas grid alone.
Off-gas grid data	Calculated using combined approach of analysis of EPC stock and external data[124].

[121] BEIS. 2022. Regional and local authority gas consumption statistics. Available at: Regional and local authority gas consumption statistics
[122] BEIS. 2022. National Energy Efficiency Data-Framework (NEED): consumption data tables 2021. Available at: National Energy Efficiency Data-Framework (NEED): consumption data tables 2021
[123] DLUHC. 2022. Live tables on dwelling stock (including vacants). Available at: Live tables on dwelling stock (including vacants)
[124] BEIS. 2022. Regional and local authority gas consumption statistics. Available at: Regional and local authority gas consumption statistics

% of solid wall insulation properties	EPC records were assessed for having solid walls using a key word search on the description of the property's walls. Where data was missing, assumptions were made using the age and type of property.
Age of housing stock	Construction age bands were aggregated according to EPC data records.
Housing stock archetype	Utilising a key word search and a range of assumptions around heating systems, the primary heating fuel was determined for each EPC record. This was used to best match EPC records to archetypes according to Tabula[125], using the properties size, type, heating fuel and construction age band.
Current number of retrofit installations	For heat pumps, data on accredited installs was taken from MCS[126]. Estimates for the ratio of accredited installs to non-accredited installs were calculated by comparing the total number of EPC records with heat pump installations to those given in the MCS data. For cavity wall insulation, loft insulation and solid wall insulation installations, data was taken from regional summaries of retrofit funding schemes[127] and scaled down to each local authority by applying assumptions based on the outputs of the EPC summary analysis. For heating controls, heat networks and double glazing, it was assumed that current labour operated at the same capacity as the average of that of similar labour types. For example, for double glazing, the operating capacity of loft, cavity wall, and solid wall insulation installers was estimated and applied to double glazing installers in the region.
Baseline number of installs: retrofit vs new	Using assumptions around installation types for accredited installs, the share of heat pumps that were installed in retrofit and new properties was assessed by analysing properties with EPC records lodged due to the property being newly constructed that also had a heat pump as the primary heating system.

[125] Tabula. 2014. National Building Typologies. Available at: National building typologies
[126] MCS. 2022. The MCS data dashboard. Available at: The MCS Data Dashboard
[127] BEIS. 2022. Household Energy Efficiency: Great Britain, Data to December 2021. Available at: Household energy efficiency

Baseline number of installer jobs	For the total labour in the region, employment estimates were taken from regional ONS data[128] and scaled down to the analysis area using SIC code mapping based on the labour split of different industries. Reasoned assumptions were used to scale down from the ONS category definitions to the sectors within scope. Employment estimates were then broken down into specific employment types using ONS estimates of splits by industry[129]. For example, retrofit assessors and coordinators were taken using the professional services share of regional employment estimates for the "other energy efficiency products" category. Total employment within each sector was broken down by services offered and local authority using MCS data[130] and key word analysis/geocoding of Trustmark, NIA, and IAA data[131].
Number of measures required for net zero	For domestic properties, wall, loft, heating control and window descriptions were taken from EPC records and combined with assumptions for retrofit requirement as detailed in the main text. For non-domestic properties, a key word search of EPC recommendations data was used to analyse the need for insulation measures and heating controls. The requirements for retrofit low-carbon heating systems was taken by analysing EPC records to see whether homes had fossil fuel heating systems. Additional demand from new build properties in the region was taken from central DFES projections[132]. The potential deployment of heat network connections was also taken from DFES projections with the scenario used depending on the scenario used within our analysis[133]. Where forecast data was not available for each local authority, weighted averages were took using

[128] ONS. 2022. Exploring regional estimates of activity in the low carbon and renewable energy economy, UK and regions of England: 2020. Available at: Exploring regional estimates of activity in the low carbon and renewable energy economy, UK and regions of England: 2020

[129] ONS. 2022. Low carbon and renewable energy economy, UK: 2020. Available at: Low carbon and renewable energy economy, UK: 2020

[130] MCS. 2022. The MCS data dashboard. Available at: The MCS Data Dashboard

[131] Trustmark.2022. Find a tradesperson. Available at: Advanced Search; NIA. 2022. Find an installer. Available at: Find an installer; IAA. 2022. Find your local installer. Available at: Find your local installer

[132] Western Power Distribution. 2023. Distribution Future Energy Scenarios. Available at: Distribution Future Energy Scenarios

[133] Western Power Distribution. 2022. Distribution Future Energy Scenarios. Available at: Distribution Future Energy Scenarios

	population density[134]. Remaining demand for low carbon heating, from existing and new properties, was then split between air and ground source heat pumps according to domestic and non-domestic accredited installation splits[135].
Estimated bill savings	Energy reduction estimates were calculated using heat loss transmittance coefficients of different insulation levels off Tabula, for each housing archetype[136]. These were combined with long-term fuel prices to calculate bill savings. Bills savings were then combined with retrofit costs[137] to calculate payback times.
Job projection assumptions (type and number)	Annual installations were split out according to scenario deployment reference curves. For insulation measures, these were then adjusted according to current labour provision (and operating capacity assumptions) and payback times of each property's collective retrofit measures. The replacement cycle of low carbon heating systems was estimated using historical deployment data and assumptions around system lifetimes. Employment intensities for retrofit installations, refit installations, new build installations and maintenance were taken from a variety of sources and/or modelling assumptions and used to calculate labour requirements for each year. Productivity increases were estimated using trends in turnover to employment ratios from the ONS[138].
Transferable skills and heating industry forecasts	Using data from the Gas Safe Register[139], Oftec[140], internal survey data[141], and the SMF[142], and combining with population estimates by

[134] ONS. 2022. Estimates of the population for the UK, England, Wales, Scotland and Northern Ireland. Available at: Estimates of the population for the UK, England, Wales, Scotland and Northern Ireland
[135] MCS. 2022. The MCS Data Dashboard. Available at: The MCS Data Dashboard
[136] Tabula. 2014. National building typologies. Available at: National building typologies
[137] BEIS. 2017. Domestic cost assumptions - what does it cost to retrofit homes? Available at: Domestic cost assumptions - what does it cost to retrofit homes?; BEIS. 2018. ECO 3 Impact Assessment. Available at: ECO 3 Impact Assessment
[138] ONS. 2022. Low carbon and renewable energy economy, UK: 2020. Available at: Low carbon and renewable energy economy, UK: 2020
[139] Gas Safe Register. 2017. Decade review. Available at: Decade Review
[140] Oftec. 2022. Where are all the female heating engineers? Available at: Where are all the female heating engineers?
[141] Gemserv. 2022. Heating system installers share their views on the opportunities and risks they face in the transition to low carbon. Available at: Heating system installers share their views on the opportunities and risks they face in the transition to low carbon
[142] Social Market Foundation. 2022. Installation for time? Available at: Installation for time?

	local authority[143] and heat pump installer employment estimates, the number of fossil fuel heating engineers per local authority was estimated. A combination of internal survey data and historic training data[144] was used to estimate the age profile of the heating industry and was combined with evidenced inputs on retirement age, attrition rate and training rates to form forecasts of the size of the heating industry to 2050. These forecasts informed inputs on the future retirement rate of the heating industry.
Local GVA impacts	Using employment estimates from the scenario projections and ONS estimates for the share of labour by industry, the number of jobs within the parts of the supply chain not included in the projections were estimated. For the manufacture of insulation, estimates were scaled down to each local authority according to an analysis of current businesses, using data from the IMA[145] and each businesses LinkedIn page. GVA intensities, collected from a range of source, were then applied to the employment estimates as well as productivity increases from the previous stage of the analysis.
National GVA impacts and turnover	Using data on the willingness to travel for work of tradespeople[146], estimates were formed by local authority for the share of surplus labour that could be used outside of the region and dampeners were applied such that national retrofit demand ceased in 2050 in line with UK net zero targets. These usable surplus ratios were then applied to the difference between peak employment (post retirement rates) and required employment before being multiplied by GVA intensities. For the manufacture of GHSPs, GSHP engineer employment estimates were combined with sector industry splits[147] and assumptions around the share of usable surplus were applied to estimate national GVA

[143] ONS. 2022. Population profiles for local authorities in England. Available at: Population profiles for local authorities in England
[144] Ofqual. 2023. Vocational and other qualifications over time. Available at: Vocational and other qualifications over time
[145] Insulation Manufacturers Association. 2022. Members list. Available at: Members list
[146] Gemserv. 2022. Heating system installers share their views on the opportunities and risks they face in the transition to low carbon. Available at: Heating system installers share their views on the opportunities and risks they face in the transition to low carbon
[147] ONS. 2022. Low carbon and renewable energy economy, UK: 2020. Available at: Low carbon and renewable energy economy, UK: 2020

	contributions. Regional turnover to GVA ratios[148] were then applied to combined regional/national GVA estimates to calculate industry turnover.

[148] ONS. 2022. Non-financial business economy, UK regional results: Sections A to S. Available at: Non-financial business economy, UK regional results: Sections A to S

Required growth in energy efficiency measures for net zero

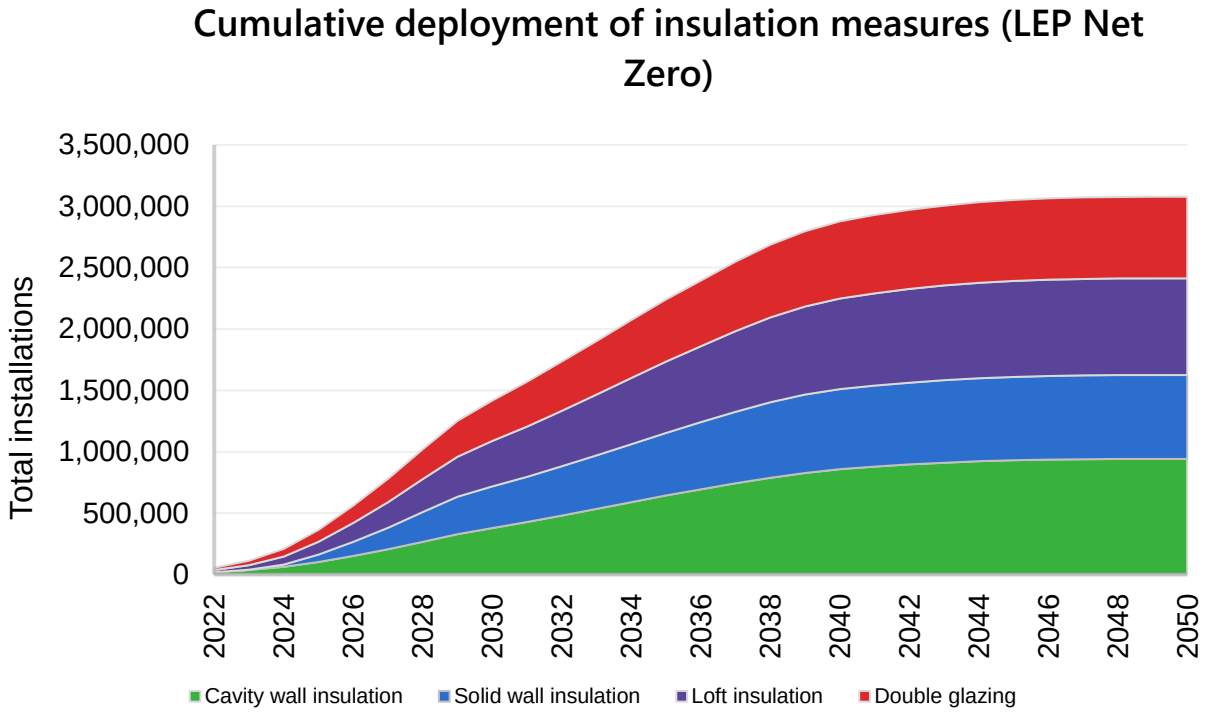


Figure 58 - Cumulative deployment of insulation measures (LEP Net Zero)

