



Working paper

Decarbonising the UK's building stock

Can immigration policy help solve workforce challenges?

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Key messages

This paper suggests five immigration policy options to support the development of the UK's retrofitting workforce: (1) create an umbrella sponsorship model for the construction sector to support firms in international recruitment; (2) create a tailored net zero workforce visa category; (3) make the skilled worker route less costly, using special provisions to significantly lower fees across retrofitting-related occupations; (4) develop retrofitting skills mobility partnerships to create a pipeline of workers; (5) increase upskilling and recruitment of refugees under the UK's Displaced Talent Mobility Pilot, prioritising applicants with retrofitting-related skillsets.

Workforce forecasts to meet low-carbon heating and energy efficiency targets are considerable. The Climate Change Committee estimates that direct employment requirements are far greater than any other net zero area. Yet workforce development remains a neglected issue.

New entrants to the industry will be critical but progress attracting and preparing the domestic workforce is slow. The UK has no workforce development plan. A complex and fragmented landscape of training options exists and there is significant concern about the lack of retrofitting courses in further education colleges.

There is strong rationale to use immigration policy to support the development of the domestic workforce, especially in the context of the UK's chronic labour shortages and given the importance and urgency of decarbonisation targets.

Immigration does not necessarily offer an easy fix. A highly qualified EU workforce is unlikely to materialise; the immigration system is now much more restrictive and costly for EU workers. Non-EU workers with the exact skillset are not a readily available pool and the construction sector is ill-equipped to use the immigration system. A more purposeful approach is required, as laid out in the immigration policy options offered here.



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Executive summary

Decarbonising the United Kingdom's (UK's) buildings is a critical element of net zero policies, with buildings the second highest-emitting sector after transport. Although the UK has made significant commitments to both low-carbon heating and energy efficiency, little progress has been made and the country has fallen far behind the rest of Europe. A key challenge is how the UK will develop the workforce required to deliver its targets. This paper explores labour shortages and skills gaps in depth and asks a new question: should the UK seek to use immigration policy to support a rapid scale-up of retrofitting in the context of its decarbonisation targets? This builds on ODI's previous work in this area, which has proposed that labour migration could support rapid and just green transitions, if governments act proactively and cooperate on green skills programmes.

This paper focuses specifically on retrofitting, and particularly the installation of heat pumps, given this is *the* critical technology that will deliver the decarbonisation of buildings in the UK. Heat pumps are a highly efficient and fully tested low-carbon heating technology, with air-to-water pumps considered the most suitable option for UK homes. The government has committed to delivering 600,000 heat pump installations per year by 2028, though significantly higher annual targets have been proposed by the Climate Change Committee (CCC) and the Labour Party. As only around 60,000 heat pumps are currently being installed annually, progress is far slower than what is required. A significant reason for this is the lack of clarity and certainty in government policy, compounded by significant challenges with the financing available. This has resulted in low consumer demand and stymied the growth of the private sector.

Workforce forecasts for the construction sector to meet low-carbon heating and energy efficiency targets are considerable. The CCC estimates that direct employment requirements for retrofitting (in the range of 120,000 to 230,000 new jobs by 2030) are far greater than any other net zero area. This labour requirement is far in excess of the National Health Service (NHS) workforce shortage and likely more than adult social care. While it is a straightforward proposition for gas engineers to upskill as heat pump engineers, there is a consensus that the age profile of the industry, lack of demand and lack of interest, will mean too few opt for this route. This research finds a definitive consensus that new entrants to the industry will be critical.

Progress attracting and preparing this new domestic workforce is slow. Although long called for, the UK has no national retrofit strategy and no workforce development plan. The complex route to become a heat pump engineer – requiring training as a gas engineer or plumber first before additional skilling for heat pumps – is considered a major barrier. The government has been slow to develop the apprenticeship standard and pathway for low-carbon heating. There is a complex and fragmented landscape of training options, but low demand is reportedly a problem. This

research finds a major concern at the lack of retrofitting courses in further education colleges and the absence of experienced teachers and trainers. The UK's generally poor skills infrastructure and lack of investment in adult education is a historical problem aggravating challenges.

