



Construction  
Leadership  
Council

# ROADMAP OF SKILLS FOR NET ZERO:

## Competencies for Domestic Retrofit



# Foreword

## CLC Roadmap of Skills for Net Zero: Retrofit Competencies

Retrofitting UK homes to decarbonise them is a key part of achieving our target of Net Zero by 2050. However, the challenges to be overcome to make this a reality cannot be under-estimated. The scale of retrofit work required across 27 million domestic UK dwellings presents a significant opportunity in the workforce, with thousands of skilled workers needed to advise on, plan, install and monitor energy efficiency improvements and low carbon heating installations across the UK. However, not only do we need to attract more people to work in the sector, it is also critical that the workforce is competent and equipped to carry out their responsibilities safely and effectively.

The Construction Leadership Council Skills for a Modernised Industry working group have produced this report to address the essential competencies required for the retrofit workforce in the UK, outlining the cross-cutting knowledge, skills, and behaviours needed. This report is the culmination of research and collaboration among industry experts and academia. The competencies presented offer valuable insights for both current professionals and aspiring entrants.

The skills crisis in the construction industry is not new and remains a significant obstacle to meeting our decarbonisation obligations. Retrofit may be particularly affected in the skills war as it competes with new-build sectors. We need to maintain focus on inspiring new entrants into retrofit by creating purpose and highlighting the valuable role that retrofit plays in creating a healthy, thriving society. With the impact of climate change looming large, the need for competent retrofit workers has never been more pressing. To accelerate progress, a concerted focus on enhancing workforce competencies is imperative.

Embedding the change that is needed requires collective action across the sector. There are already many initiatives that are working to stimulate action and scale up the delivery of retrofit work, tackling the challenges from multiple perspectives. Alongside the good work that is happening, we encourage everyone to incorporate competence of the workforce into their plans.

Establishing a competent workforce is not just about those coming into industry as school leavers, it is also about upskilling those already working in the sector and supporting the transition of those transferring from other sectors or industries. Industry needs to work closely with education and training providers, ensuring that the curriculum and retrofit training matches industry needs, preparing the workforce for delivering their work well into the future.

This report serves as a roadmap for empowering the retrofit workforce with the necessary competencies to meet the challenges of tomorrow. By providing a clear definition of the core, cross-cutting competencies, it equips stakeholders with the knowledge to foster collaboration and to build the workforce of the future.

We thank all those who have contributed their expertise, insights, and support in the development of this report. Your contributions have been instrumental in shaping the content and recommendations presented herein.



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# Executive Summary

## OVERVIEW

The UK has more than 28 million homes, the majority of which will need to be retrofitted to meet the UK's legally binding target of Net Zero by 2050<sup>1</sup>. However, despite the clear need for retrofit and the benefits that can be achieved, the amount of retrofit work happening currently will not meet this target.

There are many challenges and barriers to delivering retrofit in the UK, spanning the supply chain, delivery and promoting demand for such works. Efforts to tackle these challenges are underway through various organisations and initiatives across the sector, for example the National Retrofit Hub.

One of the key challenges in delivering the scale and quality of work required is the workforce capacity and capability.

- **Capacity:** There needs to be enough people working across a range of trades and occupations to carry out the amount of retrofit work needed across the full project cycle (including advice, planning, design, specification, installation, commissioning, and post-installation review). At the local level, the workforce numbers should be able to meet the demands in each region.
- **Capability:** This workforce needs to have an appreciation of the challenges and procedures involved in the full retrofit process, as well as the competence to effectively execute the work to the standards required.

To establish this workforce as envisioned, the education and training system must support industry by equipping new entrants and upskilling the existing workforce with the knowledge, skills and behaviours<sup>2</sup> required. However, this requires a consistent understanding of what is needed in industry and the appropriate mechanisms for establishing these in the workforce, including qualifications, training, and certification. Creating a competent workforce creates an environment where clients are confident in procuring retrofit work with advice from trusted practitioners. A key driver in the development of competence in industry is the Building Safety Act. The Act introduces competence requirements across all of the built environment, including retrofit, providing the driving force for creating commonly agreed upon competence frameworks in industry.

Embedding this competency-driven regime requires an agreed, consistent definition of the competencies needed for the workforce to deliver the quality and quantity of retrofit needed to meet Net Zero by 2050. To address this challenge, this report presents a consistent framework of the core overarching knowledge, skills and behaviours<sup>2</sup> required to deliver effective retrofit at scale, both in retrofit-specific roles and associated roles in industry, for retrofit of residential buildings in the UK. The competence statements presented in this report can be used to support the development of competence frameworks for specific functions and disciplines involved in retrofit work. This supports the development of training and education that equips the workforce for the future, and supporting industry in formulating the requirements for those working in the retrofit sector.

The structure of the report follows the roadmap of 'where we are now', 'what we have done' and 'where we need to go'.

1 CCC (Climate Change Committee) (2022) *Independent Assessment: The UK's Heat and Buildings Strategy*.

2 The definition of individual competence as per the Building Safety Act is "skills, knowledge, experience and behaviours". Since experience is difficult to define generically, it is not included in the competence statements developed in this report.





To establish this workforce as envisioned, the education and training system must support industry by equipping new entrants and upskilling the existing workforce with the knowledge, skills and behaviours required. However, this requires a consistent understanding of what is needed in industry and the appropriate mechanisms for establishing these in the workforce, including qualifications, training, and certification.



## Where we are now:

### RETROFIT SKILLS AND TRAINING LANDSCAPE

The construction education system in the UK is driven by demand from industry, with vocational education and training undertaken when there is tangible benefit that can be achieved, for example in the employment market.

From a retrofit perspective, this 'market-demand' reliance creates a vicious cycle where uncertainty over long-term pipelines of work and lack of clear government incentives and policy mean that there is little demand for retrofit work from clients. This, combined with vague competence requirements, leads to little incentive for industry to upskill and train in retrofit. There is also a desperate need to inspire new entrants into the sector, promoting retrofit as an attractive career with lifelong opportunities. Homeowners (whether private or public) need to be incentivised to retrofit their homes to suitable standards and to procure competent practitioners to execute the work. This then provides the demand from industry that colleges and training providers need to establish suitable training courses and invest in teachers and facilities.

A further challenge for education and training is the lack of a mature and consistent framework for retrofit that encompasses qualifications, certifications, training courses and providers. A consistent framework is needed to coordinate skills and training for retrofit, providing a clear vision for qualification and certification that matches the competencies needed in industry.

The skills and training landscape needs to be tackled from multiple fronts – recruiting new entrants, upskilling the existing workforce, and ensuring that qualifications are fit-for-purpose. There are various initiatives across industry that are addressing these challenges from different angles, for example National Retrofit Hub and Construction Leadership Council People & Skills workstreams. A summary of the challenges is as follows:

- **New entrants:** Retrofit needs to be promoted as an attractive and rewarding career option, with increased awareness of retrofit and low carbon requirements embedded in all construction relation education and training, together with the development and promotion of retrofit-specific qualifications. This needs to inspire school leavers to work in this sector.
- **Existing workforce:** To stimulate uptake from industry, it is important to demonstrate what the benefit of undertaking training will be, and how this will improve profitability or the ability to execute work. Specifying minimum levels of competence required to undertake work provides an incentive for practitioners to obtain the necessary qualifications and certifications. Transfers from other industries or built environment roles should be encouraged by highlighting the transferability of their existing skills and detailing opportunities for re-skilling, for example heating engineers to heat pump installers.
- **Updating qualification and training:** new standards and qualifications need to be developed and existing ones updated to align with the competencies needed in industry to deliver effective retrofit.



## What we have done: DEFINING COMPETENCE IN RETROFIT

The aim of this report is to provide a consistent and clear definition of the cross-cutting, overarching competencies required for individuals working across the whole retrofit process.

The statements identify individual competence, not organisational competence or capability, but are generically stated at the functional level, not specifying applicability to roles or occupations. As they are not linked to specific job titles, roles or contexts, they can be adapted to suit particular purposes as required. These statements can be used to support the update and development of competency frameworks and occupational standards for retrofit related roles as well as to evaluate and update content for training courses and qualifications. Note that the competency statements do not provide the detail of the specific technical competencies needed in individuals working in specific roles.

The overarching competence statements were written with reference to industry standards and guidance documents for domestic retrofit and build on previous research into skills for retrofit. The statements were classified according to three levels of ability: aware, proficient, and expert. These were categorised into two broad groups, with sub-categories for each group as per the table below:

- Core transferable competencies – these are the essential interpersonal skills that create an enabling environment for successful delivery of projects and effective working relationships. Effective retrofit work requires a high level of interpersonal skills as practitioners and tradespeople need to engage with clients, homeowners and the variety of other trades and people collaborating with them. Whilst these are applicable in all parts of the built environment, the statements aim to detail how these apply to retrofit work.
- Overarching technical competencies – these detail the key technical aspects across the whole retrofit process, from planning to evaluation and monitoring, which are crucial for effective retrofit delivery. These are cross-cutting competencies that are applicable across the board, regardless of specialism.

Core transferable competencies	Overarching technical competencies
Retrofit Advocacy	Regulatory Landscape
Communication	Client needs and advice
Collaboration	Cost
Commitment to excellence	Property assessment
Continuous improvement	Technology and design
Digital	Coordination and integration
	Evaluation and monitoring



## Where we need to go: FUTURE WORK – MATCHING TRAINING AND EDUCATION TO INDUSTRY NEEDS

Transforming education and training needs to happen alongside changes in industry that will create the demand needed. On the industry side, this includes embedding these competencies into the requirements for the existing workforce which provides the incentive for the workforce to undertake training. Reformation of the supply-side involves matching training and education to industry needs through evaluating and updating curricula and content in training and education and establishing appropriate mechanisms for validation and certification.

A summary of recommendations is presented for how the work can be taken forward to create the change that is needed to equip the workforce to effectively deliver retrofit for Net Zero. Action is needed from government, industry and training and education providers. These are not an exhaustive list and reference is made to the 'Stakeholder Interaction Map' presented in Appendix A that explores the actions and relationships needed to create an enabling environment for effective retrofit. The key actions are briefly summarised in the table below.

Stakeholder	Key actions needed
Government (policy makers)	<ul style="list-style-type: none"> <li>• Commit to long-term national retrofit strategy that provides long term certainty and pipeline of work, stimulating both demand for retrofit and supply of workforce.</li> <li>• Introduce incentives or schemes that encourage clients to undertake retrofit.</li> <li>• Create demand for training by introducing incentives and schemes that encourage the existing workforce to undertake training.</li> <li>• Review government funded schemes and targets to ensure holistic approach is taken, for example linking skills funding with retrofit programme funding.</li> </ul>
Industry	<ul style="list-style-type: none"> <li>• Develop sector-specific competence frameworks.</li> <li>• Introduce minimum competence required to practice in industry.</li> <li>• Work with organisations such as IfATE and CITB to ensure that occupational standards include knowledge, skills and behaviours needed for holistic, integrated retrofit as detailed in this report.</li> <li>• Emphasise the urgency of retrofit requirements and skills in local planning, for example in employer-led Local Skills Improvement Plans.</li> </ul>
Education and training providers	<ul style="list-style-type: none"> <li>• Introduce core modules that cover the basics of retrofit and building physics along with carbon and climate literacy. This should be a minimum requirement across all construction related qualifications and training.</li> <li>• Evaluate course content and curricula of retrofit-specific courses to ensure that they are delivering on the knowledge and skills required in industry.</li> <li>• Be active in working with industry to align courses and qualifications with industry needs (e.g. through LSIPs or networks such as Supply Chain Sustainability School)</li> <li>• Coordinate with other colleges and training providers to develop appropriate training materials and the infrastructure needed to deliver the courses (such as recruiting teachers and investing in training facilities).</li> <li>• Work with accreditation bodies to validate qualifications and courses.</li> </ul>



This report has been produced under the Construction Leadership Council People & Skills workstream to support the delivery of the Industry Skills Plan. The challenge of creating a retrofit workforce that is fit for the future draws together all four of the workstreams from the CLC's Industry Skills Plan<sup>3</sup>: the need to create a work environment that is attractive and desirable, the importance of suitable routes of entry through qualifications or courses that are fit for purpose, embedding competence requirements through defining the knowledge, skills and behaviours required, and equipping the workforce to be able to deliver the work of the future.



<sup>3</sup> CLC (2021) [Industry Skills Plan for the UK Construction Sector 2021-2025](#).



# 1. Introduction – Skills and Net Zero

The UK has a legally binding target to achieve net zero carbon emissions by 2050. Meeting this target requires significant action across all sectors of the economy, including the construction industry, which is responsible for approximately a quarter of UK emissions<sup>4</sup>. Whilst the built environment contributes significantly to carbon emissions, it is also vital for ensuring a transition to renewable energy, resilience to extreme weather events, and providing essential infrastructure for society to thrive. The sector is therefore an essential contributor to achieving the target of net zero.

The built environment comprises a wide range of sectors and activities, including the construction, operation and maintenance of both domestic and non-domestic buildings as well as infrastructure. Decarbonisation of the built environment requires action across all these sectors from numerous stakeholders, including government bodies, industry professionals and trades, professional institutions and trade associations, training providers, assessment bodies, financial services, and as well as both public and private clients. In recent years, there has been a large amount of work both in industry and in academic research investigating how to address the challenge of decarbonising the built environment<sup>5</sup>.

Emissions from energy in the use of domestic buildings account for 48% of the UK built environment emissions (see Figure 1). These include emissions from regulated operational energy from heating and hot water, cooling, lighting, and ventilation in homes, as well as unregulated energy use such as cooking, appliances, and plug loads<sup>6</sup>. Effective retrofit which improves the energy efficiency of homes and transitions to low carbon heating and renewable power generation is therefore essential to reducing emissions and achieving the Net Zero target.

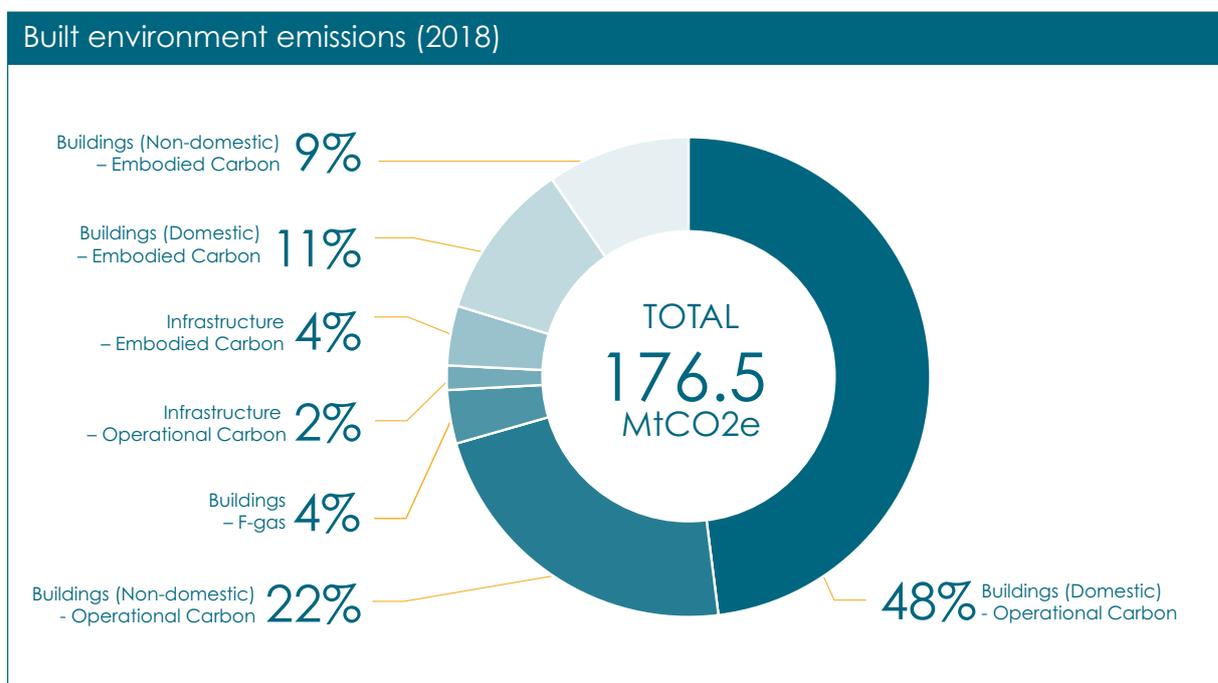


Figure 1: UK Built Environment emissions contributions per sector, for baseline year 2018 (using full emissions datasets, not projections), highlighting the significance of retrofitting domestic buildings to reduce emissions. Source: UKGBC (2021)

<sup>4</sup> UKGBC (2021) [Net Zero Whole Life Carbon Roadmap](#).

<sup>5</sup> An example is CLC's [CO2nstruct Zero](#) initiative, which brings industry together and motivates action in accordance with 9 priorities, each with metrics as identified in the Performance Framework

<sup>6</sup> UKGBC (2021) [Net Zero Whole Life Carbon Roadmap](#)



Enabling effective retrofit requires a robust understanding of the whole system of stakeholders and the challenges to be overcome from both demand side and supply side. Existing research highlights these challenges from a variety of perspectives, such as technical requirements, the policy and strategic landscape, and the size of the workforce and the roles required (see Figure 2). The National Retrofit Hub<sup>7</sup> (NRH) has been established to draw together all those involved in the retrofit sector to enable large scale delivery of retrofit in the UK, emphasizing the importance of addressing the whole retrofit system. This is actioned through dedicated working groups, each of which tackle specific challenges in retrofit, for example products & solutions, supply chain, workforce, finance, and creating demand.

Some of the key challenges in retrofit		
Technical	Strategic	Workforce
What needs to be done and how – technologies and details e.g. installation, operation, maintenance.	Policies and incentives that are stimulate the market from both the demand-side (e.g. procuring retrofit work) and supply side (e.g. encouraging new entrants and investing in upskilling). These need to be accessible and easily implemented.	Capacity and competence – need the right number of people in the right roles (appropriately qualified), with the necessary knowledge, skills and behaviours.
Examples of industry reports that provide further detail on these challenges		
UKGBC (2021) <i>'Net Zero Whole Life Carbon Roadmap for the Built Environment'</i>  LETI (2021) <i>'Climate Emergency Retrofit Guide'</i>	CLC (2021) <i>'National Retrofit Strategy'</i>  Energy Systems Catapult (2021) <i>'Foresighting Skills for Net Zero Homes'</i>	CITB (2021) <i>'Building Skills for Net Zero'</i>  PwC (2022) <i>'Green skills as an enabler of UK retrofit'</i>  Historic England (2023) <i>'Delivering Net Zero for England's Historic Buildings'</i>

Figure 2: Overview of key challenges in retrofit

One of the main challenges to be addressed in domestic retrofit is the establishment of supply chains that can deliver the level and scale of retrofit required<sup>8</sup>. This needs to address both capacity in the workforce, having sufficient number of people qualified to carry out the work required, as well as competence, ensuring that the workforce have the necessary knowledge, skills, behaviours, and experiences. The scale of work required to deliver net zero means that are significant opportunities in the retrofit workforce, with large numbers needed in most retrofit roles. For example, the Heat Pump Association (HPA), indicates a shortfall of approximately 29,000 qualified heat pump installers to undertake the number of installations needed to meet government targets<sup>9</sup>. This is a significant number and only represents one discipline in the retrofit sector.

Establishing a workforce that can deliver the retrofit work needed to support the UK's transition to Net Zero requires a robust and consistent understanding of the competencies necessary for effective retrofit. This needs to address the full breadth of the workforce including trades, professional services, and supply chain, as well those in supporting roles in industry, such as management and procurement. The skills and training landscape needs to support new entrants and upskilling of the existing workforce and equip them with the competence needed in industry. The focus of this report is therefore on the competencies required to deliver effective retrofit at scale, both in retrofit-specific roles, and associated roles in industry in the next decade. This provides the framework to create a competent workforce and to update the training and education landscape to meet these requirements.

<sup>7</sup> <https://nationalretrofitHub.org.uk/>

<sup>8</sup> CLC (2021) *Greening our homes: National Retrofit Strategy*.