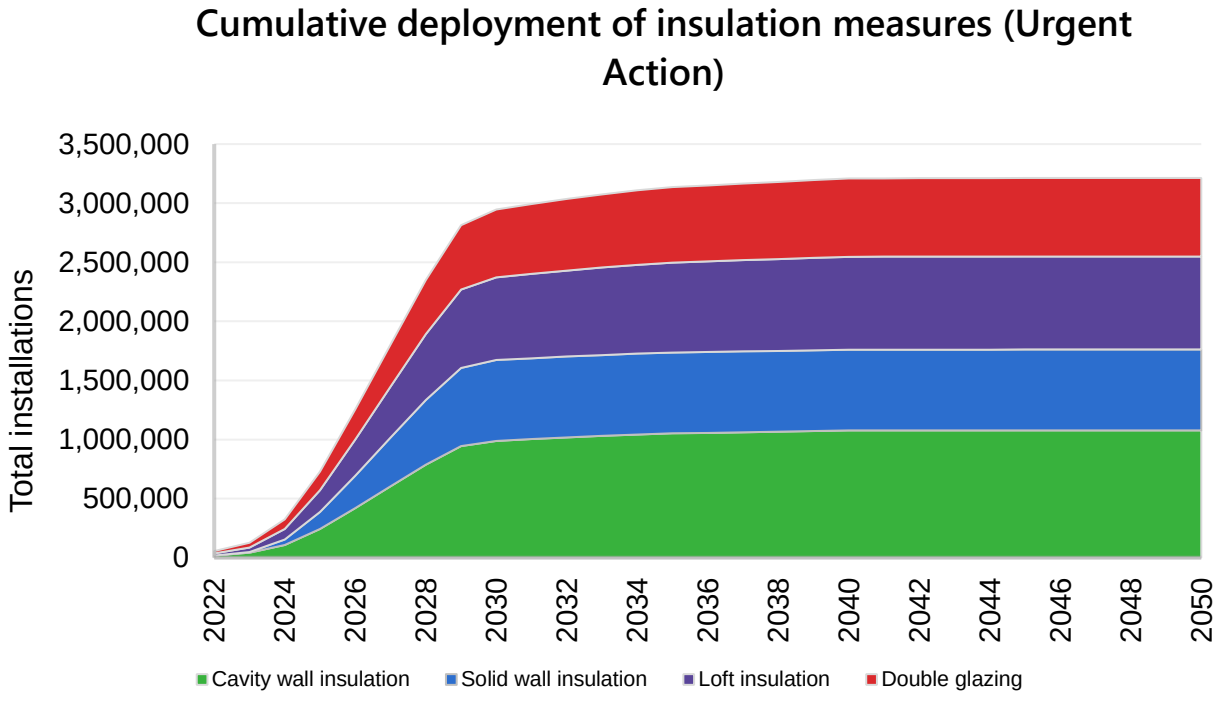


Figure 59 - Cumulative deployment of insulation measures (Urgent Action)

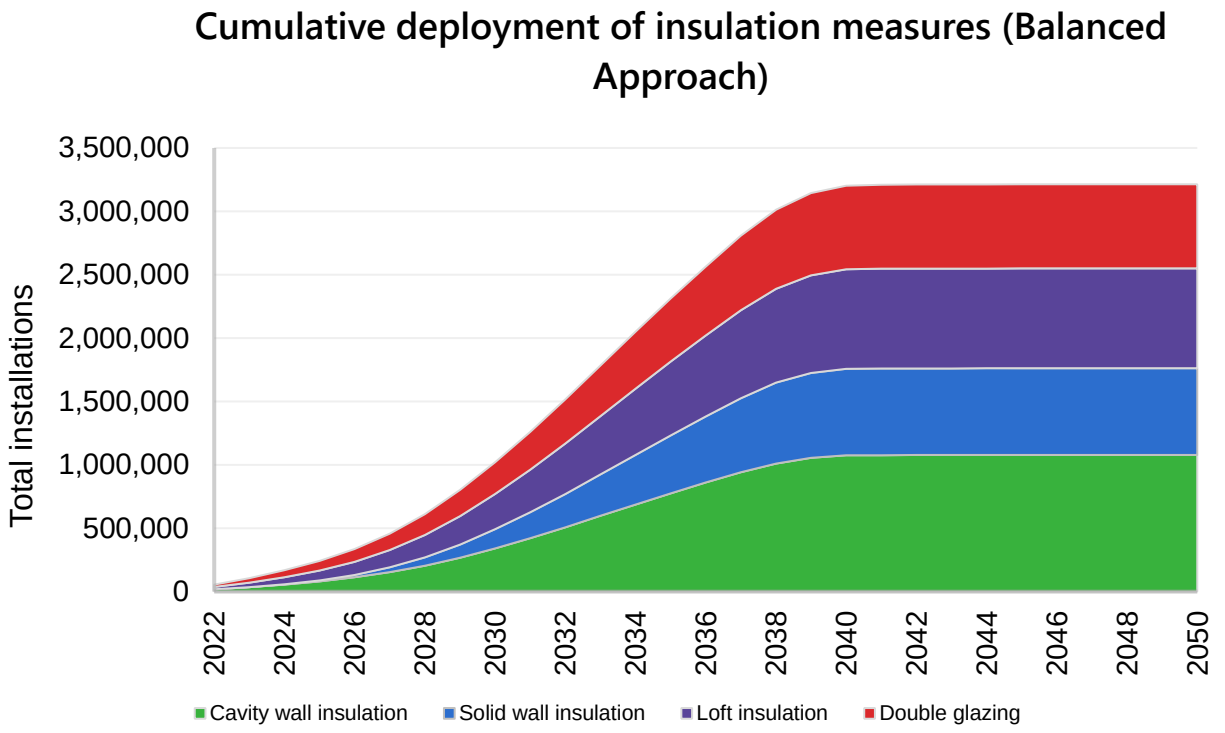


Figure 60 - Cumulative deployment of insulation measures (Balanced Approach)

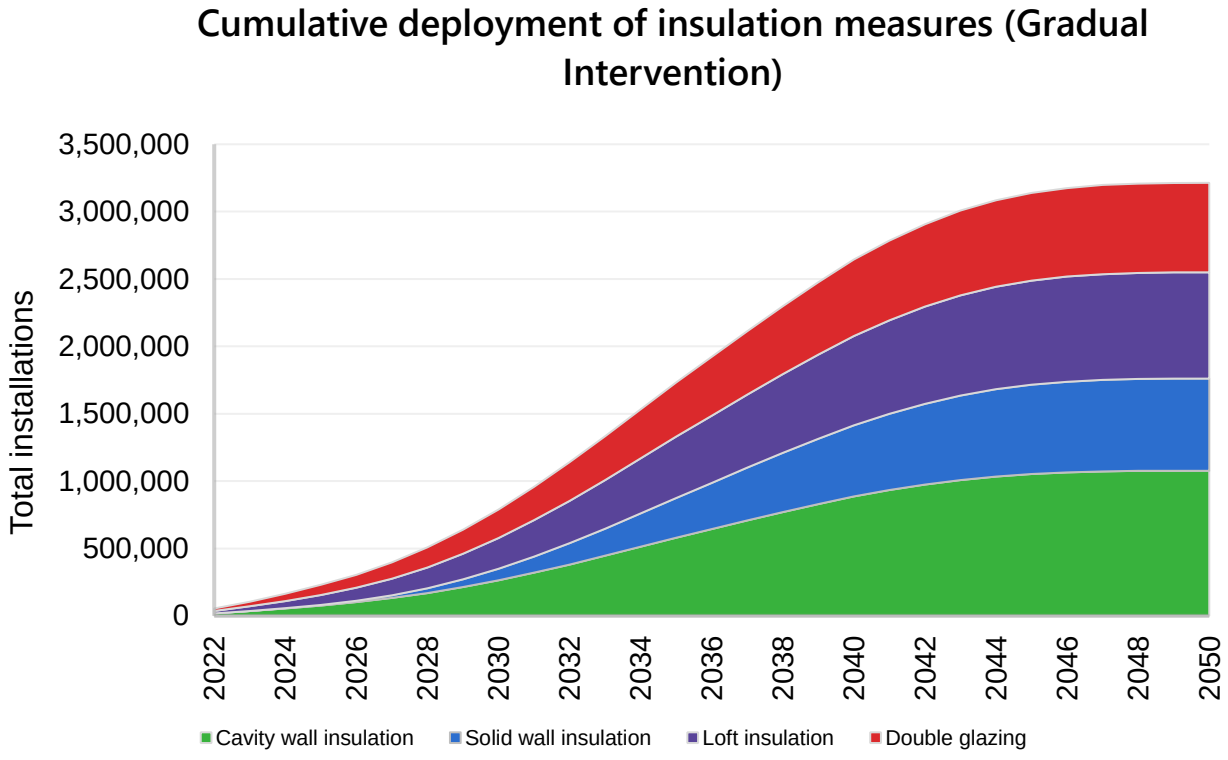


Figure 61 - Cumulative deployment of insulation measures (Gradual Intervention)

Required growth in low carbon heating for net zero

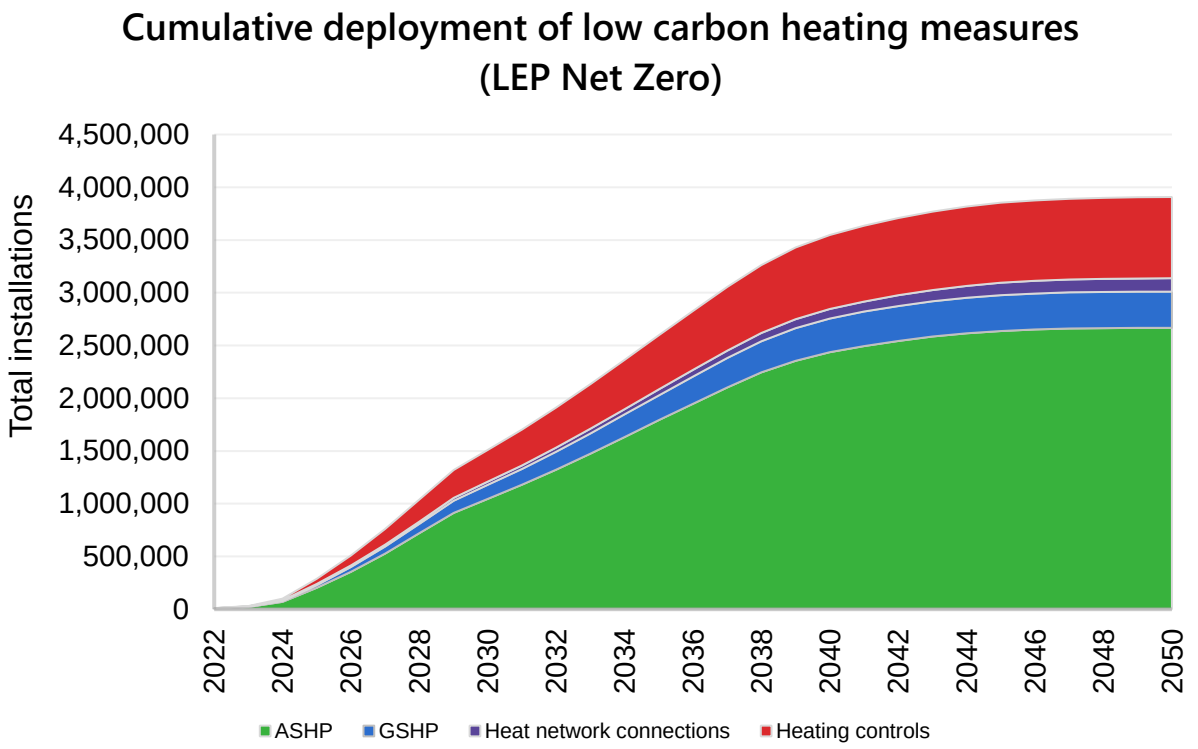


Figure 62 - Cumulative deployment of low carbon heating measures (LEP Net Zero)

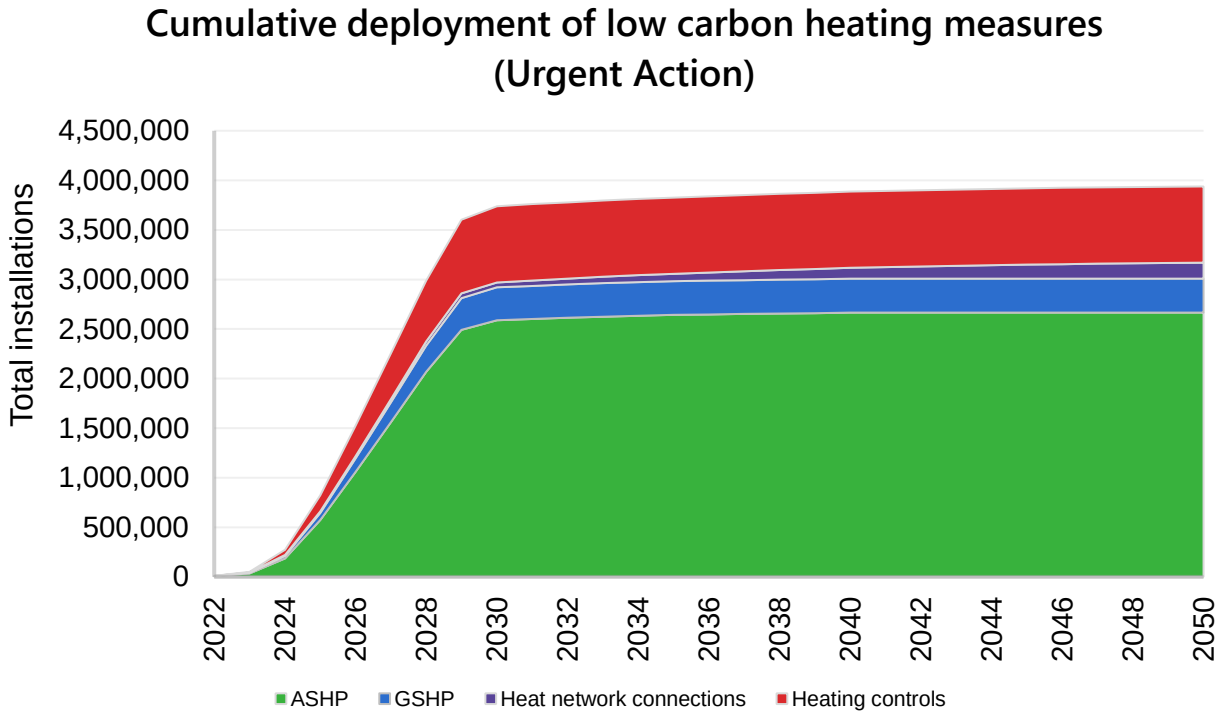


Figure 63 - Cumulative deployment of low carbon heating measures (Urgent Action)