These challenges need to be evaluated in the wider context of the UK's tight labour market, with an ageing population, chronic labour shortages in many sectors, and unusually high rates of economic inactivity (including alarming long-term sickness trends). The construction industry is also struggling, with persistently high vacancy rates and a lack of professional pathways into the sector. The impact of Brexit in reducing the availability of the European Union (EU) construction workforce, with little visible replacement by non-EU workers, has also exacerbated shortages. The CCC highlights the very real possibility that workers will simply not be found in time.

While development of the domestic workforce is clearly critical – and should provide the lion's share of the retrofitting workforce – there is strong rationale to use immigration policy to provide complementary, flexible support to workforce development. Openness to this option was justified by stakeholders consulted for this research, on the basis that retrofitting is a critical national mission, given the magnitude of the task and the fast pace required of this area of the net zero transition. While using the tool of immigration could support a wider retrofitting workforce development strategy, it does not necessarily offer an easy fix. This research and consultation exercise identified three key challenges as follows:

1. The EU workforce is unlikely to materialise

While workers from countries such as Sweden, Norway, the Netherlands and Poland are highly qualified, the UK has made its immigration system much more restrictive and costly for EU citizens. Recent data shows EU citizens are making little use of the new skilled worker visa system, meaning the UK is unlikely to attract the highly experienced heat pump engineers who could teach, train and supervise to help scale up the domestic workforce.

2. Non-EU workers with the exact skillset are not readily available

Given the unfamiliarity of UK gas boiler systems and the fact that heat pump technology is new, international recruitment outside the EU is likely to require some upskilling in heat pump technology and to meet new retrofitting standards. Upskilling plumbing, heating or ventilation and cooling engineers, with highly similar skillsets, would be an attractive option and faster than training new entrants from scratch in the UK. However, this would require proactive investment and partnerships.

3. The construction sector is ill-equipped to use the immigration system

The construction sector has traditionally relied on EU workers and – while the majority of construction occupations are eligible for skilled worker visas – firms are making relatively low use of the post-Brexit immigration system. The prevalence of small firms is a major factor, given that they find the system difficult and costly to navigate. While the government has included five

new construction occupations on the shortage occupation list for 2023, there remains concern that this will make little difference if most building firms feel unable to manage international recruitment processes.

Given these barriers, a more purposeful approach is required. Much can be learned from the experience of health and social care in the UK. Both benefit from a dedicated visa route and, in the case of the NHS, a workforce development strategy, partnerships and labour agreements to develop an overseas pipeline of talent. Informed by this more comprehensive approach to workforce planning, the following **five immigration policy options** are proposed to support the retrofitting workforce (see Box 1).

Box 1 Immigration policy options

1. Create an umbrella sponsorship model for the construction sector

A dedicated body taking responsibility for administration and making sure sponsorship requirements are met would greatly support small and medium-sized construction firms in international recruitment. Learning is available on the risks of umbrella sponsorship from the agriculture sector to ensure recruitment is ethical. This model could include vocational training linked to industry placements given some upskilling may be required.

2. Create a net zero workforce visa

The UK government could more explicitly link immigration policy to high-priority sectors such as retrofitting by creating a net zero workforce visa. Creating a tailored visa category, as has been done for health and social care, would be an important symbolic policy to communicate the essential nature of this workforce. This option could be adopted in parallel to Option 3, to attract more workers under this new visa category.

3. Make the skilled worker route less costly for the net zero workforce

The UK's exceptionally high visa fees place the country at a disadvantage in the global competition for talent. Reducing these costs would help attract the highly qualified EU workers who could act as trainers and supervisors, as well as the plumbers, heating and ventilation engineers, and electricians who could fill workforce gaps. Special provisions could be introduced to significantly lower fees across retrofitting-related occupations.