<sup>9</sup> HPA (Heat Pump Association) (2023) *Unlocking widescale heat pump deployment in the UK*



Whilst the focus of this report is on domestic retrofit, work is required across all sectors of the economy to equip the workforce to meet the challenges of delivering net zero. The Green Jobs Delivery Group<sup>10</sup> brings together industry and government to “tackle emerging and future workforce demands across the economy”<sup>11</sup>, focusing on the delivery of net zero.

The ‘Net Zero and Nature Workforce Action Plan’ is due to be published by mid-2024 and is expected to provide sector-specific analyses of aspects such as workforce shortages and skills gaps and opportunities for upskilling to enter green economies.



<sup>10</sup> <https://www.gov.uk/government/groups/green-jobs-delivery-group>  
<sup>11</sup> Green Jobs Delivery Group (2023) Summer 2023 Statement



## READING THE REPORT

This report supports the skills and training landscape of domestic retrofit in the UK by providing an overarching framework of competence required to deliver effective retrofit. To assist in navigating the content, the report has been written in three parts. Each part can be read independently according to the level of detail required by the reader.

### Part A

Part A lays out the context of skills and training in domestic retrofit in the UK. This section describes the qualifications and current schemes for regulating competence in industry, setting the scene for developing competence statements for effective delivery of retrofit work.

### Part B

Part B describes the processes followed for developing the competence statements that define the knowledge, skills, and behaviours for retrofit. This is followed by a recommendation of future work needed to embed these changes both in industry and in education and training.

### Part C

Part C presents the statements of knowledge, skills, and behaviours needed in the UK to deliver effective retrofit. These are cross-cutting competencies applicable across trades and professions involved in retrofit work and identify individual competence requirements. They do not detail specific technical competencies needed.

### Appendices

Two Appendices have been created to provide further detail for those who wish to delve deeper into the context of domestic retrofit. These can be read independently and provide further information that supports the work of this report on skills:

- **Understanding domestic retrofit in the UK:**  
this covers what retrofit entails, the stakeholders and funding and policy landscape as well as the scale of the challenge facing domestic retrofit from two angles - the state of the UK housing stock and the size of the workforce needed.
- **A brief overview of Competency in the Construction Industry:**  
this provides an overview of the organisations and mechanisms that govern competence in the built environment, including occupational standards and the regulatory landscape, with particular focus on the Building Safety Act and the roll-out of competence frameworks.



# Part A: The landscape of skills and training in retrofit

## 2. AN OVERVIEW OF SKILLS AND TRAINING FOR RETROFIT

### 2.1 Understanding retrofit

The development of a suitable framework for competencies for retrofit requires a robust understanding of domestic retrofit in the UK. Retrofit work includes improving the energy efficiency of homes (for example upgrading insulation and glazing), transitioning to low carbon heating, and installing renewable power generation<sup>12</sup>. Retrofitting homes not only improves their energy efficiency, it also improves energy security and addresses fuel poverty, as well as bringing wider benefits to health and well-being of occupants.

The nature of retrofit work makes it incredibly challenging to create an effective, scalable approach. Retrofit encompasses many stakeholders, policies, funding mechanisms and technical solutions that could be pursued.<sup>13</sup> From a physical building perspective, the UK housing stock is highly varied, and the retrofit approach and technologies required are unique to each property. Furthermore, traditionally constructed and heritage buildings are likely to require specialist understanding of the performance of these buildings and implications on retrofit work.

Effective retrofit is essential for reducing carbon emissions and achieving the UK's target of net zero by 2050. However, poorly executed retrofit work can have unintended consequences, damaging client confidence and leading to an unwillingness to invest in retrofit work. Therefore, it is critical that retrofit work is executed properly and that there is a consistent framework upon which people working in the sector are educated and trained.

Whilst the focus of this report is on competence for retrofit, it is worthwhile noting that creating an enabling environment for retrofit requires looking beyond the supply-side challenge of skills and addressing the system of stakeholders, incentivising action across both demand and supply-side. Further detail about the landscape around domestic retrofit in the UK, including stakeholders, funding, policy and capacity in the workforce is included in Appendix A.

<sup>12</sup> BSI (2023) [PAS 2035:2023 Retrofitting dwellings for improved energy efficiency. Specification and guidance.](#)

<sup>13</sup> Further detail is included in the Appendix A and particular reference is made to the 'Stakeholder Interaction Map'.

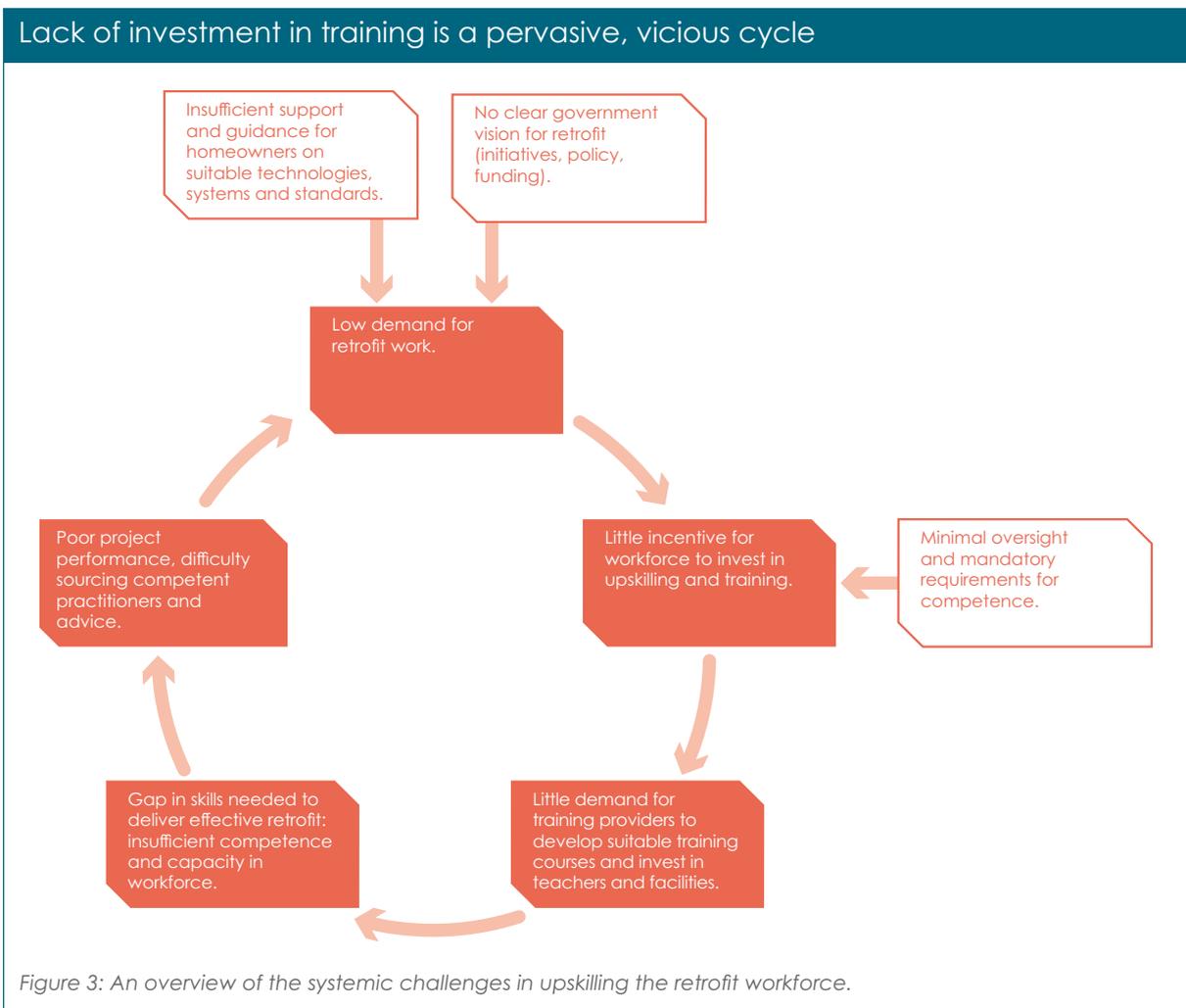


## 2.2 Current status of skills and training

From a workforce perspective, the challenge is two-fold: capacity – having enough people trained in the required roles; and competence – having the necessary knowledge, skills, behaviours, and experience to deliver work to the required standard for achieving Net Zero. Across all roles, there needs to be an appreciation of the importance of retrofit work, a holistic understanding of the retrofit process and how each intervention measure fits in the system, and awareness of the interdependencies and interactions between trades.

Developing the workforce needed to retrofit the UK's homes requires both training of new entrants and training and upskilling of the existing workforce. Research estimates that 80% of the workforce of 2030 is already working<sup>14</sup>. Therefore, since there are long lead times in maturing new entrants, it is expected that most of the demand for upscaling the delivery of retrofit will need to be met by the existing workforce, including those currently in the sector as well as transfers from other industries or specialisms. However, despite the clear need for practitioners to execute the scale of work required<sup>15</sup>, there is little incentive for industry to invest in training and upskilling and low demand for retrofit training<sup>16</sup>.

The lack of investment in training is a pervasive, vicious cycle: without clear commitment from government to a long-term pipeline of retrofit work and a stable policy landscape with initiatives and funding schemes to create confidence in the market, there is little demand for retrofit work from clients and incentive for industry to upskill and train in retrofit. Homeowners (whether private or public) need to be incentivised to retrofit their homes to suitable standards and to procure competent practitioners to execute the work. This then provides the demand from industry that colleges and training providers need to establish suitable training courses and invest in teachers and facilities. This process is illustrated in Figure 3.



14 Industrial Strategy Council (2019) UK Skills Mismatch in 2030.

15 CITB (2021) Building Skills for Net Zero

16 ESC (2022) Domestic Retrofit Market Intelligence and Skills Assessment – Greater South East Net Zero Hub



## 2.3 Stimulating skills and training at the local level

A variety of initiatives and policies have been created to stimulate the retrofit market, both from a market perspective and in relation to skills, for example the 'Heat Training Grant'<sup>17</sup>, although this targets a narrow subset of the retrofit skills needed (see Appendix A for more detail on the funding and policy landscape).

National government commitments and policies need to be translated into the requirements at the local and regional level to ensure that training and development are matched to local area needs. There are several examples that demonstrate how this can be executed in practice, illustrating the valuable role that local authorities and devolved governments play in delivering the national vision<sup>18</sup>.

An example of a mechanism that can be used to drive the evaluation of local needs is Local Skills Improvement Plans (LSIPs). LSIPs are part of the UK government's recommendations for reforming the education and training system to deliver skills the economy needs<sup>19</sup>. The LSIP is employer-led and engages colleges, other providers, and local employers to evaluate supply and demand in local skills system, identifying local priorities and making skills training more responsive to local market needs.

Although some LSIPs note the urgency of retrofit and associated skills, this is not consistent across LSIPs in England, and the lack of sufficient emphasis on retrofit means that employers are not creating the necessary signals to education and training providers to scale-up on retrofit training<sup>20</sup>. Historic England are encouraging the organisations responsible for LSIPs to address training and development of the workforce to meet local retrofitting needs for traditionally constructed buildings<sup>21</sup>.

LSIPs can also be an effective mechanism for education and training providers to collaborate with industry to ensure that the training provided matches industry requirements. Education and training providers should be encouraged to engage with industry in other ways too, creating opportunities for industry to inform curriculum development and content. An example is through the Supply Chain Sustainability School<sup>22</sup>, which has recently opened membership as a Partner to colleges and education providers, enabling closer collaboration between industry and education.



17 <https://www.gov.uk/government/publications/heat-training-grant-for-heat-pumps>

18 Some examples include: [NetZero Training](#) (a partnership between Portsmouth City Council and the City of Portsmouth College); [Net Zero Academy](#) (a collaboration in Wales between "between NPTC Group of Colleges, Industry Specialists, and Respected Trade Associations"); [Retrofit West](#) ("West of England Mayoral Combined Authority project that aims to build the supply chain, supporting local businesses and delivering green skills development for residents")

19 Department for Education (2021) *Skills for Jobs: Lifelong Learning for Opportunity and Growth*.

20 Ravenscroft, C. (2024) 'Ready for Retrofit? An analysis of Local Skills Improvement Plans in England'. Dissertation. (MSc Sustainability and Adaptation). Centre for Alternative Technology/University of East London

21 Historic England (2023) [Delivering Net Zero for England's Historic Buildings: Local Data on the Demand for Retrofitting Skills and Economic Growth](#)

22 <https://www.supplychainschool.co.uk/partners/become-partner/>



### 3. QUALIFICATIONS

The UK construction education system is characterised by a narrow scope of learning, where training typically focuses on specific job roles and tasks without providing broader context of construction processes and practices, the use and performance of buildings, and how their trade intersects with these aspects<sup>23</sup>. This approach exacerbates the fragmentation in industry and is incompatible with delivering net zero, which requires a holistic understanding and integrated approach. This is particularly challenging in the retrofit sector where retrofit work encompasses multiple traditional trades and disciplines, as well as several newly developed roles specific to retrofit work as defined in PAS 2035<sup>24</sup>.

Some of the main challenges around qualification and training with respect to retrofit are summarised as follows:

- Retrofit is not the responsibility of a single trade or discipline, but rather cuts across multiple trades and construction roles (for example plumbers, insulation installers, electricians, heat pump installers). Furthermore, retrofit related training and qualifications tend to focus on low carbon technologies or specific installer routes (such as insulation, plumbing, heat pumps, solar)<sup>25</sup>. There is therefore a need for traditional trades to have a good understanding of retrofit processes and technologies and how they interface with each other to enable effective delivery.
- General construction courses and trade qualifications may not place sufficient emphasis on retrofit and Repair, Maintenance and Improvement (RMI). A particular challenge is that understanding traditionally constructed and heritage buildings is not currently represented in existing general construction standards and qualifications, nor in many retrofit-specific courses.
- PAS 2035 establishes roles and responsibilities required to undertake retrofit work. Working to these standards therefore requires qualified people in each of the roles specified: Retrofit Assessor, Retrofit Coordinator, Retrofit Designer, Retrofit Installer, and Retrofit Evaluators. However, domestic retrofit courses are quite new, and some new roles that are required do not have well-established qualifications<sup>26</sup>.
- National Occupational Standards and the IfATE occupational standards may not adequately specify the knowledge, skills and behaviour required for effective retrofit in industry, and therefore the associated curriculums and vocational qualifications might not equip learners with the necessary knowledge and skills that are needed in industry<sup>27</sup>.
- Informal masterclasses are available but are not mandatory and there is low demand from industry to undertake training, especially where there is no certification gained.

The National Retrofit Hub has developed a 'Qualifications & Training Map'<sup>28</sup> that provides an overview of qualifications and courses that are relevant to retrofit. This includes retrofit-specific training as well as apprenticeships and general construction courses that form the springboard for entry into retrofit roles. This gives an idea of what is available, but does not provide the detail of colleges or training providers that offer the qualifications or courses, nor an evaluation of the quality or content of the training.

23 Killip, G. (2020) 'A Reform Agenda for Construction Education and Practice,' *Buildings & Cities*, 1(1), pp 525-537.

DOI: <https://doi.org/10.5334/bc.43>

24 BSI (2023) *PAS 2035:2023 Retrofitting dwellings for improved energy efficiency. Specification and guidance.*

25 ESC (2022) *Domestic Retrofit Market Intelligence and Skills Assessment – Greater South East Net Zero Hub*

26 CITB (2021) *Net zero and construction perspectives and pathways*

27 ESC (2023) *Skills for an Integrated and Customer Focussed Retrofit Process*

28 <https://nationalretrofitthub.org.uk/knowledge-hub/qualifications-training-map/>



## 4. COMPETENCE SCHEMES FOR RETROFIT

Demand for training and qualifications can be stimulated through mandates that specify minimum requirements of competence and appropriate certification when undertaking retrofit work or installations<sup>29</sup>. In the retrofit market currently, assurance of competency is governed through several mechanisms:

- **Competent Person Schemes<sup>30</sup>:** These schemes allow installers to self-certify certain types of building work, certifying that the work complies with Building Regulations. The government specifies the Mandatory Technical Competencies (MTCs) that installers are required to meet to be able to self-certify their work. There are various schemes, and they cover specific types of work such as building fabric measures (e.g. insulation, glazing) and building services (e.g. ventilation and air conditioning, heating and hot water).
- **PAS 2030 Retrofit Installer Scheme:** This scheme certifies that companies are competent to install and certify Energy Efficiency Measures (EEM) and comply with the requirements of PAS 2030. This is usually a requirement for any installer who undertakes work through government funding or initiatives.
- **Microgeneration Certification Scheme (MCS)<sup>31</sup>:** This is a quality assurance scheme that certifies low-carbon energy technologies and installers. Independent third-party certification bodies are accredited by UKAS to assess products and installers against the MCS standards.
- **Trustmark<sup>32</sup>:** This is a government endorsed quality scheme addressing home improvement work. They work with Scheme Providers (trade associations and accreditation bodies that accredit companies or practitioners) and Registered Businesses to advance and improve these work standards and help promote these accredited tradespeople to homeowners.
- **Construction Skills Certification Scheme (CSCS):** Although not specific to retrofit, this Industry Card Scheme is a way to verify that “individuals working on construction sites have the appropriate training and qualifications for the job they do”<sup>33</sup>. The CLC details minimum requirements for cards, including aligning to minimum standards for qualifications and training and recommends that the sector specifies and promotes the use of card schemes with the CSCS logo<sup>34</sup>.

Whilst these schemes provide a basic level of assurance of competence, they may not provide a robust assessment of the required level of knowledge, skills, and behaviours for effective retrofit. Since most domestic retrofit projects are likely to fall under the category of self-certification by the installers, there is a risk that without strong oversight, retrofit projects may not deliver the energy efficiency improvements as anticipated<sup>35</sup>.

Furthermore, in the domestic retrofit market, particularly private homeowners, it can be difficult to enforce minimum standards for competence or suitable level of quality as people typically rely on local general builders for retrofit work<sup>36</sup>. For example, a review by BEAMA suggested that only about 30% of heat pumps are installed by an accredited installer (MCS or equivalent)<sup>37</sup>. Other research into heat pump installers suggested that almost 30% of installers who installed a heat pump over the previous 12 months had not received any formal training in heat pump installation<sup>38</sup>. This suggests that many installations are undertaken by practitioners that either have not had formal training and/or are not certified, which means that they may be at risk of poor quality or inadequate installation.

This overview highlights the fragmentation and challenges of the current mechanisms governing competence in the retrofit sector. A unified approach to competence, with appropriate systems in place to ensure that accreditation through schemes is a true representation of industry competence, is a key part of establishing a suitable workforce. More information about the new building safety regime, which drives competence in the construction workforce, is included in Appendix B.

29 Killip, G. (2020) 'A Reform Agenda for Construction Education and Practice,' *Buildings & Cities*, 1(1), pp 525-537. DOI: <https://doi.org/10.5334/bc.43>

30 <https://www.gov.uk/guidance/competent-person-scheme-current-schemes-and-how-schemes-are-authorised>

31 <https://mcscertified.com/installers-manufacturers/becoming-certified/>

32 <https://www.trustmark.org.uk/aboutus/who-is-trustmark>

33 <https://www.cscs.uk.com>

34 CLC (2024) *Industry Card Schemes*

35 CCC (2022) *Independent Assessment: The UK's Heat and Buildings Strategy*.

36 ESC (2022) *Domestic Retrofit Market Intelligence and Skills Assessment – Greater South East Net Zero Hub*

37 BEAMA (2021) *Electrification of Heat*.

38 BEIS (2021) *Social research with installers of heating systems in off gas grid areas of England and Wales*.



## 5. BUILDING UP THE WORKFORCE

A shortage of skilled workforce could become a major barrier in the implementation of the policies for achieving net zero. It is critical to build up the capacity in the supply chain to be able to meet the demand for retrofit work required. However, there is a long lead time from when new entrants begin training or qualification until they are competent practitioners; and there is lead time in evaluating and updating existing courses and qualifications to ensure that they provide the competencies that industry needs. In addition, the existing workforce needs to be incentivised to undertake training for retrofit. This demonstrates the urgency needed to address the skills and training landscape from multiple fronts – recruiting new entrants, upskilling the existing workforce, and ensuring that qualifications are fit-for-purpose. Table 1 provides an overview of the challenges and opportunities for the retrofit workforce.