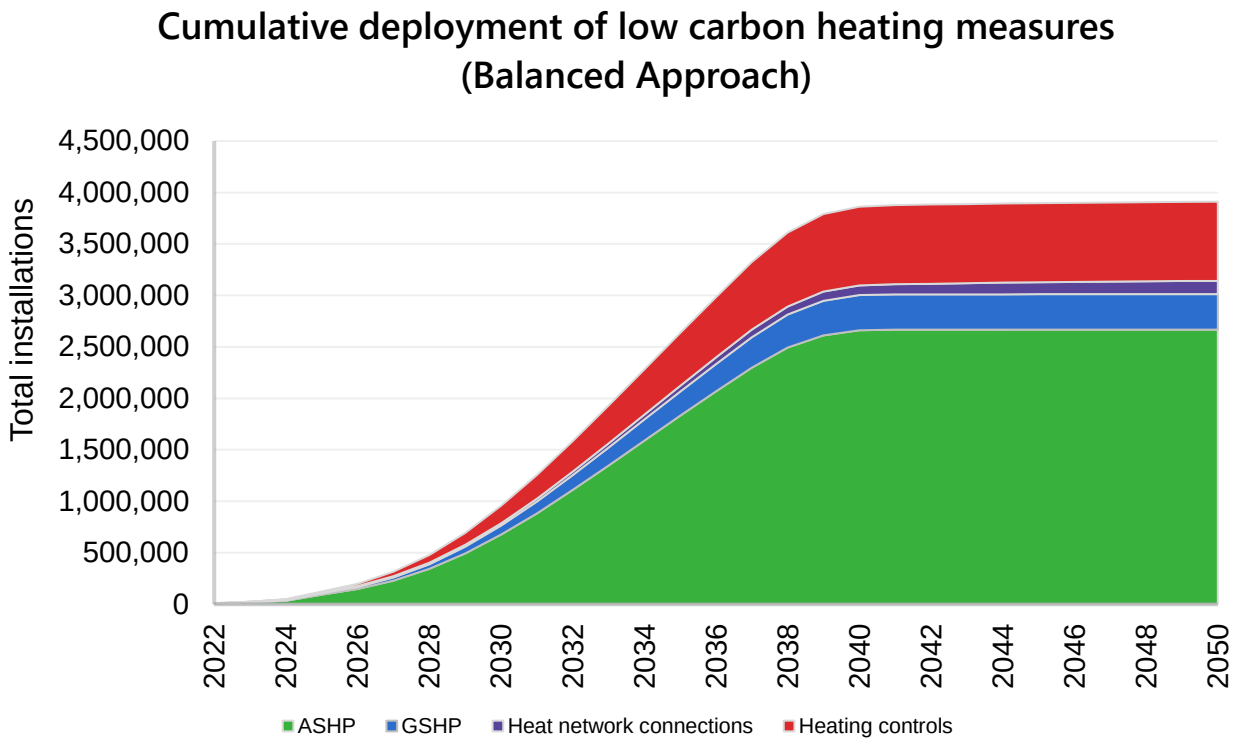


Figure 64 - Cumulative deployment of low carbon heating measures (Balanced Approach)

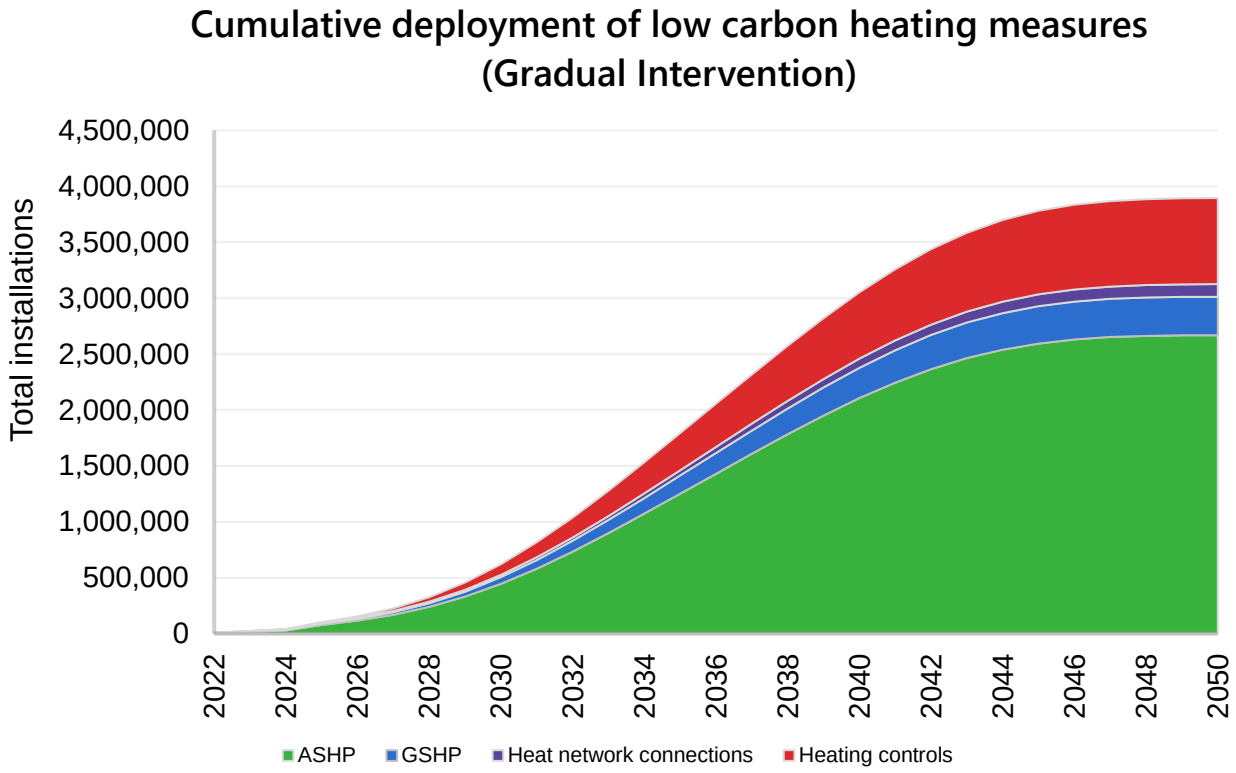


Figure 65 - Cumulative deployment of low carbon heating measures (Gradual Intervention)

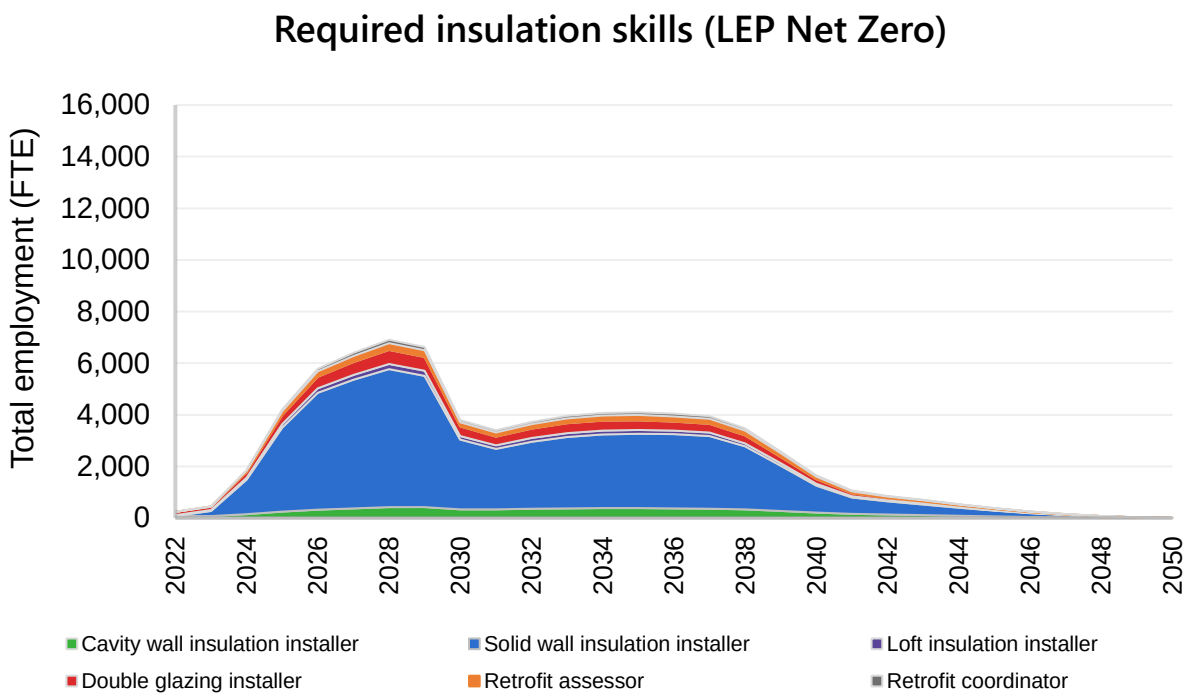


Figure 66 - Required insulation skills (LEP Net Zero)

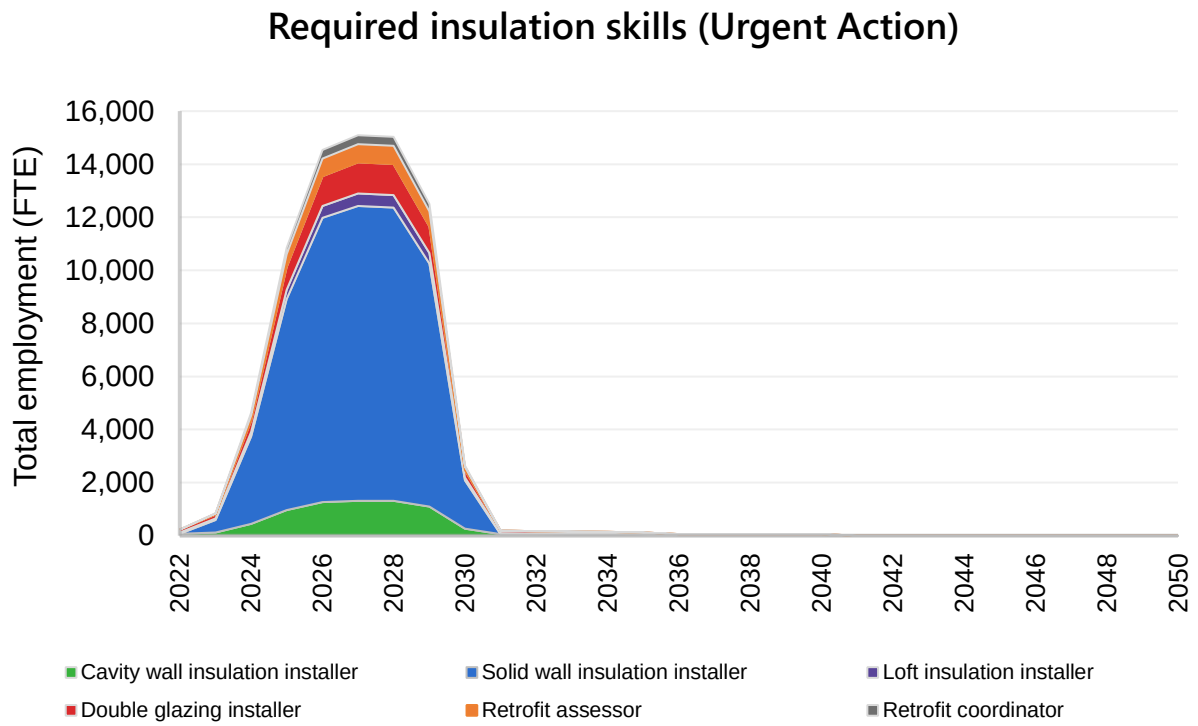


Figure 67 - Required insulation skills (Urgent Action)