4. Develop retrofitting skills mobility partnerships

Purposeful intervention in skills mobility partnerships would create a pipeline of workers for retrofitting. This type of intervention would build on the UK's experience of government-to-government agreements used in the health sector. Germany's experience developing partnerships with India and Colombia to create a pipeline of solar technicians and electricians is instructive and could provide a model for the UK's public and private sectors.

Box 1 Immigration policy options continued

5. Increase upskilling and recruitment of refugees

The UK could scale up recruitment under its Displaced Talent Mobility Pilot. This programme supports employers to recruit refugees on fast-tracked, three-year, skilled worker visas. While it has mainly targeted healthcare, Scottish employers are recruiting for their renewable energy workforce. There is a clear opportunity to prioritise retrofitting, not least because of the profile of potential refugee applicants under this programme (which include high numbers of engineers, electricians and plumbers).

For several of these options the private sector role is critical. Employers and trade bodies could act now, including to develop skills mobility partnerships, as has been done in Germany, or to take advantage of skilled worker visa routes to recruit ‘displaced talent’. However, strong leadership from government is essential. The main recommendations are as follows:

1. With the utmost urgency, create a workforce development strategy for retrofitting.
2. Monitor the take-up of the new building trades included on the shortage occupation list to assess the impact of recent policy changes.
3. Pursue a dialogue with the construction sector on whether and how to implement a new umbrella sponsorship model.
4. Create a net zero visa workforce category and significantly reduce visa fees for workers filling retrofitting-related occupations.
5. Explore the use of visas that combine vocational training and upskilling in the UK with industry placements.
6. Investigate the opportunities for retrofitting skills mobility partnerships and explore the potential role for the UK aid budget to support these.
7. Scale up recruitment under the Displaced Talent Mobility Pilot, targeting people with retrofitting-related skillsets.

Political barriers to considering immigration solutions may appear considerable in the current juncture. However, this is by no means reflective of public attitudes. Public opinion polling shows there is considerable scope for a more open immigration system, as long as rules are clear and competently enforced. Given the urgency of the challenge, which will accelerate from 2025 with the Future Homes Standard, now is the time to proactively explore these possibilities.

1 Introduction

Direct greenhouse gas emissions from buildings are the second-largest source of emissions in the United Kingdom (UK) after transport, due to the nature of home and hot water heating (CCC, 2022). The UK's 28.6 million homes are notoriously inefficient, losing up to three times more heat than homes in the rest of Europe (Baker et al., 2022). In recent years, the UK government has committed to scaling up action to meet its target of retrofitting¹ all homes to Energy Performance Certificate (EPC) band C by 2035. Although the government has set ambitious retrofitting targets, little progress has been made to date and the UK is falling behind the rest of Europe (Bruel and Rosenow, 2023). A key challenge is how the UK will develop the workforce to deliver its targets. This report explores this issue and asks a new question: should the UK seek to use immigration policy to support a rapid scale-up of retrofitting in the context of its decarbonisation targets?

This case study builds on ODI's pioneering work in this area, which has comprehensively made the case that, with the right frameworks in place, labour migration could support rapid and just green transitions (Gençsü et al., 2020; Mason et al., 2022). While some skills can be provided by young people entering the workforce and by reskilling existing workers, in some sectors there will inevitably be gaps that cannot be filled due to demographic trends or competing demands within the economy (Gençsü et al., 2020). This is a neglected area, but one that needs more attention given the unprecedented scale of transition required. There is a need to act proactively, with adequate workforce planning and flexible migration policies, as well as for countries to cooperate on the creation of green skills programmes (ibid.; Mason et al., 2022).

This case study focuses on the UK and retrofitting. More specifically, heat pumps are our primary focus – they have the highest emission-reduction potential compared to other retrofitting activities and are *the* critical technology that will deliver the decarbonisation of buildings in the UK. We explore both labour shortages and skills gaps, as two separate but interlinked issues. A focus on retrofitting does not imply that workforce challenges are not significant in other areas of the UK's green transition. The country is described as being 'nowhere near having a workforce ready to deliver the big decarbonisation projects we need in the next two decades', with policy interventions to address the skills deficit generally seen as insufficient and an area where more progress is critical (Balata et al., 2022: 22; Skidmore, 2022; CCC, 2023).