Table 1: Overview of challenges and opportunities in the retrofit workforce

	NEW ENTRANTS	EXISTING WORKFORCE
<b>Challenges</b>	<ul style="list-style-type: none"> <li>• Insufficient uptake of retrofit related roles</li> <li>• Long lead times from entry to courses/ qualifications to competent practitioners</li> </ul>	<ul style="list-style-type: none"> <li>• Skills shortages (capacity) – insufficient numbers of people in the required roles</li> <li>• Skills gaps (competence) – education and training does not necessarily provide the competencies needed in industry for holistic, effective retrofit</li> <li>• Ageing workforce</li> <li>• Various barriers to undertaking training (e.g. cost, time, desire, no perceived benefit, few mandatory certification or accreditation requirements)</li> </ul>
<b>Opportunities</b>	<ul style="list-style-type: none"> <li>• Advocate the importance of retrofit</li> <li>• Promote retrofit roles as desirable careers</li> <li>• Highlight career progression opportunities</li> <li>• Include retrofit content in curriculum for all general construction trades and roles</li> <li>• Develop and promote retrofit-specific qualifications.</li> </ul>	<ul style="list-style-type: none"> <li>• Promote holistic understanding of the retrofit process</li> <li>• Incentives to invest in training and upskilling</li> <li>• Specifying minimum levels of competence (accreditation or certifications required) when procuring retrofit work</li> <li>• Demonstrate opportunities for building on existing qualifications and skills to transition into retrofit related roles</li> </ul>



## 5.1 Recruiting new entrants

To recruit new entrants, retrofit needs to be promoted as an attractive and rewarding career option to encourage individuals to apply for roles in the sector. However, career pathways for low carbon roles are often not clear and the significance and value of the work to be done not appreciated. Furthermore, there needs to be a clear understanding of the transferability of the skills and knowledge gained in retrofit roles that highlights the professional prospects for new entrants and those retraining or upskilling to work in retrofit.

The typical routes of entry into the construction sector (post-18) are as follows:

- National Vocational Qualifications (England, Wales, Northern Ireland); Scottish Vocational Qualification (Scotland) – work-based qualifications usually based on national occupational standards that demonstrate competence for the particular role.<sup>39</sup>
- Apprenticeships – Employed full-time together with a combination of on-the-job (80%) and off-the job (20%) training, and an independent end-point assessment<sup>40</sup>.
- Higher National Certificates (HNCs)/Higher National Diplomas (HNDs): provided by higher and further education colleges.
- Degrees and Postgraduate Diplomas/Certificates

Across all these routes, there needs to be both an increased awareness of retrofit and low carbon requirements in all construction relation education and training, and the development and promotion of retrofit-specific qualifications.



<sup>39</sup> See Appendix B for more information on the relationship between National Occupational Standards and vocational training across the UK and the devolved nations

<sup>40</sup> <https://www.instituteforapprenticeships.org/about/glossary/>



## 5.2 Upskilling existing workforce

As discussed previously, 80% of the workforce of 2030 is already working currently. A key challenge for the existing workforce is understanding the drivers or incentives for undergoing training or upskilling. In the domestic retrofit market, there are many SMEs and self-employed practitioners who may not do additional training for several reasons:

- Sufficient work without having to have specific accreditations or qualifications, therefore low perceived benefit to be gained (not appreciating the opportunity to diversify work streams);
- Cost of training and certification is a barrier;
- Lost revenue from time off work when undertaking training (particularly challenging for practitioners that are self-employed);
- Short courses or training that do not lead to accredited qualification not deemed worthy;
- No obligation or mandatory requirements to have qualifications or certifications;
- Ageing workforce – little desire or incentive to retrain, with sufficient work foreseen using their current skills for their remaining careers<sup>41</sup>.

These barriers need to be addressed with support from policy and funding. To stimulate uptake from industry, it is important to demonstrate what the benefit of undertaking training will be, and how this will improve profitability or the ability to execute work. However, it is not just specialist skill roles that should be doing training, it is necessary to enhance the knowledge of low carbon construction and retrofit across the workforce more broadly. Procurement of work is also important: specifying minimum levels of competence that are expected provides an incentive for practitioners to obtain the necessary qualifications and register with competence schemes.

To meet the numbers of specialist skilled practitioners required, the workforce needs to be supported in understanding the applicability and transferability of their existing qualifications into retrofit related roles. It is important to demonstrate opportunities for the existing workforce to build on their current capabilities as they may already have many of the technical and transferable skills required. The following two examples illustrate how this can be achieved:

- 1 The 'Scottish Installers Skills Matrix' is an example of how to create a framework and share information about routes into low-carbon and retrofit roles.<sup>42</sup> The matrix was developed for installers working in energy efficiency and low carbon technology in Scotland. For each technology or energy efficiency measure, the matrix outlines the recommended minimum qualifications required for the applicable trades, demonstrating alternative career paths or additional training required to conduct the work.
- 2 The Heat Pump Association provides pathways for heating engineers to undertake additional training to become heat pump installers<sup>43</sup>. The pathways specify upskilling and recertification that builds on the foundation skills that they already possess.

## 5.3 Updating qualification and training

To deliver effective retrofit, new standards and qualifications need to be developed and existing ones updated to align with the competencies needed in industry<sup>44</sup>. This requires a robust understanding of what knowledge, skills, behaviours, and experience are needed in the workforce to be able to work effectively in industry. Research conducted by the Energy Systems Catapult (ESC) suggests that 70% of the knowledge and skills needed to deliver effective retrofit are not currently addressed in the relevant occupational standards<sup>45</sup>. This gap demonstrates the importance of updating existing training courses and qualifications to equip both new entrants and the existing workforce with these competencies that are needed in industry currently and in the foreseeable future. This report seeks to provide the basis for this work by creating a robust understanding of the knowledge, skill, and behaviour statements for individuals across the whole retrofit process. Further detail about the recommended actions required to embed these competencies into training and education are included in Chapter 9.

41 BEIS (2021) [Social research with installers of heating systems in off gas grid areas of England and Wales](#).

42 ESP [The Scottish Installers Skills Matrix](#)

43 HPA (2023) [Unlocking widescale heat pump deployment in the UK](#)

44 CITB (2021) [Net zero and construction perspectives and pathways](#)

45 ESC (2023) [Skills for an Integrated and Customer Focussed Retrofit Process](#)



# PART B: Developing the competence statements for retrofit

## 6. CREATING A RESOURCE FOR COMPETENCE IN RETROFIT

Retrofitting residential properties is a critical element of delivering on the UK's commitment to achieve Net Zero by 2050. This requires a workforce that has a holistic understanding of the challenges and the processes involved in retrofit, as well as the competence to effectively execute the work to the standards required. To establish this workforce as envisioned, the education and training system must support industry by equipping new entrants and upskilling the existing workforce with the knowledge and skills required. To support this, this work seeks to provide a consistent and clear definition of the overarching competencies required for retrofit.

The aim of this report is to present a consistent framework of the core transferable knowledge, skills, and behaviours<sup>46</sup> required in individuals across the full spectrum of the retrofit process, from product manufacturers and the supply chain to designers and installers. The knowledge, skills, and behaviour (KSB) statements identify aspects that are specific to retrofit work in the context of enabling and delivering the work that is required to meet the target of Net Zero. This builds on previous research that identifies knowledge and skills required for effective whole-house, integrated retrofit that meets the needs of clients<sup>47</sup>.

An example of how the competence statements reflect the specific requirements of retrofit is in communication and understanding clients' needs. Effective retrofit work requires a high level of interpersonal skills as practitioners and tradespeople need to engage directly with clients, homeowners and the variety of other trades and people collaborating with them<sup>48</sup>. The competence statements reflect the importance of these in the 'Core transferable competencies' and illustrate the ways that these should be evident for those working in retrofit.

As the focus is on retrofit-specific competence, the statements do not include general construction related knowledge, skills and behaviours, for example health & safety, carrying out construction work, general building materials and processes, fundamentals of sustainability and climate literacy, or other overarching requirements for competence in the built environment (for example ethics and promoting equality, diversity and inclusion). Furthermore, the statements do not include details of specific technical knowledge, skills or behaviours that may be required to be competent in a particular occupation as these will be more accurately defined through the occupational standards and sector-specific competence frameworks.

The statements identify individual competence, not organisational competence or capability, but are generically stated at the functional level, not specifying applicability to roles or occupations. As they are not linked to specific job titles, roles or contexts, they can be adapted to suit particular purposes as required. Examples of how the overarching competence statement could be used include:

- Support the update and development of competence frameworks and occupational standards for retrofit related roles.
- Evaluate and update content for training courses and qualifications.
- Create company-specific job profiles for internal use or recruitment, which creates a demand from industry for individuals to have defined levels of competence.

The competence statements proposed address the requirements of industry as envisaged in the next decade, delivering a workforce that can adapt to future scenarios to deliver retrofit work. However, as technology, regulation and requirements evolve, it is expected that the knowledge and skills required will need to be periodically reviewed and built upon as the landscape evolves.



## 7. FORESIGHTING RESEARCH INTO KNOWLEDGE AND SKILLS FOR RETROFIT

The launchpad for the development of the competence statements is the Energy Systems Catapult research into skills for net zero homes<sup>49</sup>. This research applied a foresighting approach to identify the skills required for future retrofit and highlight gaps in existing skills provision. Foresighting stems from the 'Skills Value Chain' proposed by High Value Manufacturing Catapult (HVMC) and Gatsby Foundation<sup>50</sup>, which defines the process for establishing future workforce capability and driving change in industry and the education system as illustrated in Figure 4. The foresighting process identifies future and emerging skills requirements in a particular industry or process and identifies changes to organisational capabilities and the resulting gaps in current skills and training<sup>51</sup>. It is important to note that a key principle of foresighting is that it does not define job roles, but instead looks at what organisational capabilities are required to successfully deliver the future scenario as envisaged.

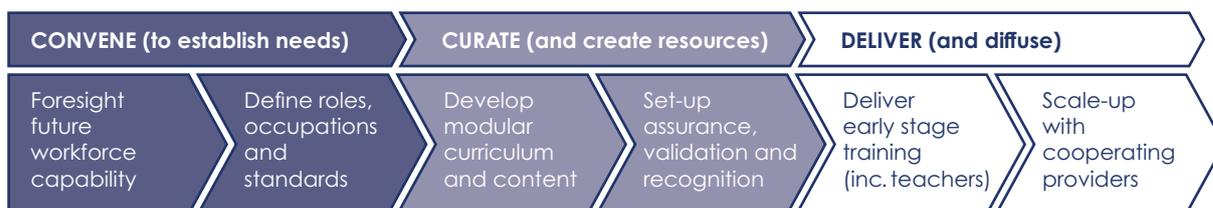


Figure 4: Skills Value Chain (HVMC and Gatsby Foundation, 2020)

The first stage of the foresighting research carried out by ESC summarises the main challenges and barriers facing the retrofit sector and the impact that this has on organisational capabilities required<sup>52</sup>. Given the fragmentation of the retrofit sector and wider issues such as lack of client demand and trust, the research addresses the skills gap in the existing supply chain together with the wider market.

The next step of the foresighting approach is the identification of the knowledge and skills that individuals need to effectively deliver retrofit. The report by ESC presents an overview of the knowledge and skills required to “create a Net-Zero mission-driven, customer focused workforce that employs a whole-systems approach” and “embraces the use of innovative digital tools”<sup>53</sup>. Through a process of industry engagement and expert workshops, 860 statements of knowledge and skills required for the future workforce were identified. These were then compared to the statements in the relevant IfATE occupational standards and it was found that only 30% of these are present in existing standards. Key gaps include property assessment, advice and customer care, low carbon heating installation, technology integration, and post-installation monitoring and evaluation.

This work by CLC aims to build on the existing research by consolidating the knowledge and skills statements into a clear and accessible framework that can be used to evaluate gaps in current competence, develop competence frameworks and create appropriate training materials and courses. This supports the process identified in the Skills Value Chain, as it provides the basis for developing content and updating curriculums<sup>54</sup>.

49 ESC (2021) [Foresighting Skills for Net Zero Homes](#)

50 HVMC (High Value Manufacturing Catapult) and Gatsby Foundation (2020) [Manufacturing the Future Workforce](#)

51 ESC (2021) [Foresighting Skills for Net Zero Homes](#)

52 *ibid*

53 ESC (2023) [Skills for an Integrated and Customer Focussed Retrofit Process](#)

54 HVMC (High Value Manufacturing Catapult) and Gatsby Foundation (2020) [Manufacturing the Future Workforce](#)



## 8. CREATING THE COMPETENCE STATEMENTS

The knowledge and skills statements from the Energy Systems Catapult research were reviewed together with industry standards and guidance for retrofit<sup>55</sup>. Where broad principles are noted, these were broken down into component parts with suitable competence statements created to address them. The core building safety criteria detailed in BSI Flex 8670<sup>56</sup> were also reviewed and, where appropriate, statements were created to contextualise the requirements for retrofit work in relation to the specified core criteria.

The statements were categorised into two broad groups:

- Core transferable competencies – these are generally referred to as 'soft' skills, interpersonal skills or similar. They are about the skills that create an enabling environment for successful delivery of projects and effective interpersonal relationships. Whilst these are applicable in all parts of the built environment, the statements aim to detail how these apply to retrofit work.
- Overarching technical competencies – as mentioned previously, the aim is not to detail specific technical knowledge and skills that may be required to be competent in a particular occupation. There are, however, key technical aspects that are crucial for effective retrofit and are applicable across the board, regardless of specialism. It is expected that all practitioners involved in retrofit should have at least a basic level of awareness across these cross-cutting technical categories.

For each group, sub-categories were created to capture key themes illustrated by the statements. Table 2 summarises each sub-category. In each sub-category, the statements were classified according to three levels of ability:

- Aware – a basic understanding of the key concepts
- Proficient – able to independently plan and deliver these aspects
- Expert – lead others, support industry transformation

Note that the levels of ability in each category may not necessarily correspond to seniority or position within an organisation. A person who is middle management or senior executive may not need to have 'proficient' or 'expert' level competence in many of the technical categories and should be sufficient with basic awareness. Conversely, an operative could perform at 'expert' level for various technical competencies whilst having an awareness of many of the core transferable competencies.

The full list of competence statements included in each of these categories is included in Part C. Retrofit documents, reports and standards use a variety of terms to refer to aspects of retrofit work. To aid with understanding the statements, some terminology is clarified:

- The definition of 'client' from PAS 2035 is used, i.e. "property owner, householder, landlord and/or tenant of a dwelling that is subject to retrofit"<sup>57</sup>. This term includes variations used in other reports such as customer, homeowner, tenant, and occupant.
- Various terms are used to refer to a residential building, these include dwelling, home, house, property. The statements typically use the term 'property'.
- The work undertaken during a retrofit project comprises 'Energy efficiency measures' (EEM, from PAS 2035), also referred to as 'Interventions'. This can include a specific product, technology or system. Both of these terms are used in the statements.

To reiterate, the competencies presented in these statements describe the cross-cutting, overarching competencies required across the retrofit workforce. They are applicable for individuals across all trades and occupations and are generically stated at the functional level, without identifying applicability to particular functions or disciplines. They do not provide the detail of the technical competencies needed in individuals working in specific roles.



Table 2: Overview of categories for competence statements for retrofit

Core transferable competencies	Overarching technical competencies
<b>Retrofit Advocacy</b>	<b>Regulatory Landscape</b>
The most important aspect for anyone involved in retrofit work is to understand why retrofit matters and how effective retrofit delivers a range of benefits to society and the environment. This includes being able to advocate for retrofit work in various contexts.	An essential aspect for effective retrofit is an understanding of the holistic landscape of retrofit and the factors that enable successful delivery. This includes policy, regulation, standards, and the supply chain.
<b>Communication</b>	<b>Client needs and advice</b>
Communication is an essential core skill for everyone in the retrofit industry. Clients should be able to communicate their expectations and requirements. Practitioners should be able to communicate about their competencies and expected project deliverables, as well as engage with clients and project teams throughout a project about challenges or changes that arise. Effective communication also includes accurate and consistent documentation of project processes and decisions.	Retrofit work demands the ability to understand clients' requirements, to provide advice or recommendations, to explain expected project benefits and impacts, and describe the operation of new technologies or systems and changes to the way the property is managed. This helps to ensure that the expected outcomes of the retrofit project are achieved. This is closely linked to 'communication'.
<b>Collaboration</b>	<b>Cost</b>
Collaboration is essential for delivering the coordinated and integrated retrofit process envisioned. Collaboration and teamwork are required throughout the project process to understand challenges and risks, coordinate installation processes and resolve issues. Drawing on collective expertise also facilitates industry transformation, for example by using collective power to lobby for changes in policy, procedures and standards.	An important part of retrofit work is understanding the economic drivers and incentives, as well as funding and grants that are available. This includes comparing the upfront costs and the lifecycle repair and maintenance costs with the expected savings from utility bills once the work is completed.
<b>Commitment to excellence</b>	<b>Property assessment</b>
A commitment to ensuring and maintaining competence and delivering work to high standards is crucial for net zero retrofit. This includes staying current with the requirements (standards, regulation, policy) and technology as it evolves, as well as undertaking appropriate training to maintain continuous professional development.	Each home is unique, therefore rigorous and robust assessment of properties is necessary to plan and conduct retrofit work that meets the client's needs. This requires an understanding of building physics and the aspects of a property that impact the suitability of alternative approaches or interventions. This includes property type, heritage or traditional features, and existing structure and condition. In addition, it is important to understand appropriate metrics, techniques for evaluation and software tools used.
<b>Continuous improvement</b>	<b>Technology and design</b>
Enabling effective retrofit requires dedication to continuous improvement and sharing best practice across industry. This involves reviewing best practice guidelines and industry case studies as well as learning from previous experiences and incorporating the lessons learnt into future projects.	Retrofit covers a variety of tasks and technologies and it is important to understand the different interventions/energy efficiency measures, technologies, and different approaches and delivery models available in retrofit. Other aspects that need to be considered include embodied carbon and operation and maintenance requirements for alternative options.
<b>Digital</b>	<b>Coordination and integration</b>
Digital tools and technologies should be used to facilitate planning and delivery of retrofit projects, and communication with stakeholders. Individuals should be able to apply established digital principles such as security, purpose, and value.	To overcome the fragmentation of retrofit, those involved in the process need to drive change through better coordination and integration. This requires an appreciation of how everything fits together in the retrofit process including interfaces between trades, as well as the whole house approach and planned phased retrofit work.
	<b>Evaluation and monitoring</b>
	Post-installation evaluation and monitoring is essential to validate the performance of installed systems to confirm that they are operating as expected and identify causes of unexpected or sub-optimal performance. This supports the delivery of high quality retrofit to the standards required to meet net zero.



These competencies equip the workforce in supporting clients in their retrofit journey, from the early stages of seeking advice and exploring options through to carrying out the work and post-installation evaluation and monitoring. This creates an environment where clients are confident in procuring retrofit work with advice from trusted practitioners, which is an important part of establishing an enabling environment for effective retrofit. For more information about the consumer's retrofit journey, see the image below taken from a report produced by ESC. From this image, it is clear that the competence statements align with the needs of the client throughout the retrofit project process.