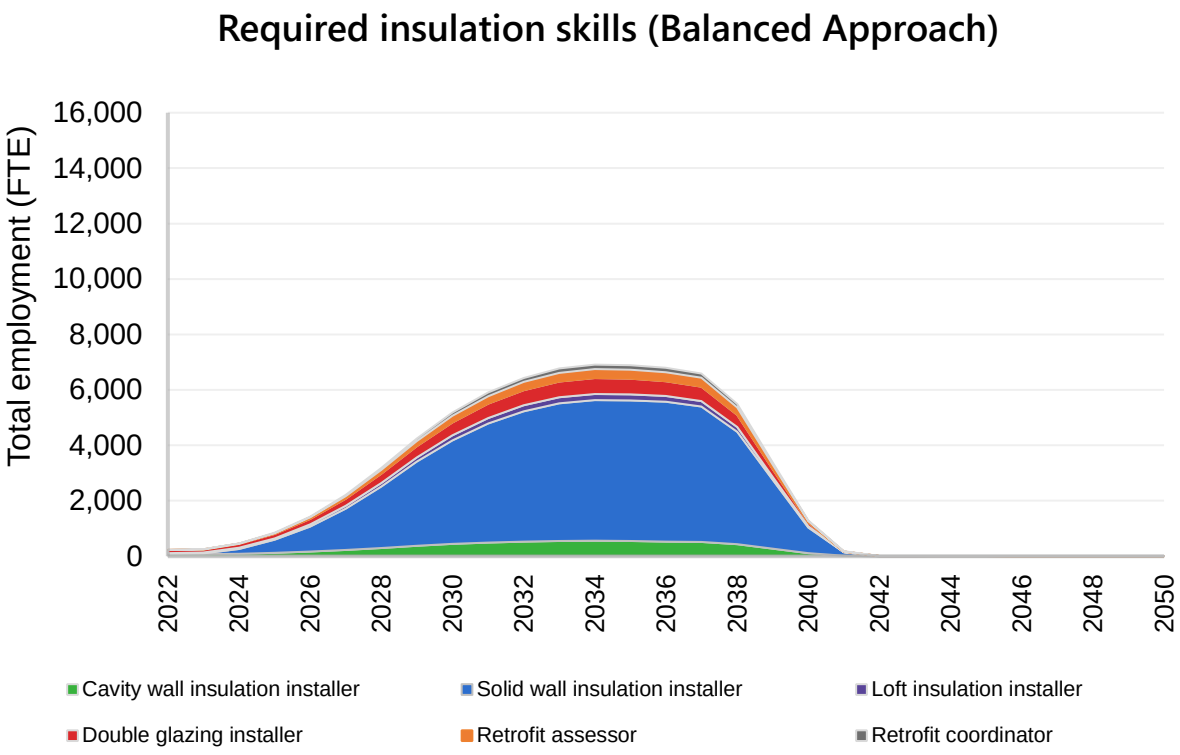


Figure 68 - Required insulation skills (Balanced Approach)

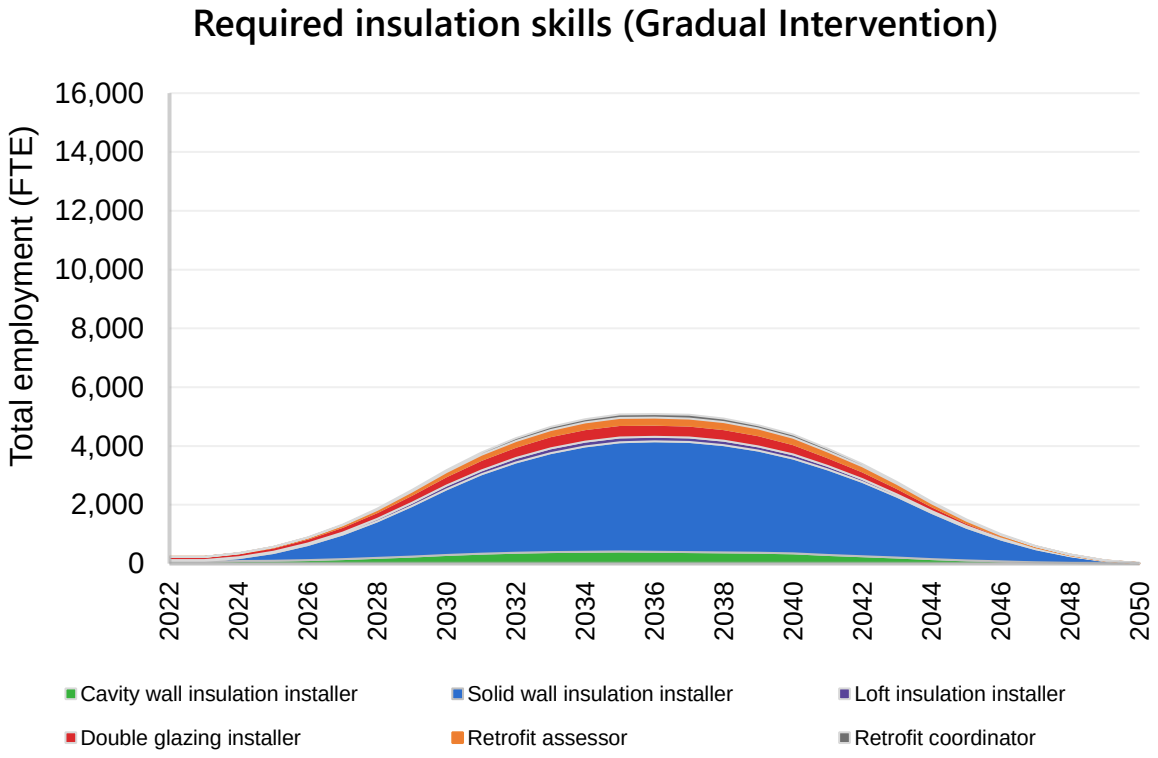


Figure 69 - Required insulation skills (Gradual Intervention)

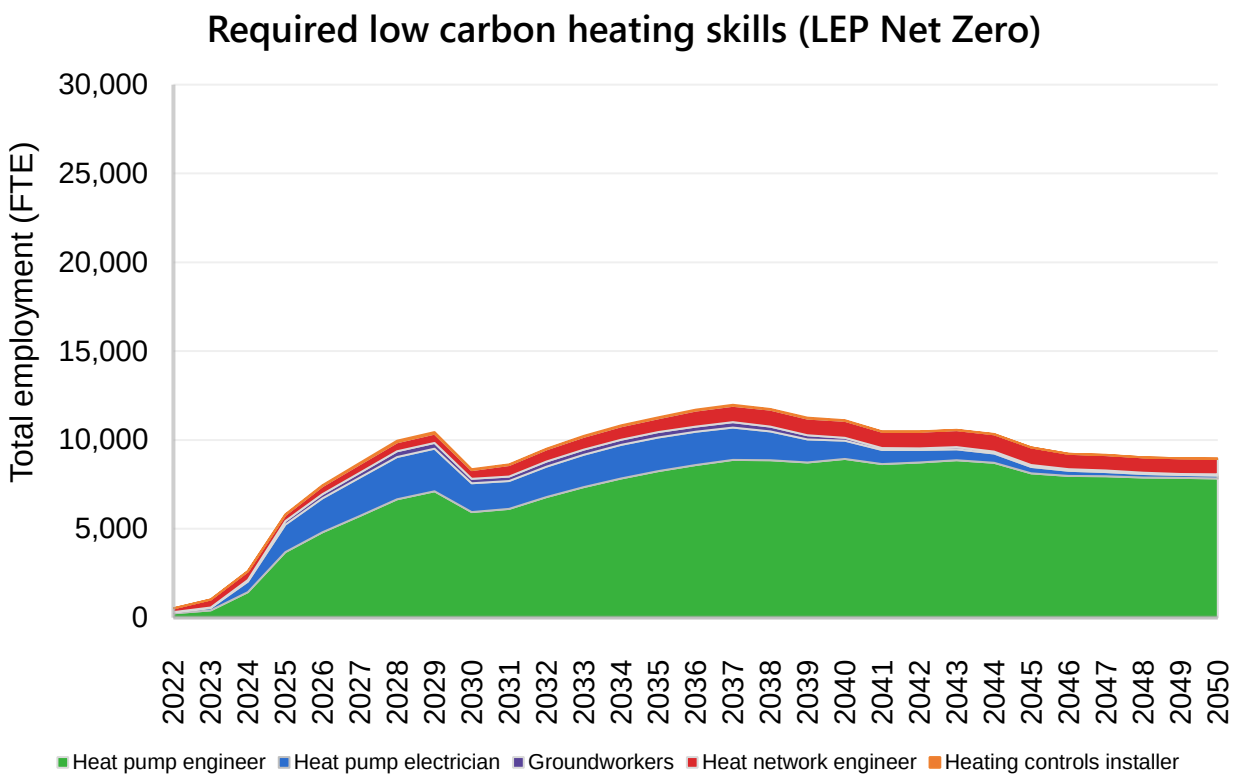


Figure 70 - Required low carbon heating skills (LEP Net Zero)

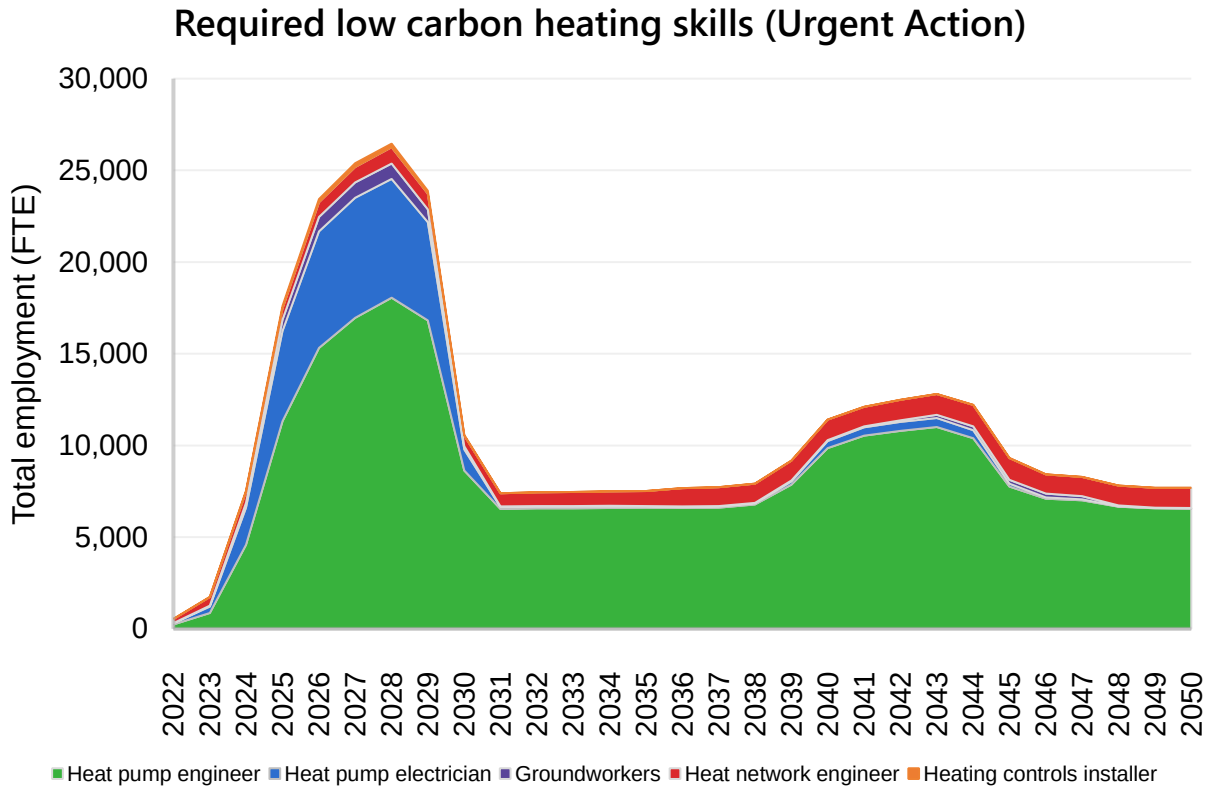


Figure 71 - Required low carbon heating skills (Urgent Action)