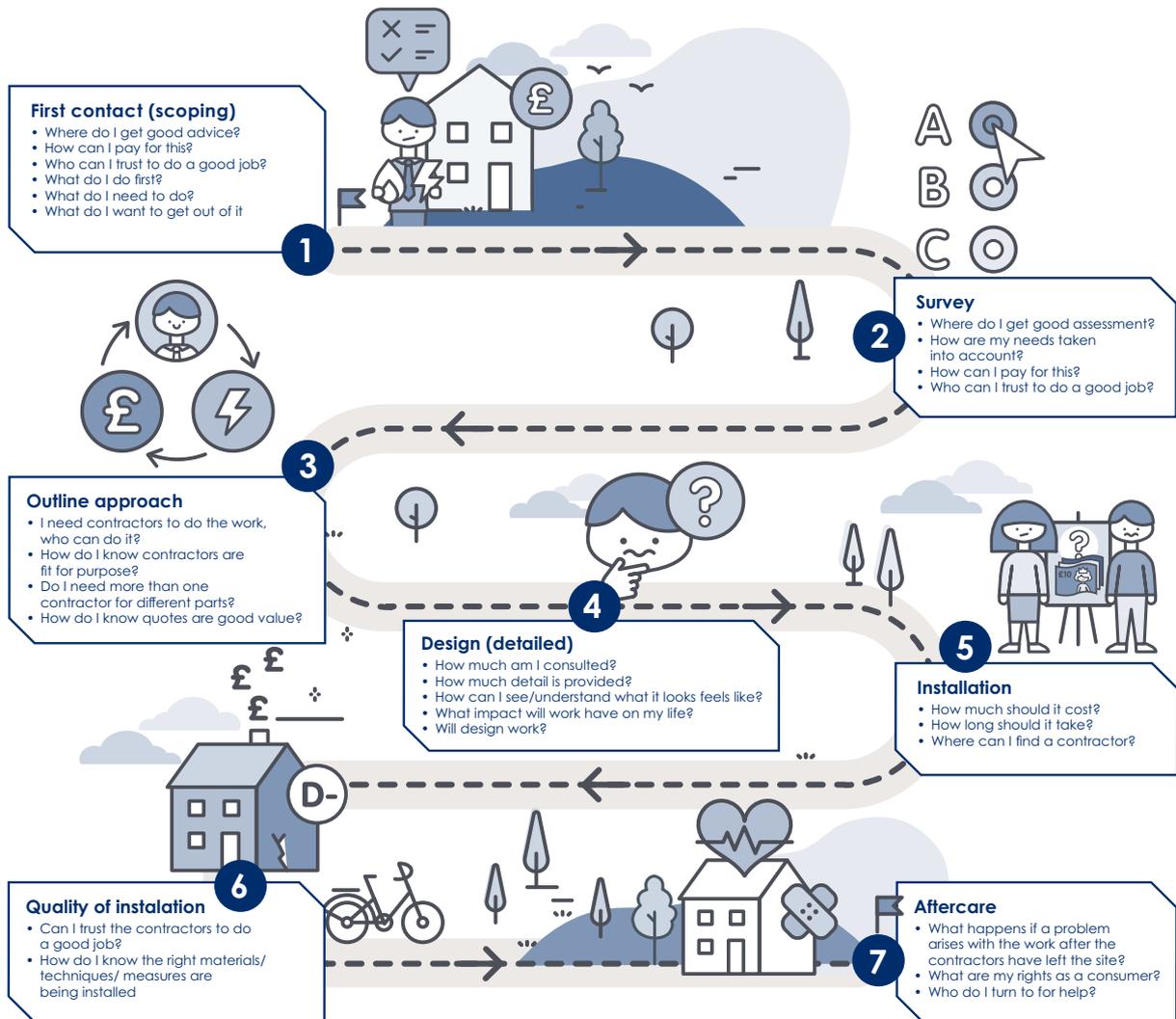


Figure 5: The retrofit customer journey (taken from ESC (2022) Domestic Retrofit Market Intelligence and Skills Assessment – Greater South East Net Zero Hub with permission.

The competence statements were validated through consultation with industry. An example of other research that demonstrates the relevance of the competence statements is the Supply Chain Sustainability School's 'Retrofit Assessment'<sup>58</sup>, which was created through separate industry consultation on key topics that are essential for working in retrofit. This assessment can be used to evaluate individual or organisational knowledge of retrofit against industry requirements, and there is significant overlap between the key themes identified, highlighting the value of this report.



## 9. FUTURE WORK: EMBEDDING CHANGE IN INDUSTRY AND MATCHING TRAINING AND EDUCATION TO INDUSTRY NEEDS

Defining standards of competence needed in industry is one step in the process of creating a workforce that is fit for the future. To deliver this impact, both supply and demand for competence need to be addressed. "Meaningful educational and training reform requires industry reform at the same time to create the appropriate demand pull"<sup>59</sup>. On the demand side, this includes embedding these competencies into the requirements for the existing workforce which provides the incentive needed for the workforce to undertake training. Reformation of the supply-side involves matching training and education to industry needs through evaluating and updating curricula and content in training and education and establishing appropriate validation and certification.



59 Killip, G. (2020) 'A Reform Agenda for Construction Education and Practice,' *Buildings & Cities*, 1(1), pp 525-537. DOI: <https://doi.org/10.5334/bc.43>



## 9. FUTURE WORK: EMBEDDING CHANGE IN INDUSTRY AND MATCHING TRAINING AND EDUCATION TO INDUSTRY NEEDS *continued*

Killip notes that the three elements of training, accreditation and compliance form a cycle of “quality assurance and continuous improvement”<sup>60</sup>, as illustrated in Figure 5. This highlights the importance of addressing both between industry (demand-side pull) and education and training (supply-side push), as well as creating appropriate mechanisms for evaluating compliance on both sides – for example Awarding Bodies that evaluate training provision and Building Control who assess practical delivery of works and enforcing regulations.

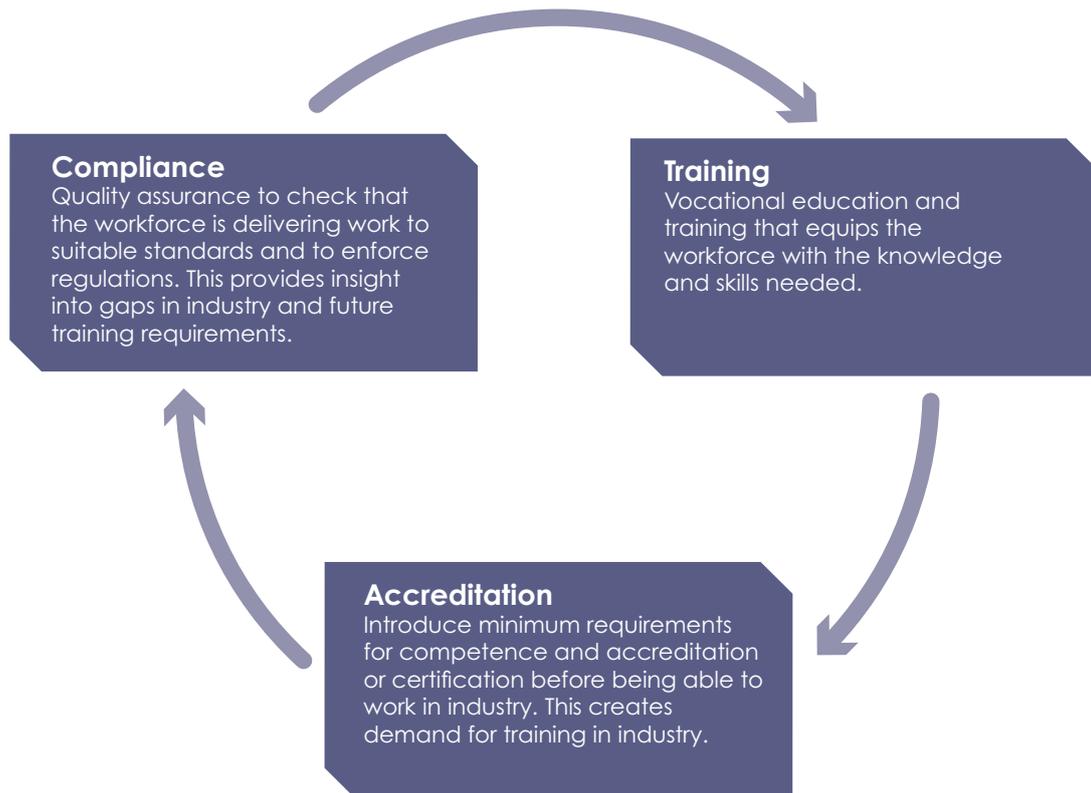


Figure 6: Interdependence between industry (demand-side pull) and education and training (supply-side push). Derived from text in Killip (2020).

To create the change that is needed in creating a workforce that can effectively deliver retrofit for Net Zero, the work presented in this report should be taken forward through several avenues:

1. Create Competence frameworks.
2. Evaluate occupational standards.
3. Assess the training and education landscape.
4. Establish mechanisms to ensure compliance.

This all needs to be underpinned by robust policy from government that is filtered down to the local authorities and regional level government bodies with the necessary funding and support mechanisms to implement the changes needed.

<sup>60</sup> Killip, G. (2020) 'A Reform Agenda for Construction Education and Practice,' *Buildings & Cities*, 1(1), pp 525-537.  
DOI: <https://doi.org/10.5334/bc.43>



## 9.1 Creating competence frameworks

Following the procedures established by the Competence Steering Group and the relevant working groups, the competence statements presented in this report can be used to support the development of competence frameworks for specific functions and disciplines involved in retrofit work. Competence frameworks can be used to create consistent and accountable mechanisms for establishing and evaluating competence in industry. More information about the development of sector-specific competence frameworks in the construction sector is included in the Appendix B.

One of the documents recommended by the Competence Steering Group Working Group 2 (which focuses on installers) is a 'SKEB Statement' which lists the skills, knowledge, experience, and behaviours (SKEB) needed to be competent in the specific role addressed by the framework. The competencies listed in this report can be used alongside other reference materials to write the detailed documentation for the competence framework. Further resources include relevant National Occupational Standards or IfATE occupational standards, the Mandatory Technical Competencies (MTC) and IfATE guidance documents, such as the 'Sustainability common KSBs' and 'Construction and the built environment common KSBs'<sup>61</sup>.

## 9.2 Evaluate occupational standards

National Occupational Standards (NOS) are created for each occupation and define the knowledge, skills and behaviour required to be competent in the specified role in the workplace<sup>62</sup>. The NOS underpin vocational education and training, and qualifications and courses aim to meet the knowledge, skill and behaviour requirements detailed in the NOS.

Therefore, an important step in evaluating and updating the training and education system for retrofit is ensuring that the NOS for all retrofit-related roles as well as the occupational standards for retrofit-related apprenticeships developed by IfATE reflect the competencies needed in industry. These should be evaluated and updated through the established processes, for example trailblazer groups and employer-led consultations.

## 9.3 Assess the training and education landscape

A significant challenge to be addressed is reforming the training and education system and the assessment of qualifications, certifications, and training courses. This includes evaluating curricula and course content against the competence requirements, creating new materials, and recruiting teachers. Whilst the primary focus is on retrofit-specific courses, there is also a need to review general construction courses and update these to include core modules that cover the basics of retrofit and building physics along with carbon and climate literacy. These courses and qualifications should also include references to traditionally constructed and heritage buildings as retrofit of these buildings require special considerations. Accreditation and certification bodies are critical in this transformation and need to drive change through updating their requirements and recertifying qualifications as necessary.

As highlighted previously, the training landscape is challenging because of the reliance on market forces to drive the provision and updating of courses. Insufficient demand from industry leads to a lack of investment from training providers and colleges in retrofit related courses and qualifications. There is also lack of coordination between colleges and training providers that offer retrofit qualifications and courses, leading to inefficient resourcing at the regional level<sup>63</sup>.

It is recommended that the next phase of work should comprise an in-depth assessment of the education and training landscape in the UK for retrofit. This could include a review of available qualifications, how the course content matches to the competencies detailed in this report, and an analysis of training providers that deliver these courses (including location, capacity, training facilities and so forth). This would provide insight into how to stimulate action and promote a coordinated approach, especially at the regional level.

61 <https://www.instituteforapprenticeships.org/developing-new-apprenticeships/developing-occupational-standards/>

62 <https://www.ukstandards.org.uk/en/about-nos>

63 ESC (2022) Domestic Retrofit Market Intelligence and Skills Assessment – Greater South East Net Zero Hub



## 9.4 Establish mechanisms to ensure compliance

Ensuring compliance is an important part of creating change as this provides the insight into gaps that need to be addressed from both practical delivery in industry and in education and training.

From the industry perspective, building control is an established mechanism for verifying that construction work meets the requirements of the Building Regulations. Following the introduction of the Building Safety Act, the building control systems have been overhauled with changes including new legislation, competence frameworks for inspectors, and application processes<sup>64</sup>. However, certain types of work carried out by a practitioner registered under the Competent Person Scheme can be self-certified and do not need to be approved by Building Control<sup>65</sup>. It is therefore important that both Competent Person Schemes and Building Control are suitably equipped to evaluate competence of the workforce in delivering retrofit work, and in ensuring that retrofit work meets the required regulations and is conducted to suitable standards.

For compliance in education and training, Awarding Bodies are critical in evaluating courses and training providers and ensuring that the training meets the required learning outcomes. Through the process for reviewing qualifications and courses, it is essential that Awarding Bodies are involved, providing insights into current gaps in curriculum and training provision and mandating updates to qualifications.



64 BuildUK (2024) [Building Safety Regime](#)  
65 <https://www.gov.uk/building-regulations-competent-person-schemes>



## 10. CONCLUSION

Retrofitting the existing building stock is a crucial part of achieving the UK's legally binding target of Net Zero by 2050. Delivering the scale and quality of work required demands a workforce that has a holistic understanding of the challenges and the processes involved in retrofit, as well as the competence to effectively execute the work to the standards required.

This report lays out a consistent framework of the core overarching knowledge, skills, and behaviours required to deliver effective retrofit at scale, both in retrofit-specific roles and associated roles in industry, for retrofit of residential buildings in the UK. This supports the development of training and education that equips new entrants and upskills the existing workforce to meet the competencies required in industry.

Achieving this change requires reformation both in industry to create the demand, and in the education and training system to build the supply. This needs to be supported through government policy, incentives and schemes. Each stakeholder plays a vital role in creating the enabling environment for large-scale effective retrofit. A summary of key actions highlighted in the report are listed in the table below.

Table 3: Summary of key interventions to deliver competencies for effective retrofit

Stakeholder	Key actions needed
Government (policy makers)	<ul style="list-style-type: none"> <li>• Commit to long-term national retrofit strategy that provides long term certainty and pipeline of work, stimulating both demand for retrofit and supply of workforce.</li> <li>• Introduce incentives or schemes that encourage clients to undertake retrofit.</li> <li>• Create demand for training by introducing incentives and schemes that encourage the existing workforce to undertake training.</li> <li>• Review government funded schemes and targets to ensure holistic approach is taken, for example linking skills funding with retrofit programme funding.</li> </ul>
Industry	<ul style="list-style-type: none"> <li>• Develop sector-specific competence frameworks.</li> <li>• Introduce minimum competence required to practice in industry.</li> <li>• Work with organisations such as IfATE and CITB to ensure that occupational standards include knowledge, skills and behaviours needed for holistic, integrated retrofit as detailed in this report.</li> <li>• Emphasise the urgency of retrofit requirements and skills in local planning, for example in employer-led Local Skills Improvement Plans.</li> </ul>
Education and training providers	<ul style="list-style-type: none"> <li>• Introduce core modules that cover the basics of retrofit and building physics along with carbon and climate literacy. This should be a minimum requirement across all construction related qualifications and training.</li> <li>• Evaluate course content and curricula of retrofit-specific courses to ensure that they are delivering on the knowledge and skills required in industry.</li> <li>• Be active in working with industry to align courses and qualifications with industry needs (e.g. through LSIPs or networks such as Supply Chain Sustainability School)</li> <li>• Coordinate with other colleges and training providers to develop appropriate training materials and the infrastructure needed to deliver the courses (such as recruiting teachers and investing in training facilities).</li> <li>• Work with accreditation bodies to validate qualifications and courses.</li> </ul>



## 11. SIGNPOSTING TO RESOURCES

The statements in the proposed framework identify the aspects of knowledge, skills, and behaviours that should be achieved in various categories and at different levels of proficiency for effective retrofit. The detail about these competencies can be found in various industry guidance documents, reports and standards. Table 4 provides a few examples of available resources but is in no way exhaustive.

Report or Guide	Description
	<p><b>LETI – Climate Emergency Retrofit Guide</b><sup>66</sup></p> <p>This guide provides detailed information about best practice retrofit for residential buildings. Additional resources include the 'quick-start guide', typical house archetype examples that provide an example of the application of the principles and targets to four primary housing types (semi-detached, detached, mid-terrace and a flat), and a summary for policymakers.</p>
	<p><b>Green Finance Institute – Broker's Handbook on Green Home Retrofit and Technologies</b><sup>67</sup></p> <p>Whilst this guide has been developed for a target audience of mortgage intermediaries and home buyers; it provides a useful overview for others who are interested in learning about retrofit. The guide covers the benefits of retrofit, available solutions and technologies as an overview of the policy and regulatory landscape to help accelerate the decarbonisation of the UK's homes.</p>
	<p><b>Retrofit Academy – Builders Introduction to Retrofit</b><sup>68</sup></p> <p>Guidance document for builders that gives an overview of retrofit and what it entails. It describes what retrofit is and the benefits thereof, the importance of whole house retrofit and fabric first approach, the retrofit process and standards as well</p>

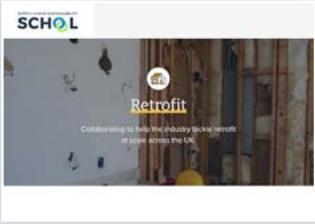
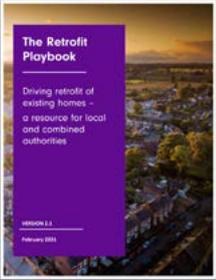
<sup>66</sup> LETI (2021) *Climate Emergency Retrofit Guide*

<sup>67</sup> Green Finance Institute (2023) *Broker's Handbook on Green Home Retrofit and Technologies*.

<sup>68</sup> Retrofit Academy (2023) *Builders Introduction to Retrofit*



11. Signposting to resources continued

Report or Guide	Description
	<p><b>Supply Chain Sustainability School – Retrofit</b><sup>69</sup></p> <p>The school provides access to free resources for retrofit training in the form of workshops, webinars and virtual conferences. There is also an e-Learning series comprising six beginner level modules of 45 minutes each on key areas of knowledge.</p> <p>The School has also created a ‘Retrofit Assessment’ that allows individuals to benchmark their knowledge of retrofit against industry requirements. This generates a customised learning plan with suggested resources to address any gaps in knowledge that are identified.</p>
	<p><b>UKGBC - The Retrofit Playbook</b><sup>70</sup></p> <p>“A resource to support local and combined authorities in developing retrofit policies and initiatives, through sharing best practice and guidance”.</p>
	<p><b>RICS – Residential Retrofit Standard</b></p> <p>“This professional standard sets out a series of concise mandatory and recommended requirements and is effective from 31 October 2024, establishing benchmarks that guide RICS members in delivering residential retrofit services tailored to their clients’ evolving needs.”</p>

69 <https://www.supplychainschool.co.uk/topics/retrofit/>

70 UKGBC (2021) [The Retrofit Playbook](#)



# PART C: Competence Statements for Domestic Retrofit

This section of the report presents the statements of knowledge, skills, and behaviours needed in the UK to deliver effective retrofit. These are cross-cutting competencies applicable across trades and professions involved in retrofit work and identify individual competence requirements. They do not detail specific technical competencies needed. In each sub-category, the statements of competence are grouped into three levels of ability, progressing from general awareness to expert level.

## Core Transferable Competencies for Retrofit

Retrofit Advocacy

Communication

Collaboration

Commitment To Excellence

Continuous Improvement

Digital

## Overarching Technical Competencies for Retrofit

Regulatory Landscape

Client Needs And Advice

Cost

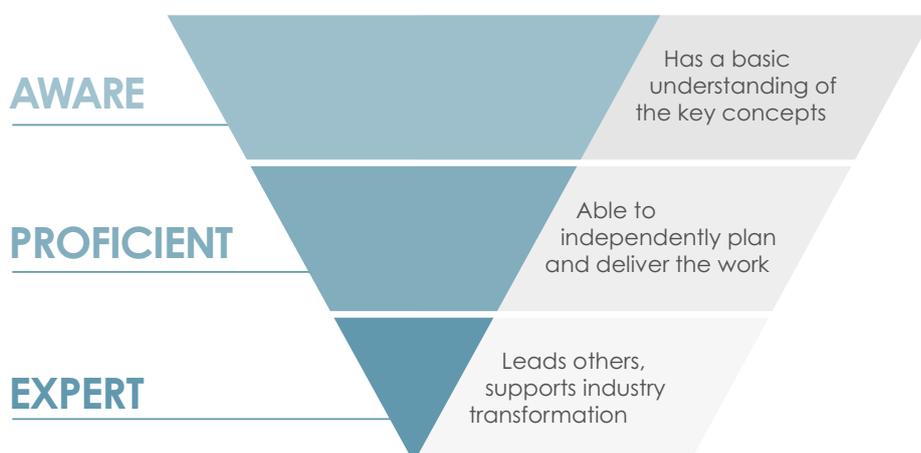
Property Assessment

Technology And Design

Coordination And Integration

Evaluation And Monitoring

The statements of competence are grouped into three levels of ability:



## Core transferable competencies: Retrofit Advocacy

AWARE	<ul style="list-style-type: none"> <li>• Understand the benefits of retrofit work and why urgent action is needed.</li> <li>• Understand how retrofit supports decarbonisation and meeting national and regional Net Zero targets.</li> </ul>	<ul style="list-style-type: none"> <li>• Understand the benefits of retrofit beyond reducing energy consumption (for example: improved comfort, health and well-being, property value, futureproofing).</li> <li>• Understand broader implications of retrofit for climate adaptation (for example: flood risk, overheating, air quality).</li> </ul>
PROFICIENT	<ul style="list-style-type: none"> <li>• Describe the challenges in delivering large scale effective retrofit (for example: fragmented process, high upfront cost, inconsistent government policy and incentive, insufficient capacity in supply chain)</li> </ul>	<ul style="list-style-type: none"> <li>• Evaluate the likely impacts of retrofit works across local and national contexts – including broader social and environmental aspects.</li> <li>• Advocate for execution of retrofit work to high standards.</li> </ul>
EXPERT	<ul style="list-style-type: none"> <li>• Justify retrofit work by demonstrating the business case and benefits that can be achieved.</li> <li>• Advocate for ambitious scope of works and performance targets that go beyond minimum requirements and supports achieving Net Zero targets.</li> <li>• Understand and explain how to address retrofit on projects with challenging features, for example heritage or protected buildings, or projects with demanding performance targets.</li> </ul>	<ul style="list-style-type: none"> <li>• Champion retrofit for more complex or difficult building types e.g. heritage, traditional or constrained properties.</li> <li>• Lobby professional bodies and trade associations to support retrofit work.</li> <li>• Lobby government regarding strategic commitments, policy and grants to incentivise retrofit.</li> </ul>



## Core transferable competencies: Communication

AWARE	<ul style="list-style-type: none"> <li>• Explain the benefits of retrofit work to other stakeholders, including team members, clients, and industry practitioners.</li> <li>• Translate industry terminology and technical information into terms that are understandable and accessible to non-technical stakeholders, including replacing technical text with suitable illustrations and diagrams.</li> </ul>	<ul style="list-style-type: none"> <li>• Engage with stakeholders who may be impacted by the work, adapting information and method of delivery according to stakeholders' needs and level of understanding.</li> <li>• Ensure record-keeping is consistent and clear, accurate and complete for all stages of the project.</li> <li>• Understand how accurate records of work carried out support future maintenance/ replacement requirements.</li> </ul>
PROFICIENT	<ul style="list-style-type: none"> <li>• Explain expectations of the project, including cost, timeframes and potential disruptions to the client.</li> <li>• Explain fire safety risks and mitigation measures to be used during the project.</li> <li>• Engage with stakeholders regularly during the project delivery, providing updates (progress, changes, impacts) at regular intervals.</li> <li>• Communicate the expectations and requirements of the work to the installation team, including details of new or unfamiliar systems or technologies and/or particular challenges for the specific project.</li> <li>• Keep records and information about the project, including materials, technologies and processes used, that is clear and accessible and in accordance with legal requirements.</li> <li>• Establish procedures for document control for record keeping.</li> <li>• Record materials and technologies used and make records accessible for future reference.</li> </ul>	<ul style="list-style-type: none"> <li>• Customise documentation prepared (including assessment reports and advice) according to the specific project and client's requirements, ensuring it is readily understandable.</li> <li>• Use alternative methods to communicate requirements or implications of work that suits individual needs and level of understanding of recipient for examples photographs, drawings, or sketches.</li> <li>• Use digital tools to facilitate communication with the client, for example to illustrate the expected improvement in energy use.</li> <li>• Provide feedback on aspects of the project that went to plan and challenges or issues that arose, highlighting any changes from the expectations as designed.</li> <li>• Create user-friendly information manuals with details of important and relevant features/requirements.</li> <li>• Upon completion of the project, collect and securely store all relevant records and documentation, following requirements of funding schemes where applicable.</li> </ul>
EXPERT	<ul style="list-style-type: none"> <li>• Ensure clear communication of expected challenges and risks on retrofit projects.</li> </ul>	<ul style="list-style-type: none"> <li>• Advocate for use of clear, accessible and simple information that is readily understandable by clients and wider project team.</li> </ul>



## Core transferable competencies: Collaboration

<b>AWARE</b>	<ul style="list-style-type: none"> <li>Understand networks and opportunities for involvement in industry bodies for specific trade or role.</li> </ul>	<ul style="list-style-type: none"> <li>Actively engage with other trades and disciplines involved on a project and with other stakeholders such as client and manufacturers.</li> </ul>
<b>PROFICIENT</b>	<ul style="list-style-type: none"> <li>Promote early involvement and coordinated approach between trades.</li> <li>Facilitate sharing of information for collaborative decision making on projects.</li> <li>Establish procedures and systems for engaging with supply chain, reviewing performance, and providing and receiving feedback.</li> </ul>	<ul style="list-style-type: none"> <li>Engage with supply chain to identify potential challenges and to proactively resolve issues that may arise.</li> </ul>
<b>EXPERT</b>	<ul style="list-style-type: none"> <li>Understand government frameworks that support collaborative engagement on retrofit projects.</li> <li>Address barriers to entry and encourage participation from across industry, especially in SMEs.</li> </ul>	<ul style="list-style-type: none"> <li>Facilitate processes for collaborative engagement across the supply chain on retrofit project bids.</li> </ul>

## Core transferable competencies: Commitment to excellence

<b>AWARE</b>	<ul style="list-style-type: none"> <li>Understand the relevant qualifications and certifications required for executing the different aspects of retrofit work.</li> <li>Understand own limits of competence and only undertake work within area of competence.</li> <li>Take responsibility for maintaining own competence and undertaking regular appropriate training to stay current with changes in technology, regulation, and standards.</li> </ul>	<ul style="list-style-type: none"> <li>Understand the requirements for Continuous Professional Development and revalidation of competence for specific trade or role.</li> <li>Understand importance of ensuring that work is undertaken by appropriately qualified and competent practitioners.</li> </ul>
<b>PROFICIENT</b>	<ul style="list-style-type: none"> <li>Understand the current competence schemes used in retrofit work for installers (for example MCS, PAS 2030).</li> <li>Know how to check an individual's competence according to the requirements of their sector-specific competence framework, for example through publicly available registers.</li> </ul>	<ul style="list-style-type: none"> <li>Obtain evidence of compliance with competence requirements for installers or subcontractors employed on a project.</li> </ul>
<b>EXPERT</b>	<ul style="list-style-type: none"> <li>Ensure appointment of competent practitioners with suitable qualifications on projects through appropriate procurement mechanisms and contracts.</li> </ul>	<ul style="list-style-type: none"> <li>Advocate for training to upskill and develop competence for retrofit.</li> <li>Engage with education and training providers to ensure training content and methodologies meet industry requirements.</li> </ul>



## Core transferable competencies: Continuous improvement

AWARE	<ul style="list-style-type: none"> <li>• Understand how lessons learnt from previous projects can be used for continuous improvement and knowledge transfer.</li> <li>• Review case studies from previous retrofit projects to learn about both successful and unsuccessful projects.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify common themes and lessons learnt from case study projects.</li> <li>• Understand interactions between retrofit measures/technologies and unintended consequences as experienced on past projects.</li> </ul>
PROFICIENT	<ul style="list-style-type: none"> <li>• Apply lessons learnt from retrofit case studies in planning and execution of projects.</li> <li>• Create documentation and processes to capture learning that occurs during project implementation.</li> <li>• Identify project-specific challenges or problems that arose over the full project process.</li> </ul>	<ul style="list-style-type: none"> <li>• Summarise learning from project implementation upon completion.</li> <li>• Suggest improvements for better project delivery or outcomes.</li> <li>• Reflect and review successes and failures to drive continuous improvement.</li> </ul>
EXPERT	<ul style="list-style-type: none"> <li>• Suggest improvements or changes required to industry guidance and standards to deliver retrofit more effectively in practice.</li> <li>• Create dissemination strategy for sharing lessons learnt within the project team and across wider industry</li> </ul>	<ul style="list-style-type: none"> <li>• Contribute to industry learning and best practice through case studies, networking, working groups and so forth.</li> </ul>



### Core transferable competencies: Digital

AWARE	<ul style="list-style-type: none"> <li>• Understand what data can be collected during the full lifecycle of retrofit projects including planning, design, installation and post occupancy performance evaluation.</li> <li>• Understand how appropriate collection and analysis of data provides insights that lead to better decision-making.</li> <li>• Understand the importance of appropriate collection, organisation, storing and sharing of digital information regarding products, processes and project details throughout the building lifecycle.</li> </ul>	<ul style="list-style-type: none"> <li>• Understand what the 'Golden Thread' is and its importance in managing building safety.</li> <li>• Be aware of the existing tools, methods or software systems for collecting and storing digital information.</li> <li>• Understand how digital tools (such as Computer Aided Design and Building Information Modelling) can be used on retrofit projects.</li> <li>• Be aware of potential cyber-security risks and use and store data in accordance with established protocols.</li> </ul>
PROFICIENT	<ul style="list-style-type: none"> <li>• Ensure compliance with data protection regulations and legislation.</li> <li>• Understand the benefits and challenges of using BIM and other digital tools, including using a common data environment across all disciplines, for retrofit projects.</li> <li>• Select appropriate digital tools to plan and execute retrofit project (BIM, digital Bill of Materials, etc).</li> <li>• Develop digital models that illustrate the project process and requirements.</li> </ul>	<ul style="list-style-type: none"> <li>• Collaborate with specialist installers or trades to integrate their aspects of the project into the model.</li> <li>• Extract relevant information from digital models or drawings for example planning outputs (schedule, bill of materials).</li> <li>• Update and manage digital information continually through the life of a project.</li> <li>• Ensure quality of data is fit-for-purpose.</li> </ul>
EXPERT	<ul style="list-style-type: none"> <li>• Advocate for implementation of software or technology that can be used to deliver better project outcomes.</li> <li>• Define how data that are collected supports evaluation of project metrics.</li> <li>• Establish procedures to analyse and evaluate data in accordance with project performance requirements.</li> <li>• Use insights drawn from analysing data to support decision-making on current and future projects.</li> </ul>	<ul style="list-style-type: none"> <li>• Integrate maintenance and end-of-life information into models to transfer knowledge upon project completion to owner, occupier or future installers.</li> <li>• Establish appropriate methods for sharing data with necessary stakeholders in a safe and secure way.</li> <li>• Implement appropriate strategies and processes to protect data, especially personal data.</li> </ul>



## Overarching technical competencies: Regulatory Landscape

AWARE	<ul style="list-style-type: none"> <li>• Understand the regulations and standards that govern retrofit work and what the mandatory requirements are.</li> <li>• Understand Energy Performance Certification, its use and the limitations thereof.</li> <li>• Understand how local context and requirements impact retrofit procurement and delivery.</li> <li>• Consider how the complexity and range of retrofit requirements create barriers in scaling up retrofit work.</li> <li>• Understand different tenure arrangements and how this may impact incentives and outcomes of retrofit work.</li> </ul>	<ul style="list-style-type: none"> <li>• Understand planning permission and likely implications for retrofit work, for example installing external insulation or solar PV.</li> <li>• Understand implications of special conditions such as conservation areas and historic or listed buildings on planning requirements and retrofit projects.</li> <li>• Understand when work may impact on neighbouring properties and the processes involved for notifying owners and carrying out work, especially party wall legislation.</li> </ul>
PROFICIENT	<ul style="list-style-type: none"> <li>• Understand the relevant policy mechanisms and government targets that stimulate the retrofit market.</li> <li>• Understand how policy and regulation impacts on choice of technology and/or retrofit approach and may incentivise specific approaches.</li> <li>• Understand the different drivers and requirements for retrofit in public and private sectors.</li> </ul>	<ul style="list-style-type: none"> <li>• Understand the different models for delivering retrofit projects, for example public-sector-led models, community-led models, market-based models.</li> <li>• Understand the differences between progressive standards for net zero retrofit and minimum compliance with building regulations.</li> <li>• Understand the local workforce and supply chain capacity for executing retrofit.</li> </ul>
EXPERT	<ul style="list-style-type: none"> <li>• Advocate for updating of regulations and standards that drive industry improvement.</li> <li>• Mitigate for potential sources of non-compliance in both the process e.g. appropriate qualifications and training, or products e.g. technical specifications.</li> <li>• Analyse the impact of available workforce on delivery of local retrofit projects.</li> </ul>	<ul style="list-style-type: none"> <li>• Identify training needs to support delivery of large scale retrofit work, from trades and technicians to managers.</li> <li>• Support initiatives to stimulate retrofit, including market-led and regulated initiatives.</li> </ul>



## Overarching technical competencies: Client needs and advice

AWARE	<ul style="list-style-type: none"> <li>• Understand typical client requirements and motivations for undertaking retrofit work.</li> <li>• Understand how various factors such as finance available, pay-back period and motivation may influence the client's decisions about scope and ambition of the project.</li> <li>• Understand various methods for engaging with clients to understand their requirements (e.g. surveys, interviews, focus groups).</li> </ul>	<ul style="list-style-type: none"> <li>• Respond to common clients' concerns and queries regarding retrofit (e.g. technologies and options, process, cost, time).</li> <li>• Understand the disruptions and impact to client of various retrofit options, for example access requirements and installation time.</li> <li>• Customise content and advice according to the client's needs and level of understanding.</li> </ul>
PROFICIENT	<ul style="list-style-type: none"> <li>• Engage with client to understand their requirements and expectations of the project (including timeframe and budget) prior to starting the work.</li> <li>• Determine client's perception of different retrofit approaches and potential barriers to be addressed.</li> <li>• Explain alternative retrofit options that may be suitable for the client's particular property and needs, the level of improvement that could be expected for various options, and compatibility or interactions with other systems.</li> <li>• Explain how the proposed work will change the property, including behaviour changes that may be required to achieve the expected benefits.</li> </ul>	<ul style="list-style-type: none"> <li>• Agree on intended outcomes of work including performance targets, such as energy use, and project process (cost, time, sequencing or phasing of work, etc.)</li> <li>• Explain how the installation of the retrofit work will impact the client, likely disruptions caused and their ability to use the property.</li> <li>• Demonstrate how the retrofit project satisfies the client's requirements.</li> <li>• Provide information on operation and maintenance of new or unfamiliar systems (heating, ventilation etc.) and how to achieve the best performance.</li> <li>• Provide advice on how to manage adequate ventilation to regulate indoor air quality (moisture and pollutants) and reduce overheating.</li> </ul>
EXPERT	<ul style="list-style-type: none"> <li>• Investigate client's complaints to determine probable cause and rectification action required to resolve issues.</li> <li>• Highlight additional work that may be required to achieve net zero emissions for the property.</li> </ul>	<ul style="list-style-type: none"> <li>• Explain maintenance and repair needed to ensure continued energy efficiency and performance improvement.</li> <li>• Account for how client's perspectives or constraints may impact the benefits that can be achieved in retrofit work.</li> </ul>



### Overarching technical competencies: Cost

Overarching technical competencies: Cost	
AWARE	<ul style="list-style-type: none"> <li>• Understand upfront costs and lifecycle costs of retrofit projects, including expected repair, maintenance and replacement.</li> <li>• Understand 'payback period' and how this may influence client's decision-making on projects.</li> <li>• Understand cost modelling approaches and software, and the input information required.</li> <li>• Understand funding, grants and financial incentives that may be available to clients.</li> </ul>
PROFICIENT	<ul style="list-style-type: none"> <li>• Calculate expected energy use and associated cost savings in operation after retrofit work is complete.</li> <li>• Calculate payback period for capital cost for suggested approach.</li> <li>• Understand assumptions and limitations of any cost modelling that is carried out, and clearly communicate these to client.</li> <li>• Understand the client's source of funding and any implications this may have on the project delivery or reporting, especially for grants and government funding.</li> <li>• Understand the funding that is available to support practitioners in upskilling or retraining, and to execute retrofit projects.</li> </ul>
EXPERT	<ul style="list-style-type: none"> <li>• Calculate whole life costs and predicted energy use for alternative approaches and identify the most cost-effective improvements.</li> <li>• Identify available funding mechanisms and applicability to different property types and retrofit approaches.</li> </ul>



## Overarching technical competencies: Property Assessment

AWARE	<ul style="list-style-type: none"> <li>Describe the basics of building physics and energy efficiency, including heat loss, ventilation and airtightness.</li> <li>Understand the technical terms used to evaluate buildings performance, such as U-value, thermal bridging.</li> <li>Understand different metrics used to describe building performance, including space heating demand and energy use intensity.</li> <li>Understand how buildings work as a system (fabric, services, technology and occupants) and the importance of the interfaces between these systems.</li> <li>Understand different materials and construction techniques across the housing stock and implications that these have on retrofit work.</li> <li>Understand physical factors and context that influence a property assessment - including building constraints, heritage features, house typology.</li> </ul>	<ul style="list-style-type: none"> <li>Explain the factors of a property that impact retrofit work, including for example size, age, type, orientation, location, and local climate conditions.</li> <li>Understand impact of occupant behaviour on energy use and retrofit requirements - number of people, hours of uses, comfort preferences for heating/hot water, use of appliances, etc.</li> <li>Understand energy assessment software used to model energy use, cost and/or carbon emissions (e.g. SAP, RdSAP, PHPP and others).</li> <li>Understand limitations and assumptions in models used, especially for basic evaluations.</li> <li>Collect and review relevant information for conducting assessments, including property type (location, heritage, structure, condition), floor area, space heating, hot water, and other features, as well as occupants behaviour.</li> </ul>
PROFICIENT	<ul style="list-style-type: none"> <li>Identify aspects that may impact the retrofit requirements, such as maintenance issues, interventions already installed.</li> <li>Apply standard approaches or techniques available to test various aspects of building physics, such as heat loss, air tightness, ventilation, moisture and energy use.</li> <li>Apply standard procedures to calculate energy performance of property.</li> </ul>	<ul style="list-style-type: none"> <li>Analyse results of energy performance assessment from software, confirming validity and debugging if necessary.</li> <li>Prepare report summarizing property assessment including records of features, defects and recommendations of repair work required prior to retrofit.</li> <li>Evaluate existing building condition and highlight maintenance or repair work required prior to retrofit work.</li> </ul>
EXPERT	<ul style="list-style-type: none"> <li>Undertake more complex simulations and analyses that may be required on high value or large scale retrofit projects.</li> <li>Understand and address challenges that can be expected on non-typical properties, such as historic or traditional buildings.</li> </ul>	<ul style="list-style-type: none"> <li>Identify and address unintended consequences from previous repair or retrofit work.</li> </ul>