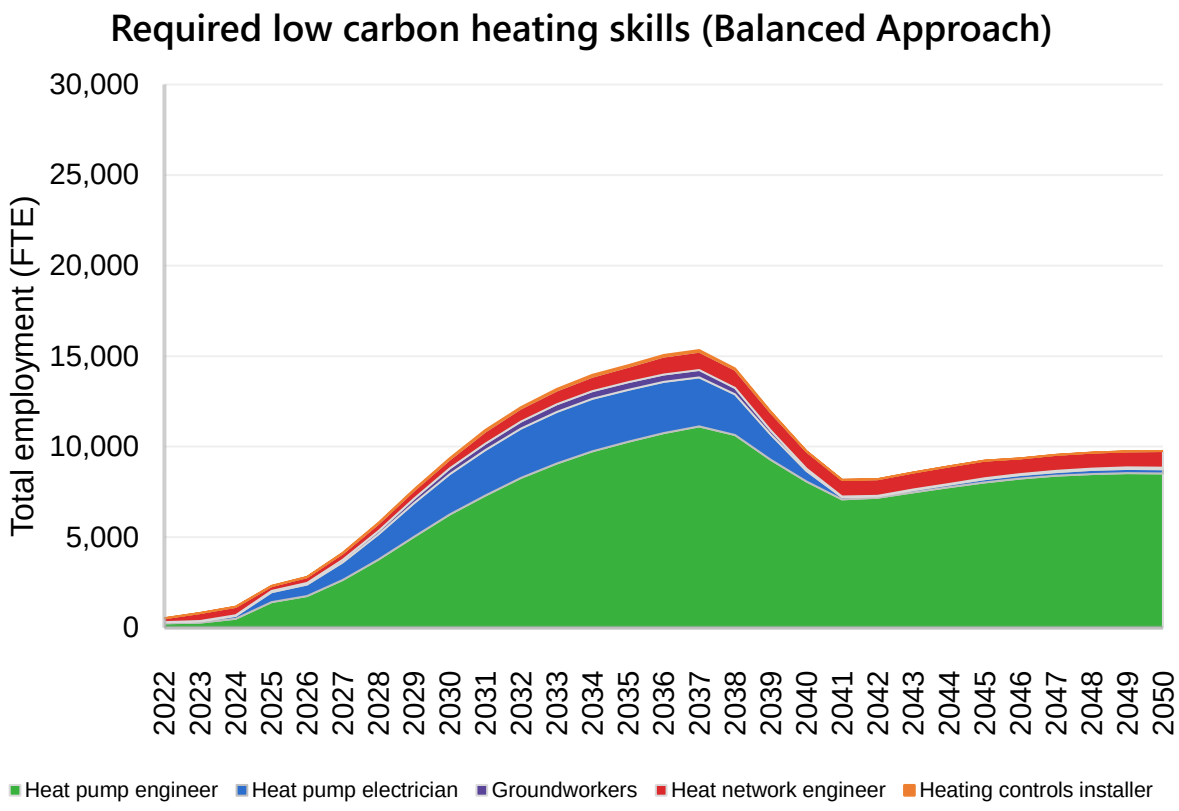


Figure 72 - Required low carbon heating employment (Balanced Approach)

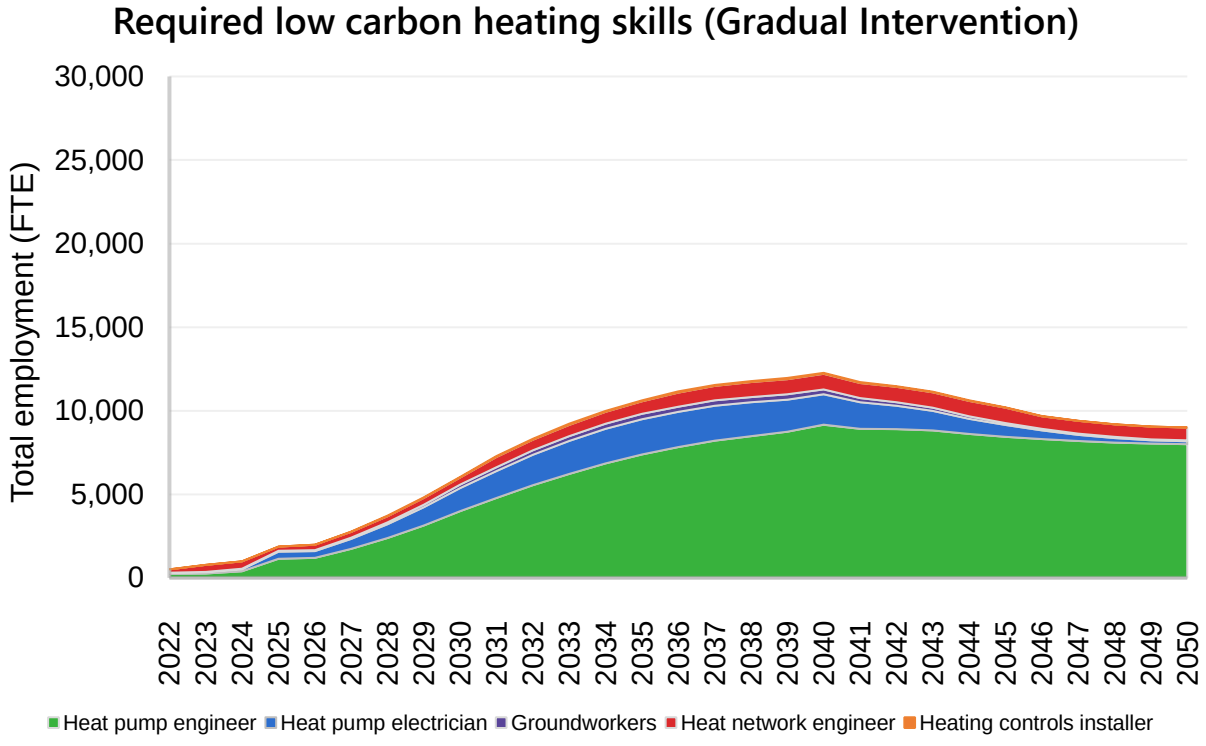


Figure 73 - Required low carbon heating skills (Gradual Intervention)

ANNEX 4: LIST OF QUALIFICATIONS OFFERED IN THE SOUTH WEST

Table 15 - List of insulation retrofit and heat pump qualifications in the South West

COURSE	TECHNOLOGY	LEVEL	OFQUAL	TRAINING CENTRE	ACCREDITATION
LCL Awards level 3 in Installation and Maintenance of Heat Pump Systems (non-refrigerant circuits) - New[149]	Heat Pumps	LCL Awards Level 3 Award	Yes	• Unitherm Heating Systems, Unit C1 & C2 Sanderling Court Osprey Road, Sowton Industrial Estate, Exeter, Devon EX2 7PJ • Nu-Heat UK Ltd, Weston Way Devonshire Road, Honiton Devon, EX14 1SD • SWAAT, 1 Quimperle Way Liskeard Business Park, Liskeard PL14 3US • Low Carbon Exchange Ltd, 61 Gazelle Road, Weston Super Mare, North Somerset, BS24 9ES • Vaillant Group Bristol, Unit 1390 Aztec West, Almondsbury, Bristol, BS32 4RX • Optimum Energy Solutions Ltd, Unit 2a Lighthouse Trade Park, Church Road, Lydney, Gloucestershire, GL15 5EN • Business Edge Ltd (Portsmouth), 6 Dragoon House, Westside View, Waterlooville, Hampshire, PO7 7SF • Hampshire Training & Assessments Ltd, Unit 1-3 Solent Building Southmoor Lane Havant Hampshire PO9 1JW	• MCS • CPS
BPEC Heat pump system (NOS mapped) Heat Pump Technology Air Source / Heat Pump Technology Ground Source[150]	Heat Pumps	BPEC	No	• Total Renewable Solutions, Unit 31 Ilton Business Park, Ilton TA19 9DU • Gas Flare Ltd3 Foundry Lane, Fish Ponds Trading Estate Bristol BS5 7XH • Optimum Energy Solutions Ltd, Unit 2a, Lighthouse Trade Park, Church Road, Lydney Gloucestershire GL15 5EN • Business Edge Ltd, 6 Dragoon House, Hussar Court, Westwide View, Waterlooville PO7 7SF	• MCS • CPS

[149]LCL Awards. ND. Level 3 Award in the Installation and Maintenance of Heat Pump Systems (non-refrigerant circuits). Available at: Level 3 Award in the Installation and Maintenance of Heat Pump Systems (Non-refrigerant Circuits)
[150] BPEC. ND. Heat pump systems. Available at: https://bpec.org.uk/qualification/heat-pump-systems/

				• Cornwall College Camborne, Examinations Officer, Trevenson Road, Pool, Redruth, TR15 3RD, United Kingdom • P G L Training, Clyst Works, Clyst Road, Topsham, Exeter, EX3 0DB, United Kingdom • Petroc, Examinations Office, Old Sticklepath Hill, Barnstaple, EX31 2BQ, United Kingdom • Vaillant Group Ltd, Unit 1390, Aztec, West Almondsbury, Bristol Avon BS32 4RX • Focus Training Group (Plymouth), 63-69 St Modwen Road Plymouth Devon PL6 8LH • South West Assessment And Training (SWAAT) 1 Owen Sivell Close Quimperle Way, Liskeard Business Park LISKEARD Cornwall PL14 3US • PGL Training Clyst Works, Clyst Road Topsham EXETER Devon EX3 0DB • SERT Training SERT at GFM, Brune Park School 1 Military Road Gosport Hampshire PO12 3BX • Focus Training Group (Newton Abbot) Unit 4, Amey House Cavalier Road, Heathfield Industrial Estate NEWTON ABBOT Devon TQ12 6TQ	
Level 3 NVQ Dip in Domestic Plumbing & Heating 600/6863/2 - EN2 (Heat Pumps)[151]	Heat pumps	Level 3 NVQ diploma		Not currently available in the South West	• MCS • CPS
LCL level 3 award in the Installation and Maintenance of Heat Pump Systems (Non-refrigerant Circuits)[152]	Heat Pumps	LCL Level 3 Award	Yes	• P G L Training, Clyst Works, Clyst Road, Topsham, Exeter, EX3 0DB, United Kingdom • Petroc, Examinations Office, Old Sticklepath Hill, Barnstaple, EX31 2BQ, United Kingdom • Hampshire Training & Assessments Ltd, Unit 1-3 Solent Building Southmoor Lane Havant Hampshire PO9 1JW	• MCS • CPS

[151] BPEC. ND. NVQ Diploma in Domestic Plumbing and Heating (Level 3 Environmental Technology). Available at: https://bpec.org.uk/qualification/dip-plumb-heat-et/

[152] EAL. ND. Level 3 Award in the Installation and Maintenance of Heat Pump Systems (Non-refrigerant Circuits). Available at: https://eal.org.uk/quals-finder/qualifications/2656-level-3-award-in-the-installation-and-maintenance-of-heat-pump-systems-non-refrigerant-circuits

				• Business Edge Ltd (Portsmouth)6 Dragoon House Westside View Waterlooville Hampshire PO7 7SF	
OFTEC Installation, commissioning and servicing of ground source heat pumps (OFT21-504G)[153]	Heat pumps	OFTEC		• Vaillant Group Ltd, Unit 1390, Aztec, West Almondsbury, Bristol Avon BS32 4RX • South West Assessment And Training (SWAAT) 1 Owen Sivell Close Quimperle Way, Liskeard Business Park LISKEARD Cornwall PL14 3US • SERT Training SERT at GFM, Brune Park School 1 Military Road Gosport Hampshire PO12 3BX • Focus Training Group (Plymouth)63-69 St Modwen Road Plymouth Devon PL6 8LH • Focus Training Group (Newton Abbot), Unit 4, Amey House Cavalier Road, Heathfield Industrial Estate NEWTON ABBOT Devon TQ12 6TQ	• MCS • CPS
OFTEC Installation, commissioning and servicing of air source heat pumps (OFT21-504A)[154]	Heat pumps	OFTEC		• Focus Training Group (Plymouth) 63-69 St Modwen Road Plymouth Devon PL6 8LH • Vaillant Group Ltd, Unit 1390, Aztec, West Almondsbury, Bristol Avon BS32 4RX • PGL Training, Clyst Works, Clyst Road Topsham EXETER Devon EX3 0DB • Focus Training Group (Newton Abbot), Unit 4, Amey House Cavalier Road, Heathfield Industrial Estate NEWTON ABBOT Devon TQ12 6TQ • Grant Engineering (UK) Ltd, Frankland Road Blagrove Swindon Wiltshire SN5 8YG	• MCS • CPS

[153]Oftec. ND. OFT21-504G - Installation, commissioning and servicing of Ground Source Heat Pumps. Available at: https://www.oftec.org/technicians/industry-training/training-courses-assessments/oft21-504g-installation-commissioning-and-servicing-of-ground-source-heat-pumps