## Overarching technical competencies: Technology and design

AWARE	<ul style="list-style-type: none"> <li>Describe the technology and measures involved in retrofit work (including heating systems, ventilation systems, renewable energy generation and energy storage systems).</li> <li>Understand how different technologies and measures impact energy use.</li> <li>Understand smart home energy management platforms and how these can be beneficial in reducing energy use.</li> <li>Understand the interactions between measures and potential unintended consequences of inappropriate design or installation.</li> </ul>	<ul style="list-style-type: none"> <li>Understand appropriate phasing of work to avoid abortive work.</li> <li>Understand the influence of material, product or technology selection on fire safety of a property.</li> <li>Understand the maintenance requirements and replacement period for various technologies (costs and process), as well as potential impacts on building safety.</li> <li>Recognise embodied carbon implications and impact on operational carbon for alternative approaches or products.</li> </ul>
PROFICIENT	<ul style="list-style-type: none"> <li>Understand the range of products and options available for each measure and their cost, performance, installation, and maintenance attributes, as well as availability in the UK.</li> <li>Use best practice industry guidance to support effective retrofit planning, design and installation.</li> <li>Evaluate alternative options for retrofit work that meets the client's requirements and are suitable for the specific property as per the property assessment carried out.</li> <li>Calculate the expected performance outcomes of alternative approaches including reduced energy use and operational costs.</li> <li>Use appropriate tools, systems and processes to design a retrofit project, including phasing of work where necessary.</li> <li>Recommend retrofit measures that are user-friendly and robust.</li> <li>Prepare design documentation, including drawings, specifications, schedule of quantities and installation details.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure design complies with regulations and requirements, including planning conditions, building regulations and property constraints.</li> <li>Determine baseline and target outcomes for performance including energy use, space heating demand, occupant comfort etc.</li> <li>Embed maintenance requirements into handover information.</li> <li>Understand the processes for decommissioning existing systems (for example fossil fuel boilers and solar panels).</li> <li>Calculate embodied and whole-life carbon of the activities, materials and products over the lifecycle using standard methodologies and databases.</li> <li>Understand and obtain warranties and/or guarantees for materials, products or systems that are installed.</li> <li>Understand guarantees that may need to be provided for work carried out for clients.</li> </ul>
EXPERT	<ul style="list-style-type: none"> <li>Evaluate and recommend appropriate retrofit measures considering cost, energy efficiency and embodied carbon, and according to property and financial constraints.</li> <li>Evaluate designs and identify opportunities for improvement in the technical solutions.</li> <li>Recommend alternative products or technologies, ensuring compliance with the technical specifications and other requirements of the project.</li> <li>Specify appropriate technical standards and procedures using industry best practice.</li> </ul>	<ul style="list-style-type: none"> <li>Specify installation details for retrofit measures, accounting for interfaces with building elements and ensuring adequate air-tightness and minimizing thermal bridging at junctions.</li> <li>Consider how the retrofit project addresses climate resilience, such as overheating and flooding.</li> <li>Advocate for embodied and whole life carbon to be considered in retrofit projects.</li> </ul>



## Overarching technical competencies: Coordination and integration

AWARE	<ul style="list-style-type: none"> <li>Describe the process for delivery of a retrofit project from inception to completion (planning, assessment, design, installation, commissioning, handover, and evaluation and monitoring).</li> <li>Understand fabric-first approach and why it is often advocated as the first step in retrofit.</li> <li>Describe whole-house approach to retrofit and the benefits thereof.</li> <li>Understand the interactions between systems and retrofit interventions for example upgrading insulation, heat pump installation and ensuring adequate ventilation.</li> </ul>	<ul style="list-style-type: none"> <li>Understand potential unintended consequences of inappropriate design or installation on retrofit projects and how to mitigate or avoid them.</li> <li>Understand different levels of retrofit and programmes for executing work (one-off deep retrofit versus phased implementation of interventions for whole-house plan of work).</li> <li>Understand the various roles required on retrofit projects (retrofit specific specialists as well as trades and others).</li> <li>Visualise the workflow and interactions between trades and how each trade or role fits into the retrofit process.</li> </ul>
PROFICIENT	<ul style="list-style-type: none"> <li>Promote whole-house approach to retrofit.</li> <li>Determine most appropriate approach and programme for delivery for a retrofit project (one-off deep versus phased implementation of whole-house plan of works).</li> <li>Plan a project according to the stages of the retrofit process.</li> <li>Evaluate opportunities for collaborating with other suppliers or installers on the project.</li> </ul>	<ul style="list-style-type: none"> <li>Manage the quality of works in accordance with minimum standards and manufacturers' recommendations.</li> <li>Implement quality assurance procedures to ensure suitable quality of work and addressing issues that arise, incorporating all trades and work involved on a project.</li> </ul>
EXPERT	<ul style="list-style-type: none"> <li>Adopt a holistic and streamlined approach to the full retrofit process.</li> <li>Create whole-house plan of works for phased delivery of the required improvements over a course of several interventions.</li> <li>Accurately plan the project process, including sequencing, dependencies and interfaces for material and the workforce.</li> </ul>	<ul style="list-style-type: none"> <li>Identify and mitigate potential risks in the project planning and installation process.</li> <li>Schedule the work with clear timeframes accounting for lead times for materials and specialist installers and allowing for contingencies.</li> </ul>



## Overarching technical competencies: Evaluation and monitoring

AWARE	<ul style="list-style-type: none"> <li>• Understand what the 'building performance gap' is.</li> <li>• Understand the importance of collecting actual data and evaluating the home's performance post-completion to compare actual performance with designed performance.</li> <li>• Understand the processes and tools used to gather data and monitor compliance of retrofit measures post installation.</li> </ul>	<ul style="list-style-type: none"> <li>• Understand available sensors and technologies for automatic collection of building performance and energy use data.</li> <li>• Understand approaches for collecting qualitative feedback (e.g. questionnaire, focus groups, interviews, observations).</li> </ul>
PROFICIENT	<ul style="list-style-type: none"> <li>• Carry out suitable commissioning and testing of retrofit works installed.</li> <li>• Determine what aspects of the project and the installed technology or systems need to be monitored and what data are required to conduct this monitoring.</li> <li>• Prepare a plan for data collection and performance measurement at each stage of the project.</li> <li>• Select appropriate software or systems to collect data to evaluate project performance.</li> <li>• Create processes for collecting client feedback and implement these to evaluate client's experience of the retrofit project.</li> </ul>	<ul style="list-style-type: none"> <li>• Collect quantitative and qualitative post-installation data to evaluate project performance.</li> <li>• Analyse data and compare actual outcomes to planned outcomes to determine if the retrofit work has had the intended outcomes.</li> <li>• Validate feedback received from quantitative and qualitative sources and review against initial information and changes in design or operation.</li> <li>• Collate post-completion feedback from the client to understand if systems and interventions are working as intended.</li> </ul>
EXPERT	<ul style="list-style-type: none"> <li>• Manage risks to minimise building performance gap.</li> <li>• Inspect work to verify completion and compliance with project requirements and regulations.</li> <li>• Compare performance of specific technologies against manufacturer data to validate installed operation.</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate any non-compliance or unintended consequences to determine root cause and resolve issues.</li> <li>• Identify remedial action required and recommend further evaluation and monitoring.</li> <li>• Provide feedback on energy consumption pattern and opportunities for improvement to client.</li> </ul>



# Appendix A: Understanding domestic retrofit in the UK

To provide a suitable analysis of the competencies needed to achieve net zero in the domestic retrofit sector, it is important to understand what retrofit entails and the specific challenges in retrofitting domestic properties<sup>1</sup> in the UK. This document summarises the landscape of domestic retrofit, including the stakeholders, funding and policy, and the specific challenges in enabling effective retrofit at scale.

The overview presented in this document supports the research presented in the report '*Roadmap of Skills for Net Zero: Competencies for Domestic Retrofit*'.



<sup>1</sup> Various terms are used by different reports and institutes to refer to domestic properties. These include residential buildings, dwellings, and homes. Domestic properties exclude public and commercial buildings, for example hospitals, schools, retail centres, and offices.



## THE LANDSCAPE OF DOMESTIC RETROFIT IN THE UK – summary points

<b>Understanding Retrofit: Significance and Implications</b>	<p>Since emissions from energy in the use of domestic buildings account for 48% of the UK built environment emissions<sup>2</sup>, decarbonising the existing building stock through effective retrofit is essential. Retrofit work includes improving the energy efficiency of homes (for example upgrading insulation and glazing), transitioning to low carbon heating, and installing renewable power generation. Retrofitting homes not only improves their energy efficiency, it also improves energy security and addresses fuel poverty, as well as bringing wider benefits to health and well-being of occupants. However, poorly executed retrofit work can have unintended consequences and damage client confidence. Therefore, it is critical that retrofit work is executed properly and that there is a consistent framework upon which people working in the sector are educated and trained.</p>
<b>Stimulating demand and supply simultaneously</b>	<p>Whilst individual technologies for retrofit are well developed, low consumer demand and insufficient skills in the supply chain inhibit delivery. The processes for accessing funding and delivering work through government schemes can be administratively burdensome, creating barriers to implementation. The lack of wide-scale implementation highlights the need for a holistic approach that addresses both the demand-side and supply-side challenges in tandem to drive the uptake of domestic retrofit.</p>
<b>Understanding the range of stakeholders and relationships</b>	<p>Retrofit encompasses a wide range of stakeholders with a complex web of interdependent actions and relationships. This includes government bodies and authorities, supply chain organisations, clients (homeowners and occupants), and education and training providers. Each stakeholder in the system plays a vital role in creating an enabling environment for retrofitting domestic properties at the rate required. To ensure adequate execution of retrofit work, policies and schemes should aim to address the whole system of stakeholders.</p>
<b>Attributes of homes that create challenges for retrofit</b>	<p>Creating an environment that enables effective domestic retrofit at scale is incredibly challenging. From a physical building perspective, the UK housing stock is highly varied, and the retrofit approach and technologies required are unique to each property. A variety of factors affect energy efficiency and retrofit work required on domestic properties, including the ownership and tenancy, the type of property (apartment, semi-detached or free-standing as well as method of construction), and the age of the property. Furthermore, traditionally constructed and heritage buildings are likely to require specialist understanding of the performance of these buildings and implications on retrofit work. Mains gas is still the dominant fuel for heating, most of which will need to be switched to low carbon heating in combination with improvements to the building fabric to support the transition to Net Zero.</p>
<b>Capacity and competence in the workforce</b>	<p>From a workforce perspective, the key challenges are capacity and competence: ensuring that there are enough people with the right knowledge, skills and training to carry out the work across the full project cycle (including planning, design, specification, installation, commissioning, and post-installation review) to the standards required. Several reports highlight significant skills shortages in key disciplines, for example heat pump installers, noting that this is likely to be a major barrier to achieving the scale of retrofit required for meeting Net Zero. However, not only do we need to increase the number of people in the workforce, we need to develop a robust and consistent understanding of the knowledge, skills, and behaviours that are needed in industry to deliver effective retrofit work. This provides the framework to create a competent workforce and to update the training and education landscape to ensure that the workforce has the necessary competencies that match industry requirements. It is important that measures are taken to address both the upskilling of the existing workforce and the education and training of new entrants in the sector.</p>

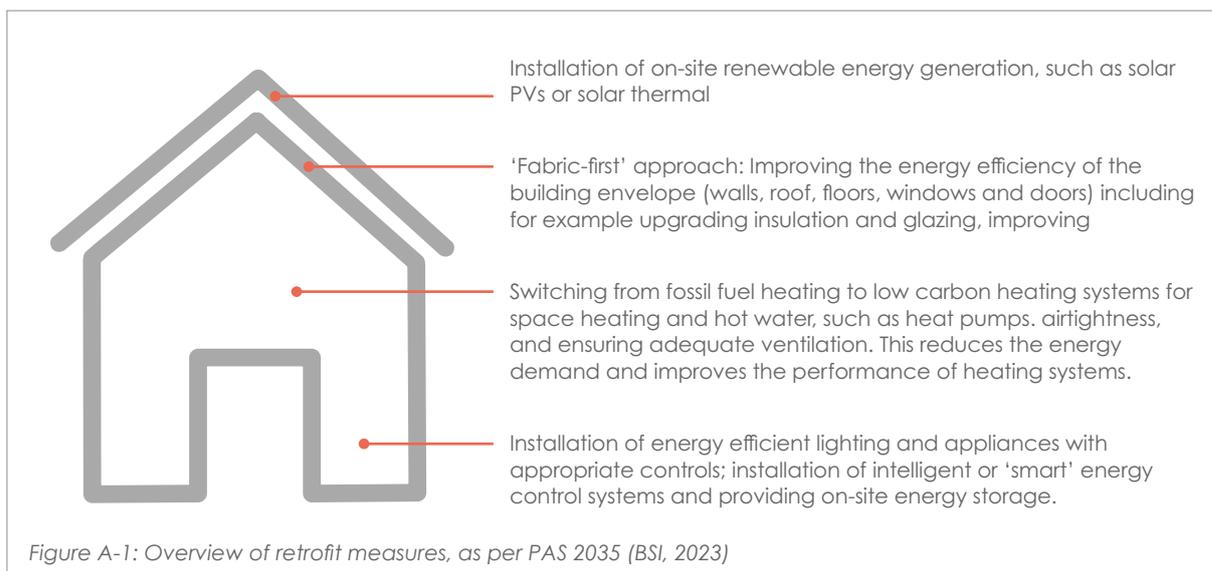
2 UKGBC (2021) [Net Zero Whole Life Carbon Roadmap](#)



# 1. AN OVERVIEW OF DOMESTIC RETROFIT

## 1.1 What is retrofit?

Retrofitting existing properties involves a range of interventions that are intended to improve energy performance or ventilation and reduce carbon emissions associated with the property<sup>3</sup>. These are illustrated in Figure A-1.



Retrofit projects can include some or all of the measures listed above, ranging from installation of a single measure to whole-house deep retrofit. Whilst some properties can achieve the necessary level of improvement through a single intervention, most will need multiple measures to be installed, either as a once-off project or conducted in a staged approach over a period of time. Improvement plans can be used to detail overall scope for improvement that is envisaged, the work that is needed, the appropriate sequence of installation, and the anticipated interactions<sup>4</sup>.

Retrofitting homes not only improves the energy efficiency, it also improves energy security and addresses fuel poverty, allowing people to more easily heat their homes to the desired level. There are wider benefits too, such as improved health and well-being from living in a warm and draught proof house where condensation and ventilation issues have been addressed. This reduces the likelihood of damp and mould which can cause or worsen health conditions. Furthermore, retrofitting can help to ensure that homes are resilient to the effects of climate change, including limiting risks such as overheating and flooding<sup>5,6</sup>.

## 1.2 Why does it matter?

Emissions from energy in the use of domestic buildings account for 48% of the UK built environment emissions. Therefore, effective retrofit of the UK's existing domestic properties to reduce energy demand and phase out fossil fuel heating is essential to deliver on UK's transition to Net Zero. However, the amount of retrofit work happening currently is insufficient and will not meet the targets required. This is despite clear emphasis on the importance of a national retrofit program to underpin the work that is necessary<sup>7,8</sup>. A significant scaling up of retrofit is needed, in terms of both the number of buildings retrofitted per year and the standards to be achieved<sup>9</sup>.

3 BSI (2023) *PAS 2035:2023 Retrofitting dwellings for improved energy efficiency. Specification and guidance.*

4 *ibid*

5 CLC (2021) *Greening our homes: National Retrofit Strategy*

6 PwC (2022) *Green skills as an enabler of UK retrofit.*

7 CLC (2021) *Greening our homes: National Retrofit Strategy*

8 UKGBC (2021) *Net Zero Whole Life Carbon Roadmap*

9 Fawcett, T., & Topouzi, M. (2020). 'Residential retrofit in the climate emergency:

The role of metrics.' *Buildings & Cities*, 1(1), pp 475–490. DOI: <https://doi.org/10.5334/bc.37>



### 1.3 Creating an enabling environment

Creating an environment that enables effective domestic retrofit at scale is incredibly challenging. Retrofit encompasses many stakeholders, policies, funding mechanisms and technical solutions that could be pursued. The UK housing stock is highly varied, and the retrofit approach and technologies required are unique to each property, meaning that it is difficult to create a scalable approach<sup>10</sup>. Whilst individual technologies for retrofit are well developed, low consumer demand and insufficient skills in the supply chain inhibit delivery<sup>11</sup>. The lack of wide-scale implementation highlights the need for a holistic approach that addresses both the demand-side and supply-side challenges in tandem to drive the uptake of domestic retrofit.

The demand for retrofit work needs to be created in both the public and private sector. However, clients who seek to undertake retrofit work on their homes have difficulties accessing reliable and trustworthy advice on what measures or technologies to install, ascertaining competence and quality of work, or taking recourse when outcomes are not as expected<sup>12</sup>. Retrofit work that is poorly executed can worsen existing conditions in the home, with unintended consequences including poor ventilation and indoor air quality, damp, and mould<sup>13</sup>. This can lead to lack of confidence in the retrofit market and unwillingness to invest in retrofit work. In addition, high upfront costs and uncertainty over expected payback periods can hamper investment in retrofit works.

From a supply chain perspective, not only is the supply chain highly fragmented, consisting predominantly of SMEs, the process for procuring and executing retrofit work is also fragmented with a lack of integration or understanding of how trades and technologies work together to achieve desired performance<sup>14</sup>. Furthermore, various analyses highlight the shortage of specialists who are skilled in retrofit-related roles to undertake the work required to reach Net Zero<sup>15,16</sup>. For example, an analysis by the Heat Pump Association suggests that 33,700 heat pump installers are needed to install the government's targeted number of annual heat pump installations, however there are currently only approximately 4,500 qualified and competent heat pump installers<sup>17</sup>. From an education and training perspective, there is not yet a mature and consistent framework for retrofit that encompasses qualifications, certifications, training courses and providers.



10 Fawcett, T., & Topouzi, M. (2020). 'Residential retrofit in the climate emergency:

The role of metrics.' *Buildings & Cities*, 1(1), pp 475–490. DOI: <https://doi.org/10.5334/bc.37>

11 ESC (2022) *Domestic Retrofit Market Intelligence and Skills Assessment – Greater South East Net Zero Hub*.

12 ESC (2023) *Skills for an Integrated and Customer Focussed Retrofit Process*.

13 LETI (2021) *Climate Emergency Retrofit Guide*

14 ESC (2021) *Foresighting Skills for Net Zero Homes*

15 CITB (2021) *Building Skills for Net Zero*

16 CCC (Climate Change Committee) (2022) *Independent Assessment: The UK's Heat and Buildings Strategy*.

17 HPA (Heat Pump Association) (2023) *Unlocking widescale heat pump deployment in the UK*



## 1.4 Understanding the stakeholders

Retrofit encompasses a wide range of stakeholders with a complex web of interdependent actions and relationships. Each stakeholder in the system plays a vital role in creating the conditions necessary for retrofitting domestic properties at the rate required. Evaluating these relationships in terms of the skills and training for retrofit illustrates the importance of understating the system as a whole. For example:

- Government needs to commit to and deliver a national retrofitting programme and create clear market signals through policies and funding mechanisms<sup>18,19</sup>. Stimulating the market for retrofit creates a pipeline of work that builds confidence in the supply chain, which is particularly important for SMEs, who deliver most retrofit work<sup>20</sup>.
- The supply chain needs to build the capability to undertake retrofit work at the rate required and follow a whole-systems integrated approach. A consistent framework is needed to coordinate skills and training for retrofit, providing a clear vision for qualification and certification that matches the competencies needed in industry. The existing workforce must be incentivised to undertake appropriate qualifications and training to upskill whilst action is taken to encourage new entrants into the sector.
- Colleges and training providers need to offer retrofit training courses that equip the workforce with the competencies that industry needs. Existing qualifications and courses should be updated accordingly and incorporate retrofit awareness across all general construction roles.
- Both public and private homeowners need to be encouraged to procure retrofit and have access to trusted support and guidance about retrofit work, the costs involved and the expected payback periods. This includes confidence in the ability of the workforce to conduct the required work to high levels of quality<sup>21</sup>. The high costs and fragmented processes mean that relying on current market forces and consumer demand will not be sufficient to meet net zero targets<sup>22</sup>.

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18 CLC (2021) [Greening our homes: National Retrofit Strategy](#).

19 CCC (2022) [Independent Assessment: The UK's Heat and Buildings Strategy](#).

20 CLC (2024) [Spring Budget 2024 Representations](#).

21 ESC (2021) [Foresighting Skills for Net Zero Homes](#).

22 CITB (2021) [Net zero and construction perspectives and pathways](#).





## 2. FUNDING AND POLICY LANDSCAPE OF DOMESTIC RETROFIT

Policies and funding mechanisms need to make the process of procuring and delivering retrofit as straightforward as possible, encouraging uptake and addressing barriers in the market<sup>23</sup>. Over the past decade, there have been a variety of schemes and grants that were meant to stimulate the retrofit and low carbon heating market. However, the success of these has been variable and has not created the widespread retrofit at scale that is necessary<sup>24, 25</sup>. The lack of long-term commitment from government creates uncertainty and lack of confidence in the market, resulting in an unwillingness in both industry and education and training providers to invest in skills and training for retrofit.

The policy for retrofit is dominated by the Heat and Buildings Strategy, which was launched by the UK Government in 2021<sup>26</sup>. This document sets out the policies and actions needed to tackle heating in buildings to reduce emissions as part of getting to net zero by 2050. Table A-1 summarises the key policies that apply to existing domestic buildings. Whilst this strategy was a major step forward in detailing the Government's commitments, an independent assessment of the strategy by the Climate Change Committee (CCC) noted significant policy gaps, including specific aspects regarding retrofit of existing homes<sup>27</sup>. These include a lack of regulation or incentives for owner-occupied homes, which constitute 65% of UK's housing stock, a reliance on market driven approach for stimulating the uptake in heat pumps, and more detailed support needed for creating an enabling environment, particularly to address skills shortages.

Table A-1: Summary of UK policies relating to energy efficiency and low carbon heat in domestic buildings (source: CCC, 2022; Tables 2.1, 2.2 and 3.2)

Sub-sector of domestic buildings	Policy mechanism
Low-carbon heat in non-fuel poor homes	Market based mechanism for low-carbon heat, supported by phase out dates for oil and gas boilers and obligations for minimum annual installations on heat pump manufacturers; Boiler Upgrade Scheme
Energy efficiency in non-fuel poor homes	Minimum standards in the private rented sector and social housing sector. Owner occupied: voluntary mortgage provider obligations for homes with mortgage, none for homes for sale
Fuel poor homes	Energy Company Obligation, Home Upgrade Grant scheme, Local Authority Delivery scheme
Social housing	Social Housing Decarbonisation Fund, Social Housing Net Zero Heat Fund (Scotland)

E3G highlights specific challenges experienced with the main government schemes for heat decarbonisation and energy efficiency, noting that “government-backed retrofit schemes are currently struggling to achieve their full potential, with several challenges holding back delivery at scale”<sup>28</sup>. These challenges include difficulty meeting the criteria, costs of compliance, insufficient resources or support in applying, and lack of awareness. It is important to streamline the administrative processes involved in accessing funds or grants for retrofit work or skills development as processes that are too complex or costly restrict access to these schemes.

23 CCC (Climate Change Committee) (2022) [Independent Assessment: The UK's Heat and Buildings Strategy](#).

24 E3G (2023) [The Spring Budget and the Retrofit Revolution](#)

25 [Written evidence submitted by the Federation of Master Builders to UK Parliament 'Heating Our Homes' Inquiry](#)

26 HM Government (2021) [Heat and Buildings Strategy](#).

27 CCC (2022) [Independent Assessment: The UK's Heat and Buildings Strategy](#).

28 E3G (2023) [The Spring Budget and the Retrofit Revolution](#)



To ensure adequate execution of retrofit work, the policies should aim to address the whole system of stakeholders and support the whole retrofit supply chain, from manufacturers to installers. For example, providing incentives for homeowners to procure work without ensuring that sufficient capacity of skilled workforce is available will negatively impact the uptake of retrofit<sup>29</sup>. Therefore, there needs to be appropriate funding and incentives for homeowners, colleges and training providers, and industry as illustrated in the 'Stakeholder Interaction Map'. In addition, it is critical that government policies adopt a whole systems approach that emphasise the breadth of work required in retrofit and avoid narrowly focused targets, for example specifying targets for technologies without considering the efficiency of the building fabric.

### 3. UNDERSTANDING THE SCALE OF THE RETROFIT CHALLENGE

This section highlights the scale of the retrofit challenge from a physical perspective – assessing the state of the housing stock and the work required to improve energy efficiency and transition to low carbon heating, and from a workforce perspective – ensuring that there are enough competent people with the right knowledge, skills and training to carry out the work to the standards required.

#### 3.1 The housing stock

To understand the scale of retrofit work required in the UK domestic housing sector, it is helpful to have an appreciation of the state of the existing housing stock. The UK has more than 28 million homes, the majority of which will need to be retrofitted to meet Net Zero<sup>30</sup>. Whilst the primary focus of retrofit is on the existing housing stock, it is also worth noting that new homes built to current building standards may not have adequate levels of energy efficiency or low carbon heating technology and therefore may also need to be retrofitted before 2050 to meet net zero requirements<sup>31</sup>.

The UK housing stock is highly varied and the retrofit approach and technologies required are unique to each property<sup>32</sup>. Table A-2 summarises some of the factors that affect energy efficiency and retrofit work required on domestic properties, including the ownership and tenancy (tenure), when the property was built, and the type of property.

Table A-2: Factors affecting energy efficiency of properties and extent of retrofit work required

Property type	Age	Tenure
Both the type of home, such as apartment, semi-detached or free-standing, and the method of construction impact the type and extent of retrofit work that may be required. Heritage buildings and traditionally constructed homes require unique skills in assessing and delivering retrofit work (Historic England, 2022). Constraints on certain types of properties may limit the suitability of retrofit measures that can be installed and consequently the level of improvement that can be achieved.	Older homes are typically less energy efficient than new builds. This is particularly challenging in the UK, which "has the oldest housing stock in Europe. Over 52% of homes in England were built before 1965, nearly 20% were built before 1919" (CCC, 2022). Traditionally constructed and heritage buildings require specialist understanding of the performance of these buildings and implications for retrofit work.	Owner-occupiers constitute the largest proportion of homes in England (65%), with the remaining homes falling into the privately rented sector (19%) or social housing (17%) (CCC, 2022). Most Government policy and funding initiatives target the private rented sector or social housing, although these are largely focused on fuel poor homes. There is a significant policy gap in owner-occupied properties, where the only mechanism currently in place is a voluntary scheme through mortgage providers (CCC, 2022).

29 ESC (2022) *Domestic Retrofit Market Intelligence and Skills Assessment – Greater South East Net Zero Hub*

30 CCC (2022) *Independent Assessment: The UK's Heat and Buildings Strategy*.

31 Fawcett, T., & Topouzi, M. (2020). 'Residential retrofit in the climate emergency: The role of metrics.' *Buildings & Cities*, 1(1), pp 475–490. DOI: <https://doi.org/10.5334/bc.37>

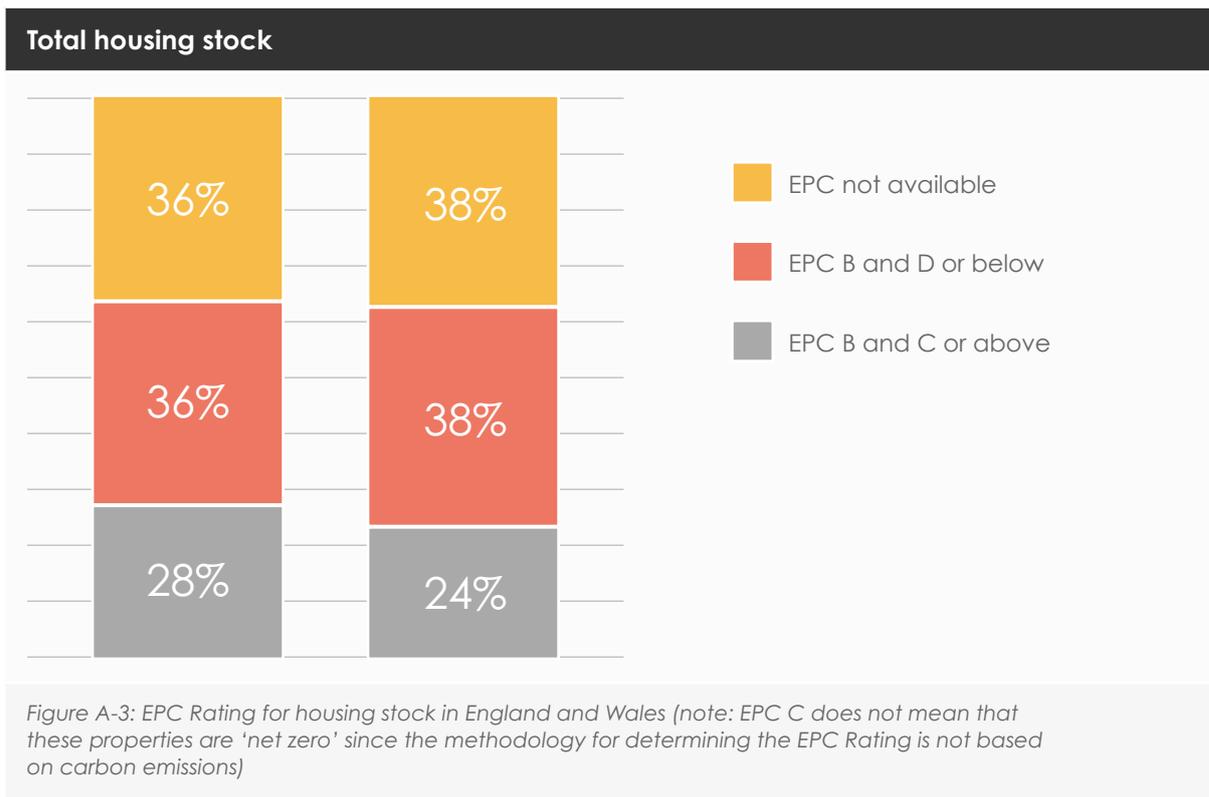
32 Ibid.



To provide an overview of the scale of retrofit required for the UK's domestic properties, a summary from the analysis of data on energy performance of buildings in England is presented below<sup>33</sup>. Energy Performance Certificate (EPC) ratings are an established part of UK policy and are used as an indication of the energy performance of properties and to highlight the retrofit effort required to improve energy use<sup>34</sup>. However, the EPC rating is not a direct measure of energy efficiency and is not a reliable indication of actual energy use<sup>35</sup>. The CCC provides an overview of the recommendations for reforming the EPC Rating metrics to better inform homeowners and policy to support net zero through incentivising energy efficiency and low carbon heating<sup>36</sup>. Whilst the EPC rating does not necessarily correspond to net zero, it is a widely available dataset that can be used to formulate an understanding of the housing stock in the UK and provide an indication of the extent of retrofit work needed.

It is important to note that not all dwellings have an EPC, therefore the statistics gathered from ONS do not represent the full domestic building stock. According to the latest statistics, approximately two-thirds of dwellings have an EPC. To minimise misinterpretation of the results, the results are presented as a proportion of the total building stock, and not as a proportion of the properties that have EPCs.

As Government policies have historically used a target of EPC Rating C, this analysis presents the results in three categories: no EPC Rating available, EPC Rating C or above, and EPC Rating D or below. Properties with EPC Rating D or below can be expected to require significant retrofit work to achieve the required standards for net zero. Figure A-3 presents the proportion of properties in each category in for England and Wales. In both countries, less than 30% of properties are recorded as having an EPC Rating of C or above, whilst more than 35% are Rating D or below, suggesting that most likely two-thirds of properties will need extensive retrofit work to comply with Net Zero.



The analysis assessed the data according to several factors that impact the energy efficiency of dwellings:

- Property type (detached, semi-detached, terraced, flats and maisonettes)
- Year of construction (pre-1929, 1930-1982, 1983-2011, 2012 onwards)
- Tenure (owner-occupied, private rent, social rent)

33 ONS (2022) *Energy efficiency of housing in England and Wales: 2022*.  
 34 CCC (2023) *Reform of domestic EPC rating metrics to support delivery of Net Zero*.  
 35 Passivhaus Trust (2020) *EPCs as Efficiency Targets*.  
 36 CCC (2023) *Reform of domestic EPC rating metrics to support delivery of Net Zero*.



As illustrated in Figure A-4, the year of construction is strongly correlated with the EPC Rating, with approximately 90% of dwellings constructed from 2012 onwards falling in Band C or above, while this is only 6% for properties built pre-1929 (and 46% unknown). The tenure is also correlated to the EPC Rating, with socially rented housing having the highest proportion of dwellings with an EPC Rating of C or above. Regarding property type, only about one-fifth of detached, semi-detached and terraced properties have an EPC Rating of C or above, whereas half of flats and maisonettes achieve this rating.



Figure A-4: EPC Rating of homes in England by property type, year of construction and tenure

Energy used to heat homes is one of the main contributors of energy use and resulting carbon emissions, and is therefore an essential aspect of retrofitting homes to net zero. Consequently, it is important to understand what the main fuel type used for central heating is in houses. The main fuel type for central heating is recorded as part of the Energy Performance Certificate (EPC) assessment, with results shown in Figure A-5. Mains gas is still the dominant fuel for heating, with 80% of dwellings using gas. Electricity is used in 11% of homes in England.

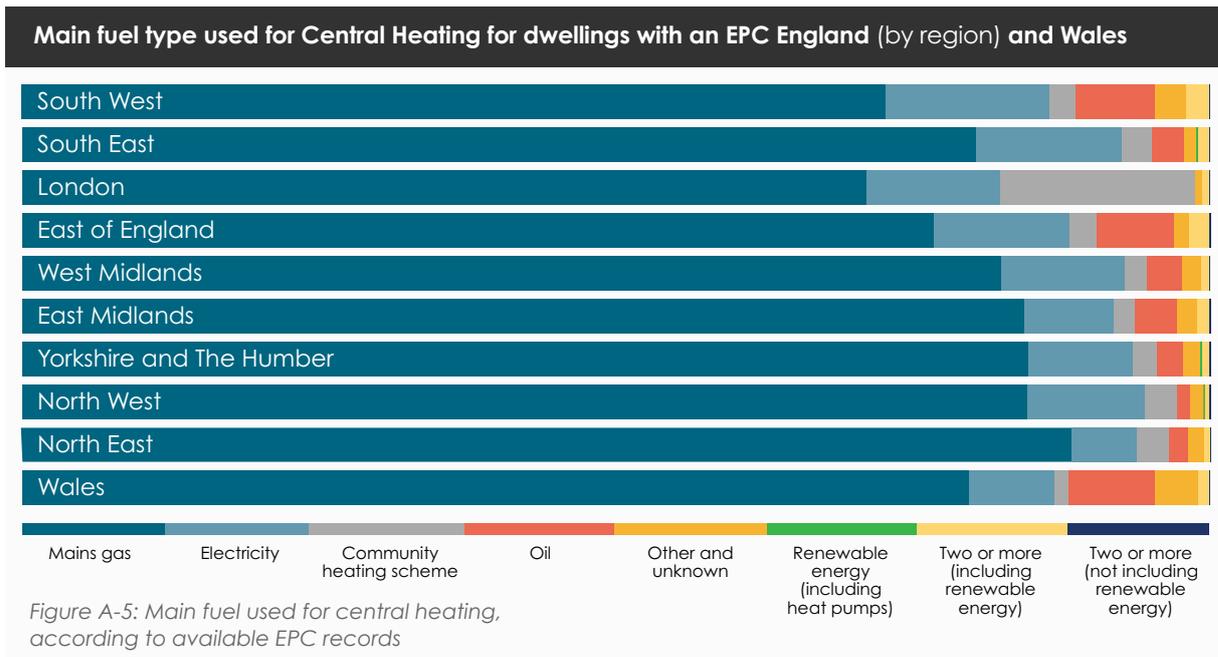


Figure A-5: Main fuel used for central heating, according to available EPC records

In summary, the challenge in retrofitting the UK's domestic housing stock is clear. As illustrated, 80% of homes are still using gas for heating and this will all need to be phased out and switched to low carbon heating (such as heat pumps) by 2050. This needs to happen in combination with improving the fabric efficiency to reduce energy demand and improve the performance of heating systems.



## 3.2 Size of workforce

The UK's construction workforce faces a significant challenge to build up the capacity needed in the supply chain to deliver retrofit work at the pace needed to meet Net Zero. The industry needs over 250,000 new workers across manufacturers, installers, and professional services to assess properties, coordinate projects, install energy efficiency measures and heat pumps, and evaluate project performance<sup>37</sup>. Previous evaluations identify significant skills shortages in key disciplines, noting that this is likely to be a major barrier to achieving the scale of retrofit required for meeting Net Zero<sup>38</sup>.

The declining workforce in the UK construction sector compounds the challenges of skills gaps. There is insufficient uptake in new entrant construction training and qualifications to balance the loss from the proportion of the workforce nearing retirement. This skills shortage is accentuated in the retrofit sector, where the lack of integration into general construction courses and general awareness lowers the profile of retrofit jobs. Many of the retrofit-related roles face existing shortages and a significant uptake is needed to meet targets<sup>39</sup>.

Work undertaken by Historic England illustrates the scale of the challenge in the size of the retrofit workforce needed through an interactive online tool that estimates the average number of new full-time equivalent (FTE) trades needed each year for each local authority in England<sup>40</sup>. This highlights the local skills needs for retrofit of England's traditionally constructed buildings.

A more detailed analysis of workforce size for retrofit is provided in CITB's 'Building Net Zero' report. CITB developed a model that considers alternative scenarios for decarbonisation of operational energy in buildings through a range of different retrofit interventions and pace of change. This research entailed the development of a model which details the number of workers and the skills and qualifications required to deliver the interventions as per the selected decarbonisation scenario. The model can be used to evaluate the impact of different scenarios on training and employment.

Figure A-6 presents the number of additional Full-Time Equivalent (FTE) Specialist Skills required each year up to 2050 to carry out the retrofit work as per the modelled decarbonisation scenario<sup>41</sup>. As seen in the graph, the number of additional specialists required rises sharply up to the late 2020s, before dropping down again and then gradually increasing until about 2040. This illustrates the scale of the challenge in terms of numbers of people to be trained, and to create the training infrastructure to support this.

The challenge in building up the capacity in specialist skills is particularly evident in heat pump installers. Government's ambition for heat pump installation in homes is 600,000 per year by 2028 (one-third in new build), up to 1.9 million per year by 2035<sup>42</sup>. According to a recent report by the Heat Pump Association (HPA), at least 33,700 heat pump installers (FTE) are required to undertake these installations, rising to 50,200 required by 2030<sup>43</sup>. This is in stark contrast to current government figures which suggest that there are approximately 4,500 qualified and competent heat pump installers working for MCS-certified businesses. This is a significant shortfall in the number of required specialists, just in this one discipline which forms part of the retrofit sector. The HPA highlights the role of existing heating engineers in supporting the transition to low-carbon heating by undertaking additional training that builds on their existing skills and recertification to become heat pump installers<sup>44</sup>.

## 3.3 Conclusion

This overview of the regulatory landscape of domestic retrofit provides insight into the challenges to be overcome in creating a large-scale programme of works to deliver carbon emissions reductions to meet the net zero target. This robust understanding supports the creation of the consistent overarching competencies required for individuals working across the whole retrofit process.

Whilst there are many areas that need to be addressed simultaneously to stimulate the market and enable effective retrofit, establishing appropriate training and qualification that matches industry's needs is a crucial part of delivering effective retrofit.