[154]Oftec. ND. OFT21-504A - Installation, commissioning and servicing of Air Source Heat Pumps. Available at: https://www.oftec.org/technicians/industry-training/training-courses-assessments/oft21-504a-installation-commissioning-and-servicing-of-air-source-heat-pumps

Refrigeration air conditioning and heat pump engineering technician (level 3)[155]	Heat Pumps	Apprenticeship Level 3 NVQ	Yes	Bath College, City Centre Campus, Avon Street, Bath BA1 1UP	• MCS • CPS
Heat pumps[156]	Heat pumps	NICEIC (Level NA)		• Not currently available in the South West	• MCS • CPS
Commercial thermal insulation operative[157]	Insulation	Level 2 NVQ		RDA Insulation 14, Durham Way Heathpark Industrial Estate, 10 Durham Way, Heathpark Industrial Estate, Honiton EX14 1SQ	
Level 3 NVQ Diploma in Domestic Plumbing and Heating (6189-31) (600/1122/1) Heat pumps pathway [158]	Heat pumps	Apprenticeships City and Guilds level 3		Various, but unclear whether the heat pump pathway is offered.	• MCS • CPS
City and Guilds Level 2 NVQ in Insulation and Building Treatments (Construction)[159]	Insulation	City and Guilds Level 2 NVQ	No	Not offered in the South West	• CPS • PAS:2030
City and Guilds Level 3 NVQ in Insulation and Building Treatments (Construction)[160]	Insulation	City and Guilds Level 3 NVQ	No	Not offered in the South West	• PAS:2030 • CPS
LCL Gas Safety for Cavity Wall & Loft Insulation Installers[161]	Insulation	LCL		Not offered in the South West	• PAS:2030

[155] Bath College. 2022. Refrigeration Air Conditioning and Heat Pump Engineering Technician Level 3 (Refrigeration). Available at: https://www.bathcollege.ac.uk/course/view/2253/refrigeration-air-conditioning-and-heat-pump-engineering-technician-level-3-refrigeration-22-23

[156]NICEIC. ND. Heat pumps. Available at: https://www.niceic.com/contractor/training-courses/renewables-courses/heat-pumps

[157] UK Government. ND. Commercial thermal insulation operative. Available at: https://www.findapprenticeship.service.gov.uk/apprenticeship/1000127098

[158]City & Guilds. ND. Plumbing and Domestic Heating (9189). Available at: https://www.cityandguilds.com/qualifications-and-apprenticeships/building-services-industry/plumbing/9189-plumbing-and-domestic-heating#tab=documents

[159]City & Guilds. ND. Insulation and Building Treatments (5931). Available at: https://www.cityandguilds.com/qualifications-and-apprenticeships/construction/construction/5931-insulation-and-building-treatments#tab=information

[160] City & Guilds. ND. Insulation and Building Treatments (5931). Available at: https://www.cityandguilds.com/qualifications-and-apprenticeships/construction/construction/5931-insulation-and-building-treatments#tab=information

[161]LCL Awards. ND. Gas Safety for Cavity Wall & Loft Insulation Installers. Available at: https://lclawards.co.uk/qualifications/lcl/gas-safety-for-cavity-wall-loft-insulation-installers/

NOCN Level 2 Diploma in Cladding Operations [162]	Insulation	NOCN Level 2		Not offered in the South West	• PAS:2030
GQA Level 2 in Cladding Operations[163]	Insulation	GQA Level 2		Not offered in the South West	• PAS:2030
GQA Level 3 in Cladding Operations[164]	Insulation	Level 3		Not offered in the South West	• PAS:2030
GQA Level 2 Diploma in fenestration installation[165]	Double glazing	Level 2		GFTS Ltd Unit 7, 1 Bess Park Road, Trenant Ind Est, Wadebridge, Cornwall, PL27 6HB (GFTS only offer the competency update version)	• MCS
Level 2 Award – Understanding Domestic Retrofit[166]	Trades working in retrofit	Level 2	Yes	• Available online as an e-learning course. • City College Plymouth (until 17 March 2023).	• MCS • PAS:2030 • PAS:2035 • TrustMark
Level 3 Award- in Domestic Retrofit Advice[167]	Retrofit advisor	Level 3	Yes	• Available online as an e-learning course free for people in Bath and Bristol • Paid for at cost for the rest of the region	• MCS • PAS:2030 • PAS:2035 • TrustMark
Level 4: Award in Domestic Retrofit Assessment[168]	Retrofit assessor	Level 4	Yes	• Available online as an e-learning course free for people in Bath and Bristol • Paid for at cost for the rest of the region	• MCS • PAS:2030 • PAS:2035 • TrustMark
Level 5: Diploma in Retrofit Coordination & Risk Management[169]	Retrofit coordinator	Level 5	Yes	• Available online as an e-learning course free for people in Bath and Bristol • Paid for at cost for the rest of the region	• MCS • PAS:2030 • PAS:2035 • TrustMark

[162] NOCN Group. ND. NOCN_Cskills Awards Level 2 NVQ Diploma in Cladding Occupations (Construction). Available at: https://www.nocn.org.uk/products/qualifications/18495-603-2355-3-nocn_cskills-awards-level-2-nvq-diploma-in-cladding-occupations-construction/

[163] GQA Qualifications. ND. GQA LEVEL 2 NVQ DIPLOMA IN CLADDING OCCUPATIONS (CONSTRUCTION). Available at: https://gqaqualifications.com/qualification/gqa-level-2-nvq-diploma-in-cladding-occupations-construction/

[164]GQA Qualifications. ND. GQA LEVEL 3 NVQ DIPLOMA IN CLADDING OCCUPATIONS (CONSTRUCTION). Available at: https://gqaqualifications.com/qualification/gqa-level-3-nvq-diploma-in-cladding-occupations-construction/

[165]GQA Qualifications. ND. GQA LEVEL 2 NVQ DIPLOMA IN FENESTRATION INSTALLATION. Available at: https://gqaqualifications.com/qualification/gqa-level-2-nvq-diploma-in-fenestration-installation/

[166]Retrofit Academy. ND. Level 2 Award in Understanding Domestic Retrofit. Available at: https://retrofitacademy.org/level-2-award-udr/

[167]Retrofit Academy. ND. Level 3 Award in Domestic Retrofit Advice. Available at: https://retrofitacademy.org/level-3-award-in-domestic-retrofit-advice/

[168] Retrofit Academy. ND. Level 4 Award in Domestic Retrofit Assessment. Available at: https://retrofitacademy.org/level-4-domestic-retrofit-assessment/

[169] Retrofit Academy. ND. Level 5 Diploma in Retrofit Coordination and Risk Management. Available at: https://retrofitacademy.org/l5-methods-of-study/

Elmhurst retrofit assessor (for Domestic energy assessors)[170]	Retrofit assessor	NA		• Available online • Not currently available in person in the South West	• PAS:2035

[170] Elmhurst Energy. ND. Retrofit Assessor Training. Available at: https://www.elmhurstenergy.co.uk/retrofit-assessor-training/

ANNEX 5: SKILLS FUNDING OPPORTUNITIES

Table 16 - List of skills funding opportunities in the South West

FUNDING STREAM	FUNDING QUANTUM	ELIGIBLE COURSES	FULL OR PARTIALLY FUNDED	END DATE
UK Community Renewal Fund	£220 million of investment made available over 2021-22 financial year. Devon Retrofit skills and business accelerator: £1,015,184.	• Level 2: Award in Understanding Domestic Retrofit • Level 4: Award in Domestic Retrofit Assessment • Level 5: Diploma in Retrofit Coordination & Risk Management	Both	2022
Strategic Development Fund	£150 million of funding available. Estimates suggest phase 1 cost around £65 million with Phase 2 costs at £85 million. Full regional allocations of funding can be found on the gov.uk website[171].	Funding for development of Local Skills Improvement Plans	Not applicable	2023 for the phase 2 of funding
Adult Education Budget	£1 billion centrally managed allocations. £786 million devolved to Mayoral Combined Authorities. £15 million of this is allocated to the West of England Combined Authority.	Available courses vary by region. For eligibility in the West of England Combined Authority please refer to the funding guidance[172]. National ESFA funding allocations and eligibility consult the gov.uk website[173].	Both fully and partially funded	Steady state funding
UK Shared Prosperity Fund	It will provide £2.6 billion of new funding for local investment by March 2025. Allocations are made regionally: • West of England Combined Authority: £13,795,332 • Cornwall and Isles of Sicily £132,00531	Investment prospectus and interventions to be released closer to the announcement of the opening of the skills funding pillar in 2024 financial year.	Fully funded	Funding available from 24/25 financial year. Fund expected to be steady state from its inception.

[171] Department for Education. 2022. Strategic development fund: 2022 to 2023 financial year. Available at: https://www.gov.uk/government/publications/strategic-development-fund-awards-2022-to-2023/strategic-development-fund-2022-to-2023-financial-year#south-west

[172] West of England Combined Authority. 2023. Funding policies and guidance. Available at: https://www.westofengland-ca.gov.uk/what-we-do/employment-skills/funding-policies-guidance/

[173] Education and Skills Funding Agency. 2022. Adult education budget (AEB) funding rules 2022 to 2023. Available at: https://www.gov.uk/government/publications/adult-education-budget-aeb-funding-rules-2022-to-2023

	• Dorset: £6,014,090 • Isle of Wight £1,730,230 • North Somerset £3,354,093 • Plymouth: £4,448,945 • Portsmouth: £2,503,904 • Gloucestershire: £2,742,441 • Somerset: £2,485,156 • Hampshire: £5,797,058 Total: £40m			
Skills Bootcamps	The National Skills fund is worth £2.5bn over the next Parliament. The ESFA has recently launched a funding round worth £60 million. £5.1 million is available to employers and training providers to deliver specialist training as part of Wave 4 Skills Bootcamps through the West of England Combined Authority.[174]	• Skills Bootcamp in Green Technologies • Organisational sustainability/net zero bootcamps • Skills bootcamp in AI for environmental sustainability • Skills Bootcamp in Environmental Data Science	Fully funded	Supplier contracts will be awarded and run for a 12-month term from wave 3 announced in August 2022. Different rules apply to MCAs.
West of England Combined Authority Green Recovery Fund[175]	The fund is worth £50 million across the West of England Combined Authority. The first round of the Green Recovery Fund aimed to allocate an indicative total of up to: • £4 million for nature recovery • £3 million for renewable energy & energy capacity.	The objectives of the fund are to: • Reduce the region's emissions from buildings and transport, and enhance our natural habitats; • Raise employment in businesses providing solutions to climate transition; • Develop viable and sustainable markets for net zero transition, by overcoming obstacles or developing innovative solutions; • Support the region's economy to	TBC	Funding Round 1 is currently closed. Further rounds are expected.

[174] West of England Combined Authority. 2023. Skills bootcamps (wave 4). Available at: https://www.westofengland-ca.gov.uk/skills-bootcamps-wave-4/

[175] West of England Combined Authority. ND. Green recovery fund. Available at: https://www.westofengland-ca.gov.uk/what-we-do/environment/green-recovery-fund/

		decarbonise, including increasing green skills provision; and • Leverage external funding into the region to tackle climate and ecological emergencies.		

ANNEX 6: LIST OF LOCAL AUTHORITIES IN THE SOUTH WEST REGION

Unitaries

1. Cornwall Council
2. Bath and North East Somerset Council
3. Bournemouth, Christchurch and Poole Council
4. Bristol City Council
5. Dorset Council
6. North Somerset Council
7. Plymouth City Council
8. South Gloucestershire Council
9. Swindon Borough Council
10. Torbay Council
11. Wiltshire Council
12. Council of the Isles of Scilly
13. Isle of Wight Council,
14. Portsmouth City Council
15. Southampton City Council,

Counties and Districts

1. Devon County Council
2. East Devon District Council
3. Exeter City Council
4. Mid Devon District Council
5. North Devon District Council
6. South Hams District Council
7. Teignbridge District Council
8. Torridge District Council
9. West Devon Borough Council
10. Gloucestershire County Council
11. Cheltenham Borough Council
12. Cotswold District Council
13. Forest of Dean District Council
14. Gloucester City Council
15. Stroud District Council
16. Tewkesbury Borough Council

17. Somerset County Council
18. Mendip District Council
19. Sedgemoor District Council
20. South Somerset District Council
21. Somerset West and Taunton Council
22. Eastleigh Borough Council,
23. Fareham Borough Council,
24. Gosport Borough Council,
25. Havant Borough Council
26. New Forest District Council
27. part of Hampshire County Council

ANNEX 7: TRAINING REQUIREMENTS FOR INSULATION AND HEAT PUMP INSTALLERS

This section sets out the necessary pathways for retrofit skills and accreditation, outlines the training and development opportunities and funding streams available for the South West, and its skills system to ensure the region can upskill its workforce to retrofit its building base to meet its net zero targets.

Insulation requirements PAS 2030 and PAS 2035

Following the Each Home Counts Review[176], which investigated consumer protection and advice surrounding the installation of energy efficiency measures and renewable energy in homes, there has been an increasing focus on quality assurance and consumer protection under government funded schemes. For insulation and energy savings retrofit, the requirements to carry out government funded retrofit projects are compliance with PAS 2035 and PAS 2030 standards.

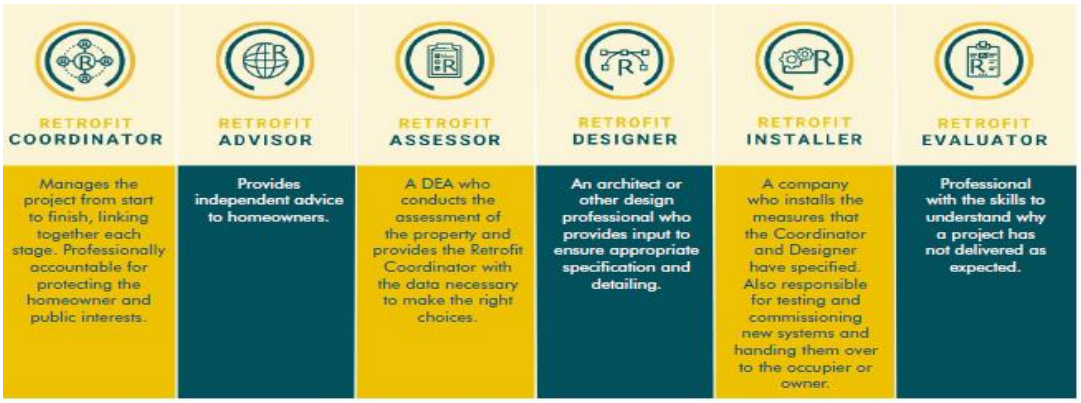
PAS 2035 is an overarching framework for preparing plans for domestic retrofit projects in the UK whereas PAS 2030 is an installation standard. Any retrofit designs that emerge from PAS 2035 specifications must be installed in accordance with the requirements outlined in PAS 2030 which is a certification which businesses can achieve to demonstrate the compliance of their installations. Unlike PAS 2030, PAS 2035 is not a certification; it is a standard that sets out the specifications which compliant retrofitting must meet. Both PAS documents are to be taken as a whole and closely relate to each other.

PAS 2035 establishes standards on how to conduct effective energy retrofits to existing buildings. PAS 2035 covers a range of areas including how to access dwellings for retrofit, identify the improvement options required, design and specify energy efficiency measures and monitor retrofit projects. The standard aims to drive a 'whole house' and 'fabric first' approach to retrofit. The full pathways to certification under PAS 2035 are set out at Annex 1. PAS 2035 introduces a range of roles and responsibilities required prior to, during and after the installation of fabric efficiency measures. The table below sets out the roles introduced under PAS 2035[177].

[176] UK Government. 2016. Each Home Counts Review. Available At: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/578749/Each_Home_Counts__December_2016_.pdf

[177] Retrofit Academy. 2023. Level 4 award in domestic retrofit assessment. Available at: https://retrofitacademy.org/l4-conversion-page/

Table 16 - Roles under PAS:2035 - Retrofit academy[178]



The core requirements for the retrofit roles under PAS 2035 are set out below.

Level 2 Award – Understanding Domestic Retrofit[179]

Completing this course provides learners with an understanding of what retrofit is, what retrofit achieves and what the future employment opportunities in retrofit could be. delivered by the Retrofit Academy. This course is based on the full NVQ Level 2 in Insulation and Building Treatments, Building Construction, Defects and Interfaces. Learners can use the completion of this course as a pre-qualification for the full NVQ. This will provide a comprehensive introduction to understanding domestic retrofit, delivered in 6 interactive eLearning sessions over a three-day period, encompassing around 18 hours. The course is ideal for those working in the domestic retrofit sector who do not currently hold any relevant domestic retrofit qualifications and is aimed at new entrants in the industry with little or no understanding of domestic retrofit.

Level 3 Award- in Domestic Retrofit Advice[180]

Undertaking this qualification provides official recognition of the knowledge and skills needed to become a Retrofit Advisor.

Level 4 Award – Domestic retrofit assessment[181]

Undertaking this qualification provides official recognition of the knowledge and skills needed to become a Retrofit Assessor. Their job is to visit properties and carry out the survey that is required to inform the decision making about what measures should be installed. Working under the supervision of a Retrofit Coordinator, this will involve assessing the condition, occupancy and significance of the building in line with the PAS.

Table 17 – requirements for retrofit roles under PAS 2035

Role	Required Qualifications	Required Accreditations

[178] Ibid
[179] Retrofit Academy. 2023. Level 2 award in understanding domestic retrofit. Available at: https://retrofitacademy.org/level-2-award-udr/
[180] Retrofit Academy. 2023. Level 3 award in domestic retrofit advice. Available at: https://retrofitacademy.org/level-3-award-in-domestic-retrofit-advice/
[181] Retrofit Academy. 2023. Level 4 award in domestic retrofit assessment. Available at: https://retrofitacademy.org/l4-conversion-page/

Retrofit Advisor	C&G Energy Awareness & Advice Green Deal Advisor Level 5 Diploma in Retrofit Co-ordination and Risk Management	Membership of TrustMark Approved Retrofit Co-ordinator Scheme
Retrofit Assessor	**Low Risk** Level 5 Diploma in Retrofit Co-ordination and Risk Management **Medium and High Risk** Domestic Energy Assessor Specialist Level 3 – 6 Awards in Traditional Buildings (for protected buildings)	Certified DEA by UKAS Accredited Assessor Body. Membership of a TrustMark Approved Scheme
Retrofit Co – Ordinator	Open College West Midlands Level 5 Diploma in Retrofit Co-ordination and Risk Management Demonstration of prior experience in competence in professional practices such as contract and project management, customer service etc.	Membership of a TrustMark Approved Retrofit Co-ordinator Scheme
Retrofit Designer	**Low Risk** Level 5 Diploma / MCIAT **Medium Risk** Level 5 Diploma / MCIAT Registered Architects, Construction Managers and Building Surveyors **High Risk** Level 5 Diploma / MCIAT Registered Architects, Construction Managers and Building Surveyors CIBSE Members who also hold Level 5 Diploma or Specialist Traditional Building Qualifications.	Membership of a TrustMark Approved Retrofit Co-ordinator Scheme
Retrofit Installer	**As Per PAS 2030:2019 - See Below Illustrative Pathways for Fabric Efficiency Measures**	Membership of TrustMark Approved Scheme.
Retrofit Evaluator	Level 5 Diploma in Retrofit Co-ordination and Risk Management	Membership of a TrustMark Approved Retrofit Co-ordinator Scheme

PAS 2030 is the industry specification/accreditation scheme which all energy efficiency installers carrying out energy efficiency installations under government funded schemes must be certified to and compliant with. By gaining PAS 2030:2019 certification, retrofit installers can demonstrate that they have installed energy efficiency measures which meet the required specifications, and have delivered on customer requirements and expectations in accordance with TrustMark standards. PAS 2030 sets out requirements in key areas including competence.

When a business becomes PAS2030:2019 certified, they are required to adhere to the PAS2035:2019 requirements for a project, which must be overseen and lodged into the TrustMark Data Warehouse by a TrustMark Registered Retrofit Co-ordinator[182] [183]. Qualification for retrofit under PAS 2030:2019 requires demonstration of suitable experience and assessment of work portfolios. The predominant way to demonstrate this is through gaining an NVQ – typically a Level 2 or Level 3 NVQ such as the City and Guilds Insulation and Building Treatments (5931)[184] [185] NVQ which requires specialisation into pathways demonstrating competence in specific retrofit elements. Relevant courses include the following:

City and Guilds NVQ Level 2 – Insulation and Building Treatments (5931)

Undertaking this qualification provides official recognition of the knowledge and skills needed to install insulation or carry out building maintenance work and to become a retrofit installer. Learners can choose from a range of qualifications to match specialisms such as external wall insulation or loft insulation. They also form part of an Apprenticeship framework. The certificates comprise three mandatory units including:

- Conforming to General Health, Safety and Welfare in the Workplace
- Conforming to Productive Working Practices in the Workplace
- Moving, Handling and Storing Resources in the Workplace.

GQA NVQ Level 2 Fenestration installation

The fenestration NVQ is aimed at those who work as installers of glass supporting systems, which include window and door units.

Training requirements for heat pumps and low carbon heating

Heat pump retrofit has fundamentally different requirements to insulation. Delivery of insulation training has focussed on compliance with standards for the process and practice of the installation itself as a prerequisite for accessing UK government funded retrofit products. By contrast training for installation of heat pumps focusses on technology standards. As such, qualifications and training for heat pump installation focus on Microgeneration Certification Scheme (MCS) certification.

Microgeneration Certification Scheme

The Microgeneration Certification Scheme (MCS) defines, maintains and improves quality in the retrofit sector by low-carbon products and installations used to produce electricity and heat from renewable sources and the contractors that install them. MCS create and maintain standards that allow for the certification of products, installers, and installations. MCS is a mark of quality and membership of MCS demonstrates adherence to industry standards highlighting quality, competency, and compliance. MCS certified contractors have already demonstrated to have met

[182] TrustMark. 2023. Data Warehouse. Available at: https://www.trustmark.org.uk/tradespeople/data-warehouse
[183] TrustMark. 2023. Support for Gaining PAS & MCS Certification. Available at: https://www.trustmark.org.uk/tradespeople/how-to-become-pas-mcs-certified#questions
[184] City and Guilds. 2023. Insulation and Building Treatments (5931). Available at: City and Guilds Level 2 and 3 Insulation and Building Treatments (5931)
[185] TrustMark. 2023. Support for Gaining PAS & MCS Certification. Available at: https://www.trustmark.org.uk/tradespeople/how-to-become-pas-mcs-certified#questions

many of the quality system and competency requirements of the PAS 2030 scheme and can therefore access a streamline entry into PAS 2030 using the MCS 023 route.

There are four key elements to becoming an MCS certified installer[185]:

- Commitment to quality workmanship.
- Commitment to customer care.
- Demonstrate competency.
- Commitment to continual improvement through the development of an effective management system.

To demonstrate competency, an installation company must provide the evidence of the skill, competency, and experience of an individual or individuals involved in the various roles required to deliver a customer's system. These roles include the supply, design, installation, set to work and commissioning of the type of systems for which the company is seeking certification. This can be done through evidencing MCS certified qualifications held and/or short courses attended - generally those established by installer certification bodies[186]. A full list of MCS certified heat pump installer courses can be found on the MCS website[187].

Competent Persons Schemes

Installers are only required to be MCS/PAS certified if they wish to install on UK government funded schemes, such as the Boiler Upgrade Scheme and ECO 4. To ensure compliance with Building Regulations installers working in the building trade can join a 'competent person scheme' to self-certify certain types of building work instead of getting building regulations approval[188]. For the purpose of this report, the approval required is for heat pump installation and certain types of insulation, a full list of which can be found on the gov.uk website[189].

To be registered with a competent person scheme, installers need to demonstrate that they meet the relevant minimum technical competence requirements. Most of the minimum technical competences are also used to assess the competence of Green Deal installers and, where relevant, installers registered with MCS.

The primary benefit of membership of competent persons schemes is that certified installers save time because they do not have to notify the local authority in advance of the work - they just notify their work online with the scheme operator who issue a building compliance certificate to the customer and advise the relevant local authority that work has taken place. Consumers benefit as building control charges are not required and installers can offer a complete service to their customer[190].

[186]MCS. 2023. Becoming certified. Available at: https://mcscertified.com/installers-manufacturers/becoming-certified/
[187]MCS. 2023. Qualifications. Available at: https://mcscertified.com/qualifications/?subitem=Heat+Pumps
[188] Department for Levelling Up, Housing and Communities. 2016. Competent person scheme - current schemes and how schemes are authorised. Available at: Competent person scheme - current schemes and how schemes are authorised - GOV.UK (www.gov.uk)
[189] Ibid
[190] NICEC. 2023. Competent person schemes – all building sectors. Available at: NICEIC | Join our schemes and be recognised for the work you do

ANNEX 8: STAKEHOLDER ENGAGEMENT METHODOLOGY

Stakeholder engagement was carried out in December 2022 – February 2023 and three key stakeholder groups were targeted:

- **Installer/ Industry Representatives**: industry will be key to the green transition and are crucial for the delivery of low carbon heating and energy efficiency installations.
- **Skills / Training Providers**: training providers will play a pivotal role in ensuring that existing and emerging skills gaps can be addressed.
- **Local Authority Representatives**: can offer key insight into some of the challenges and opportunities currently facing the transition within the region, from a skills and wider development perspective.