37 CITB (2021) [Building Skills for Net Zero](#)

38 CCC (2022) [Independent Assessment: The UK's Heat and Buildings Strategy](#)

39 CITB (2021) [Net zero and construction perspectives and pathways](#)

40 Historic England (2023) [Delivering Net Zero for England's Historic Buildings: Local Data on the Demand for Retrofitting Skills and Economic Growth](#)

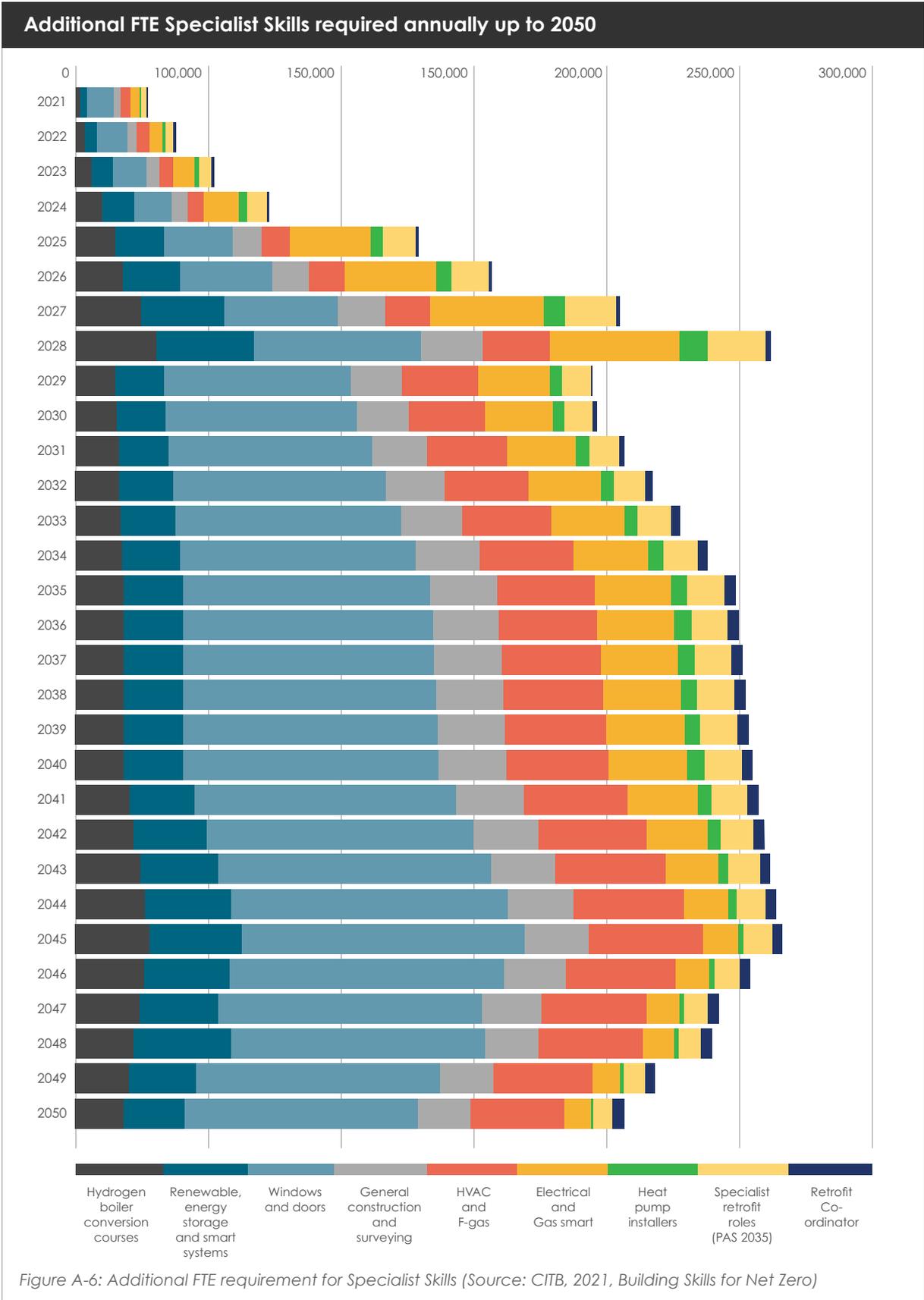
41 CITB (2021) [Building Skills for Net Zero](#)

42 CCC (2022) [Independent Assessment: The UK's Heat and Buildings Strategy](#)

43 HPA (Heat Pump Association) (2023) [Unlocking widescale heat pump deployment in the UK](#)

44 *ibid*





# Appendix B:

## A brief overview of Competency in the Construction Industry

### 1. COMPETENCY IN THE CONSTRUCTION INDUSTRY

To influence the development of training courses and qualifications, it is helpful to have an overview of how competence, qualifications, and accreditation are addressed in the UK and how this is reflected in the construction sector. The overview presented in this document supports the research presented in the report '*Roadmap of Skills for Net Zero: Competencies for Domestic Retrofit*'.

#### 1.1 National Occupational Standards (NOS)

Across all sectors, National Occupational Standards (NOS) are created for each occupation and define the knowledge, skills and behaviour required to be competent in the role in the workplace. The primary role of NOS is to underpin vocational training, apprenticeships and qualifications in all sectors across the UK. NOS can also be used by individuals, employers, recruiters, or training providers to understand an occupation's knowledge and skills requirements, write job descriptions, create bespoke competency requirements, or develop appropriate training material<sup>45</sup>. NOS are developed by Standard Setting Organisations (SSO) with representatives from employers and other stakeholder and are applicable across the UK.

As mentioned, NOS underpin vocational qualifications, however the details of how this works is different for each of the devolved nations. For Wales, Northern Ireland and Scotland, vocational training is based on the NOS that are applicable to the region. In England, NOS are expected to be reflected or considered in vocational qualifications, but do not have a formal status or requirement. Education and training is also a devolved matter.

#### 1.2 CITB and NOS

For the construction sector, CITB develops and maintains the National Occupational Standards (NOS) for the parts of industry that are within its remit<sup>46</sup>. The full list of occupations covered by CITB's NOS are available on their website<sup>47</sup>. These are applicable across the whole UK.

#### 1.3 Institute for Apprenticeships and Technical Education (IfATE)

IfATE is an Arm's Length Body of the Department of Education that is responsible for occupational standards for apprenticeships and technical education in England. The occupational standards are similar to NOS in that they are descriptions of an occupation and the knowledge, skills and behaviours required in the role<sup>48</sup>. The standards are developed by employer-led trailblazer groups and underpin all IfATE's apprenticeships and technical education. The standards are grouped into 15 sectors, of which 'Construction and the built environment' is one. Each sector has an occupational map that provides an overview of the apprenticeships and technical qualifications available and the routes of progression across occupations. Figure B-1 illustrates the relationship between NOS, CITB, IfATE, and vocational qualifications across England and the devolved nations.

Because of the importance of net zero and environmental targets, IfATE expects all standards and qualifications to consider "green skills". The 'Green Toolkit' provides guidance to assist with the revision of existing occupational standards and development of new standards<sup>49</sup>.

45 <https://www.ukstandards.org.uk/en/about-nos>

46 <https://www.citb.co.uk/standards-and-delivering-training/national-occupational-standards/>

47 <https://www.citb.co.uk/standards-and-delivering-training/training-standards/national-occupational-standards-nos/occupations-in-construction/>

48 <https://www.instituteforapprenticeships.org/about/what-we-do/>

49 Institute for Apprenticeships and Technical Education (IfATE) '[Green Toolkit](#)'



IfATE conducted a review of the Construction Route in 2022 in collaboration with employers to evaluate the route and its occupational map<sup>50</sup>. The review sets out key principles and characteristics for the route that should be reflected in occupational standards, including aspects such as building safety, sustainability (with a note on the importance of retrofit), customer service and communication skills, and collaboration. A further outcome of the review is a list of occupations that are not currently included in the occupational map and for which occupational standards should be developed. 'Retrofit coordinator' and 'other retrofit occupations' were both suggested as priorities for development. The development of a Retrofit Coordinator occupational standard and apprenticeship is now well underway.

In addition, IfATE's Green Apprenticeships Advisory Panel (GAAP), which advises on alignment of existing apprenticeships to green jobs or where they could be made greener as well as opportunities for new apprenticeships to address emerging skills gaps in the green economy, made recommendations to further 'green' 65 of the construction route occupational standards. The recommendations from the Construction Route review and GAAP are to be implemented by the relevant trailblazer groups<sup>51</sup>.

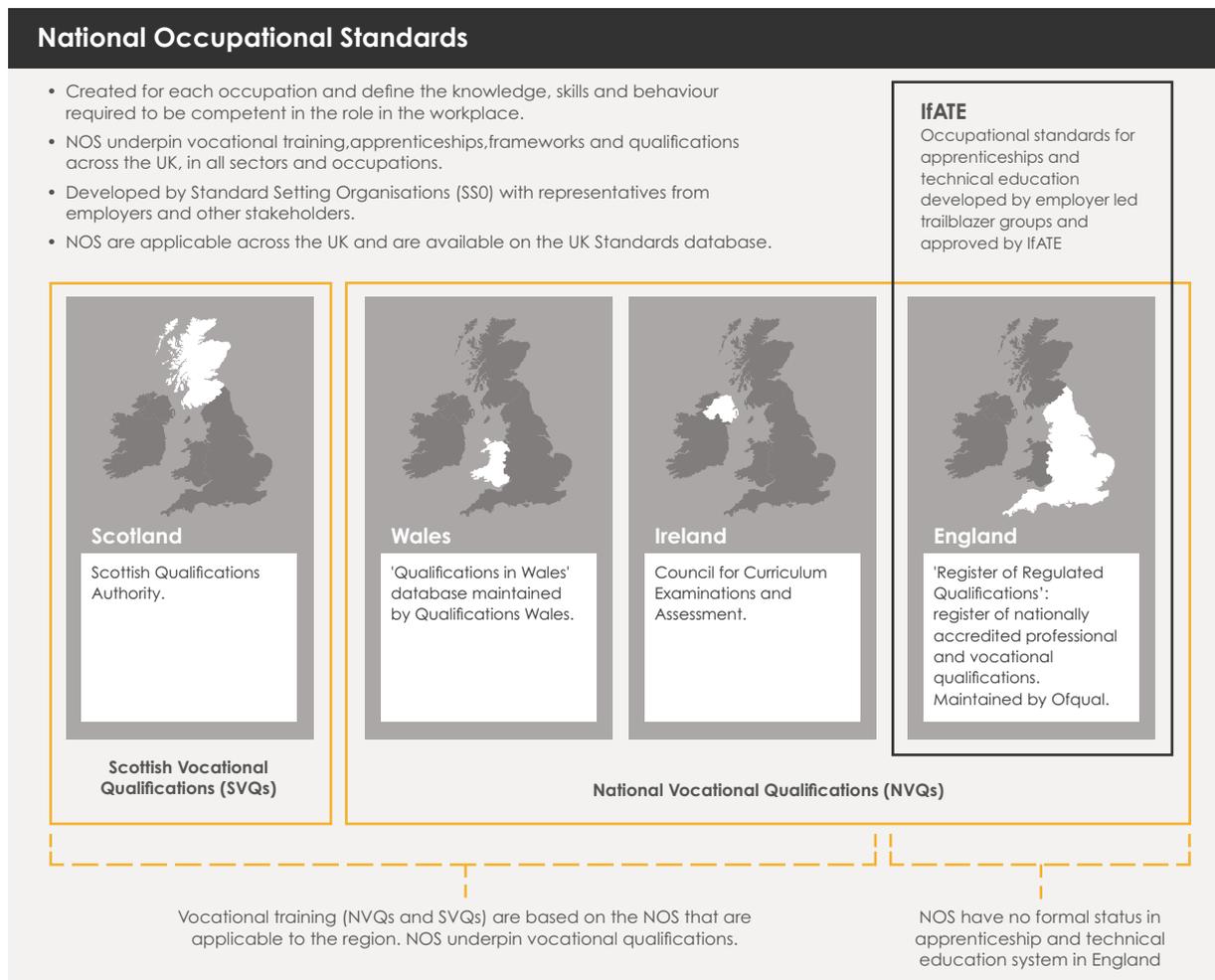


Figure B-1: Overview of National Occupational Standards and qualifications across the UK.

50 IfATE (2022) *Construction Route Review*  
 51 Ibid



## 1.4 The regulatory landscape

### 1.4.1 Competence Steering Group

Following the Grenfell tragedy in 2017, one of the key findings of the independent review by Dame Judith Hackitt was the lack of consistency and fragmentation in procedures and standards for assuring competence of those working in the built environment. Since then, there has been a significant amount of work undertaken to reform competency in the built environment and to establish appropriate processes for management thereof. The Competence Steering Group (CSG) was created in 2018 to action the recommendations around competence of the Hackitt Review. This work resulting in the publication of several reports: 'Raising the Bar'<sup>52</sup> in August 2019, 'Setting the Bar'<sup>53</sup> in September 2020 and 'A Higher Bar'<sup>54</sup> in January 2024. These detail the recommendations for establishing a system of competence standards for industry. Part of the work of the CSG is the overarching competence framework, developed by Working Group 0, as well as sector-specific competence frameworks developed across 12 Working Groups. The CSG is now transitioning into a new phase as it becomes a sub-set of the Industry Competence Committee, and is now the 'Industry Competence Steering Group'. For a detailed review of the work conducted to date and the work in progress relating to competence, refer to the CSG's most recent report<sup>55</sup>.

### 1.4.2 Sector-specific competence frameworks for installers

The primary document governing competence frameworks is BSI Flex 8670, which outlines the core criteria for building safety competence that are to be included in sector-specific frameworks for individuals working in the built environment<sup>56</sup>. This can be used by industry to develop and/or evaluate sector-specific competence frameworks that contextualise the core criteria and requirements of the standard according to the defined role, function, activity or task within the scope of the framework. The standard supports consistent and robust processes for development and management of sector-specific competence frameworks.

Each Working Group under the Competence Steering Group is responsible for the development of sector-specific competence frameworks for the roles within their disciplines. Sector-specific competence frameworks should clearly define the scope and applicable function, role or task, and address aspects including minimum learning requirements, validation of individual competence, and requirements for maintaining competence.

The most relevant for the retrofit sector are the frameworks developed by Working Group 2 – Installers. The first phase of the work evaluated the current arrangements for developing and evaluating competence in six installer sectors – domestic plumbing and heating, dry lining, fire detection and alarms, fire stopping specialist, rainscreen cladding, and roofing – and compared these to the requirements of BSI Flex 8670 and identified gaps to be addressed<sup>57</sup> (CSG WG2, 2022). The review assessed the schemes and processes for evaluating organisational and individual competence, the existing qualifications, the requirements for periodical reevaluation of competence, and routes for recognition of prior learning or experience. This provided the foundation for the development of a competence framework for each of these installer disciplines.

This work is continuing with the creation of super-sectors that group installers into one of five super-sectors: envelope, engineering services, interiors, civils and structure. This provides the structure to roll out the development of competence frameworks at scale across all installer disciplines.

52 CSG (Competence Steering Group) (2019) *Raising the Bar: Improving Competence Building a Safer Future*

53 CSG (2020) *Setting the Bar: A new competence regime for building a safer future*

54 CSG (2024) *A Higher Bar: Achieving a competence-led built environment*

55 *ibid*

56 BSI (2021) *BSI Flex 8670 v3.0:2021-04: Built environment. Core criteria for building safety in competence frameworks. Code of practice.*

57 CSG WG2 (Competence Steering Group - Working Group 2) (2022) *Competence Framework – Installer Pilots Report (Phase One)*



### 1.4.3 Building Safety Act

An important development in regulating competence is the publication of the Building Safety Act 2022, which reforms the building safety landscape and provides the legal framework for safety standards in design, construction, maintenance, and management of buildings<sup>58</sup>. Although the focus is on higher risk buildings (above 18m or seven storeys with at least two residential units or is hospital or care home), the Act also introduces new responsibilities and systems that are applicable to those working on all buildings. One of the areas of focus in competence in the built environment:

- The Act introduces an amendment to the Building Act 1984 Schedule 1 Building Regulations to include a definition of 'Industry Competence'. Competence requirements relate to "the skills, knowledge, experience and behaviours of an individual" and all individuals carrying out design, construction, and refurbishment work are required to be competent for their roles. Competence in relation to organisations requires that they demonstrate organisational capability to carry out their roles.
- The Act creates a new body, the Building Safety Regulator (BSR), whose functions include overseeing safety and standards of all buildings and facilitating and encouraging improvement of competence of built environment industry and building inspectors.
- The BSR must establish a Committee on Industry Competence whose functions include monitoring industry competence, advising and facilitating improvement of industry competence for those in the built environment, and guidance to the public for assessing competence. This committee has been established.

Figure B-2 provides a visual summary of this overview of the regulatory landscape around competence in the built environment. Guidance is available that provides an overview of the Building Safety Act and how it changes building safety in the construction sector<sup>59</sup>.

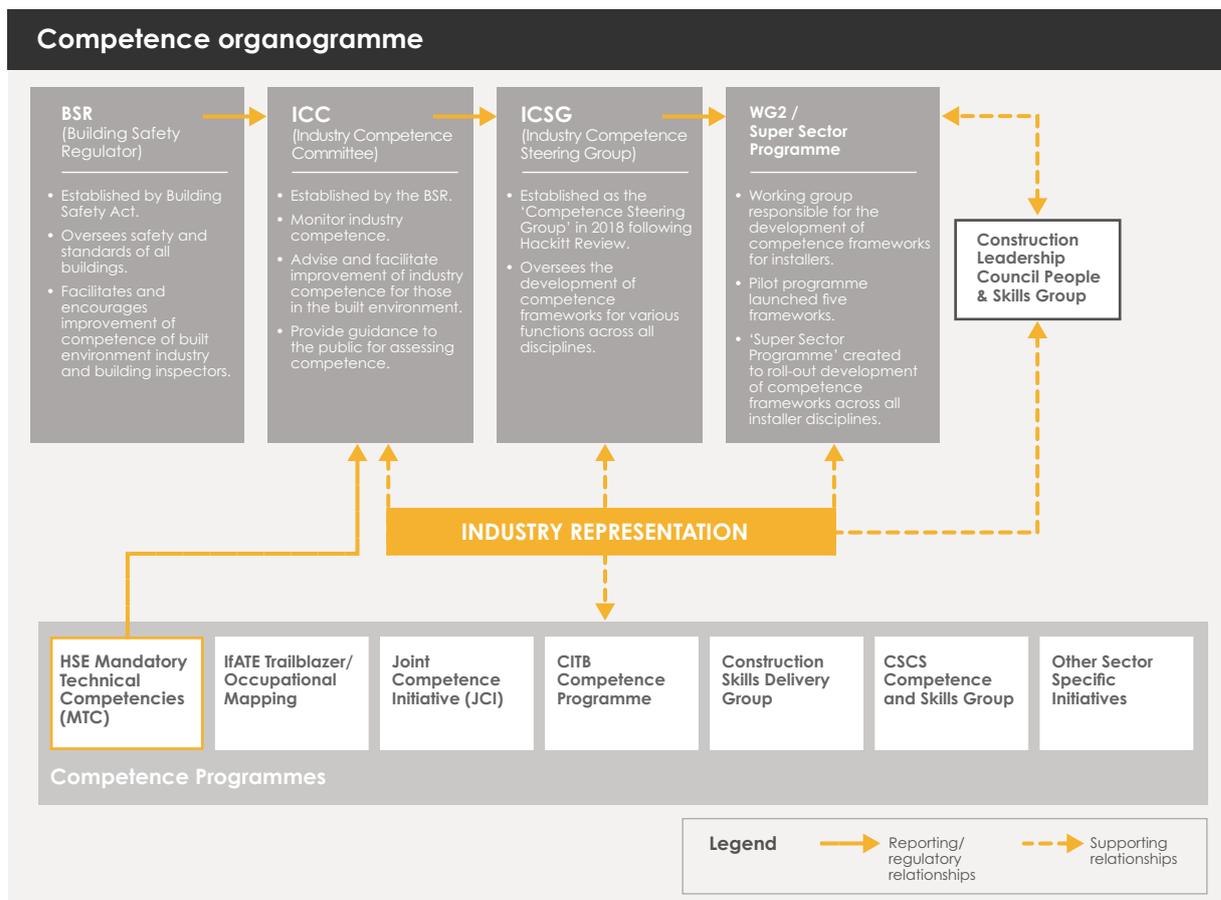


Figure B-2: Overview of the regulatory landscape around competence in the built environment (developed by Faye Burnett – CLC People & Skills Competence Working Group)

58 Building Safety Act 2022, c.30

59 Build UK 'Building Safety Regime' - a comprehensive guide to the new building safety regime that is being updated as secondary legislation and guidance is published and is endorsed by the CLC



## 1.5 Matching the education to industry needs

This overview of how competence is governed and the relationship between vocational training and occupational standards provides the basis for understanding how to engage with the relevant stakeholders to update the education and training system to equip the workforce with the competencies needed. Simultaneous action is required from both industry and education and training providers:

- Industry: Embed requirements for competencies that ensure the workforce has a holistic understanding of retrofit and can execute the work to high standards. This is through both sector-specific competence frameworks and occupational standards.
- Education and training providers: Evaluate training courses and qualifications and update content to match with the knowledge, skills and behaviours required in industry. Coordination at the regional and national level between colleges and training providers is also important to ensure consistency and prevent duplication of effort.

Further detail on future work required and recommended actions to deliver the change needed in industry is given in the main report.



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