Three sets of questions were developed for the three groups identified above and stakeholders were invited to take part in either a semi-structured interview or to complete an online survey.

Installer/Industry Representatives

Several local installers/industry representatives were interviewed and surveyed within the retrofit market, including energy efficiency and low carbon heating. These ranges from small-to-medium enterprises to large corporations, representing a range of different business capabilities and operations. The questions within the surveys and interviews focused on current and future skills demand, the challenges faced by industry and what support is needed to meet net zero targets.

Interviewees included those active within the manufacturing, energy assessment and installation spaces. A range of companies who specialise in the low carbon retrofit sector were interviewed including across energy efficiency and low carbon heating. For further detail surrounding the type and size of the industry organisations surveyed and interviewed, see the Sample Overview below.

Skills / Training Providers

Skills/training providers from both within and outside of the South West were interviewed and surveyed to understand local capabilities and additional perspectives from surrounding areas that will impact the South West in the retrofit sector. The engagement focused the existing courses available within the retrofit space, how they expect demand for courses to change, and how they are planning to adjust. The training providers surveyed generally had many students enrolled on their courses (see the Sample Overview below).

Local Authority Representatives

Local Authority representatives were surveyed across the South West, representing key individuals involved in the green skills and low carbon space within the regions. Questions within the survey aimed to understand the challenges perceived by local authorities surrounding retrofit skills and the interventions needed to allow industry to meet consumer demand and local net zero targets.

Sample Overview

The following graphs provide information on the industry and training provider stakeholders that were interviewed and surveyed. A broad range of stakeholders were targeted to try and capture as much information as possible about the

retrofit sector. In Figure 75, those that stated 'other' for company core business, those industries were for construction and a trade association.

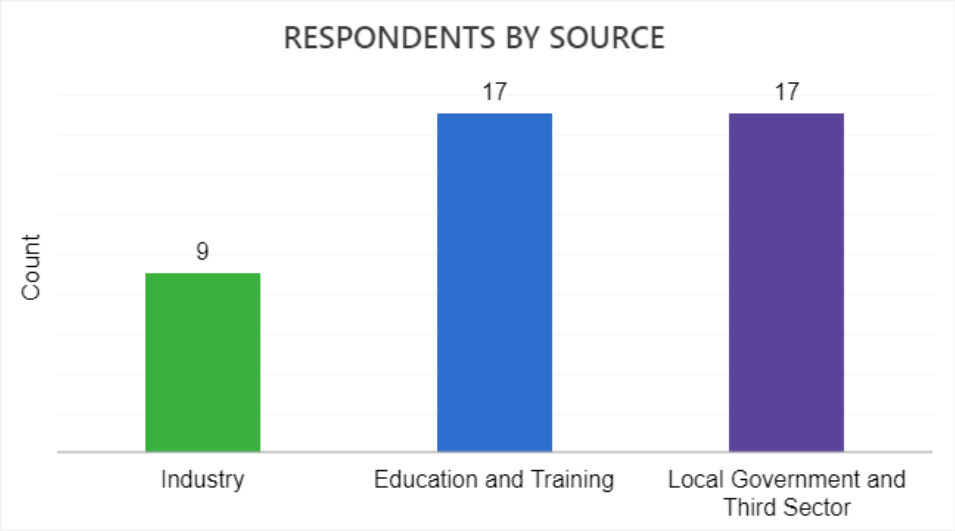


Figure 74- Survey respondent by source

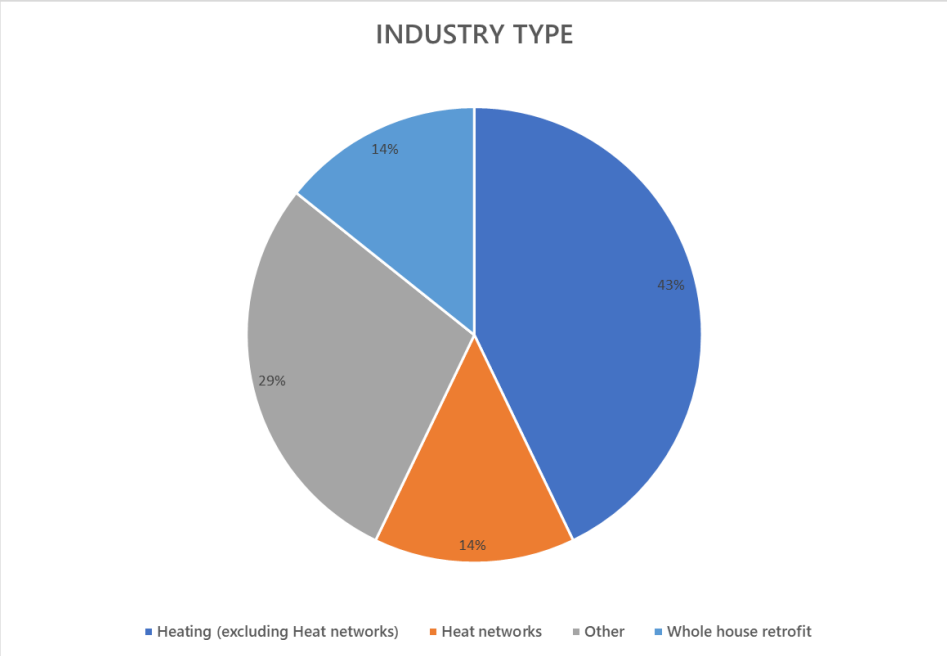


Figure 75 - Respondent by industry type

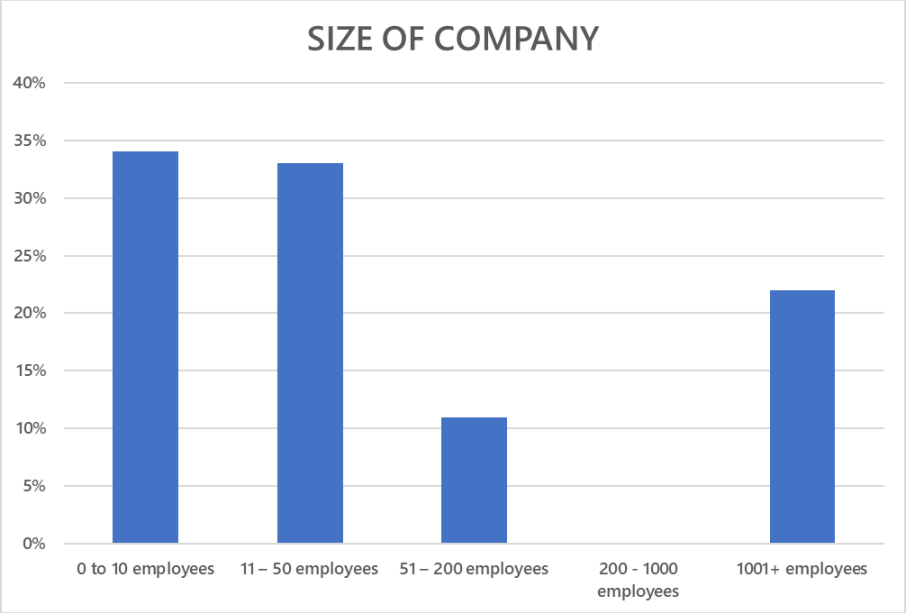


Figure 76 - Employees in organisation by industry representative

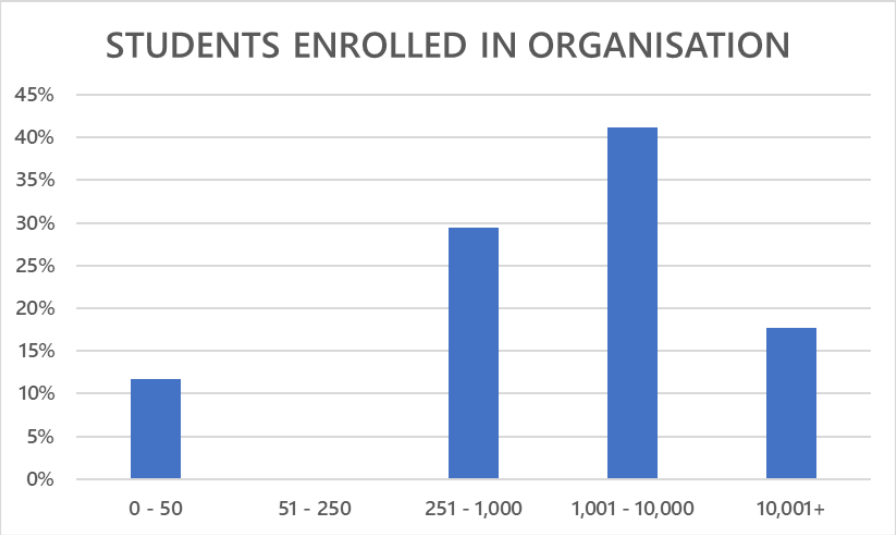
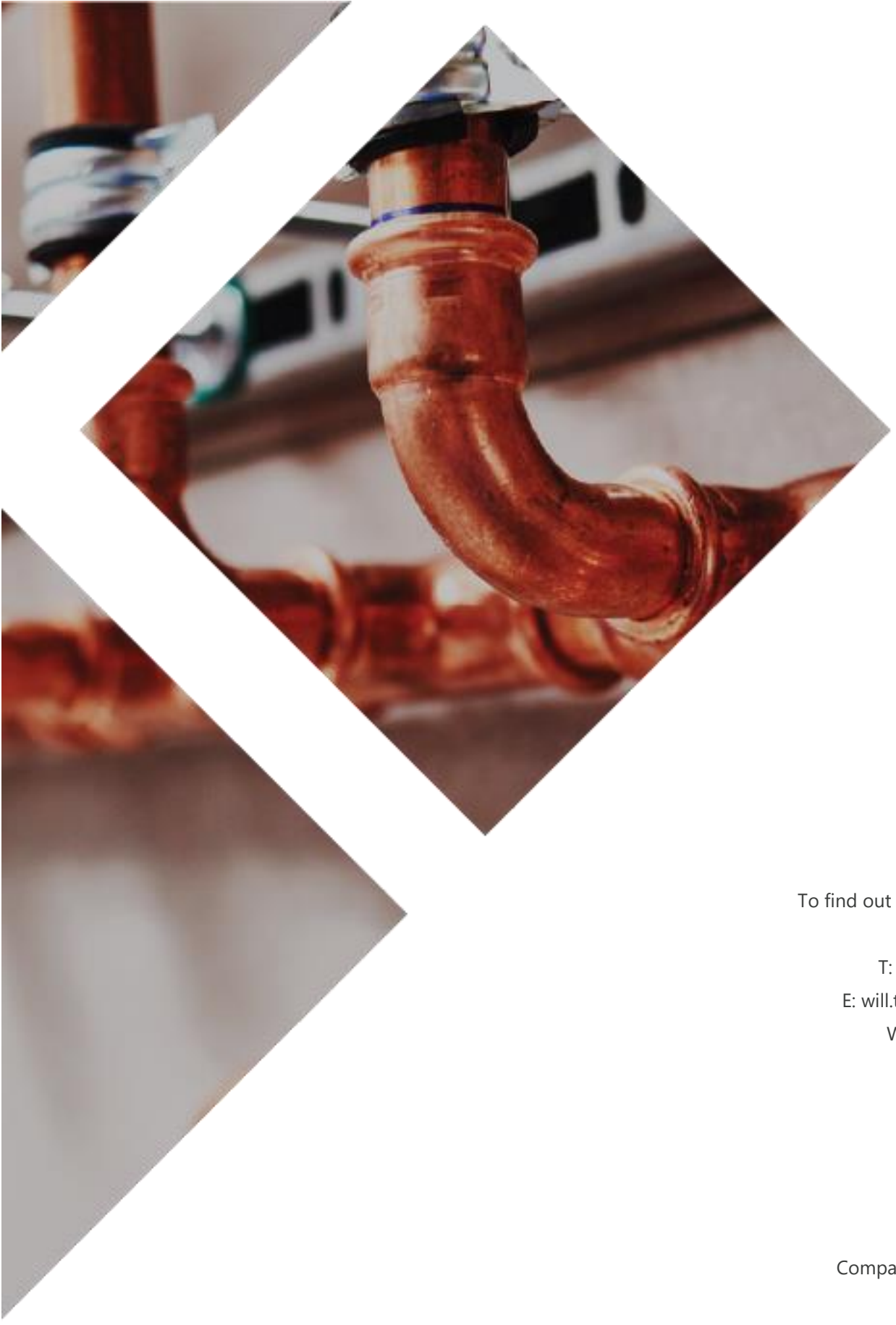


Figure 77 - Students by education and training provider respondent



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