A comprehensive literature review and 21 key informant interviews, conducted between March and June 2023, form the basis of this case study. Key informants included representatives from think tanks, academia, local government and the private sector. Anonymised quotes are included

1 'Retrofit' refers to any work on an existing building to improve its energy efficiency, making it easier to heat, able to retain that heat for longer, and replacing fossil fuels with renewable energy. This includes, for example, replacing gas boilers with low-carbon heating options such as heat pumps and the fabric insulation of buildings.

(in italics or as block quotes) to illustrate the perspectives of key stakeholders throughout the report. Section 2 lays out basic information on heat pumps and energy efficiency measures and provides a rapid summary of the (non-workforce related) barriers holding back progress. Section 3 looks in-depth at workforce aspects including forecasts for the scale-up in the context of the UK's labour market. Section 4 addresses skills development, assessing barriers and challenges in this area. Section 5 looks at the immigration policy context post-Brexit, before Section 6 delves into whether immigration policy could be adapted to better suit workforce needs in the area of retrofitting. Finally, Section 7 provides some options for immigration policy reform.

2 Retrofitting in the UK

This is a background section that provides basic information on the nature of retrofitting in the UK. It describes the nature of a heat pump retrofit and how heat pump installation sits alongside energy efficiency measures, and outlines the government's retrofitting targets and the various challenges which have held back progress in this area.

Heat pump retrofits

Heat pumps draw heat from a source and transfer that heat to the space to be heated. The source of heat can be either the air, ground, water or waste heat (e.g., from a factory). Air-source pumps are compatible with most buildings. Ground-source pumps are more efficient, although they often require deep, vertical boreholes that are difficult to install in densely populated areas. Unlike gas boilers, they typically work at lower flow/output temperatures, which means they may require larger radiators. There are two main types of air-source heat pumps: air-to-air and air-to-water. Air-to-air heat pumps, also known as air conditioning, blow warm air to provide space heating; air-to-water heat pumps provide wet central heating systems through underfloor heating and radiators. In the UK, air-to-water heat pumps are considered the most suitable heat pump option as they can be installed with more traditional central heating systems (Cretu et al., 2022). However, the growth in requirements for cooling could lead to a more important role for air-to-air systems, which can produce cold as well as heat.

Heat pumps are considered highly efficient, as heat is being transferred rather than generated. In a typical household, the energy output of the heat pump is around four times greater than the electrical energy used to run them, making them around 3–5 times more efficient than a gas boiler (IEA, 2022; Skidmore, 2022). Their decarbonisation potential is significant, given the only carbon associated with a heat pump is the energy used to power the pump. The UK government estimates significant emission reductions – up to 70% – if gas boilers are replaced by heat pumps (Department for Energy Security and Net Zero, 2023). When the UK's electricity is fully renewable, home heating in properties with heat pumps will be fully decarbonised.²

In addition, heat pumps offer wider social and economic benefits, saving consumers money, protecting households from energy price shocks and improving air quality (IEA, 2022). Heat pump technology is now well tested and well established as the best low-carbon option for heating the UK's homes; heat pumps will play a substantial role in the UK's net zero transition (Department for Energy Security and Net Zero and the Department for Business, Energy and Industrial Strategy, 2021).

2 The UK is well on its way to achieving renewable energy targets. In 2020, 43% of Britain's power came from a mix of wind, solar, bioenergy and hydroelectric sources, with 2022 seeing some months passing 50% of provision (National Grid, 2023). The CCC considers that the UK can reliably decarbonise electricity by 2035 and has stressed the target is 'within sight' if the government makes the necessary reforms (Carbon Brief, 2023).

Heat pump installation and energy efficiency measures

Whether – and to what degree – heat pump installation needs to be done alongside energy efficiency measures is a complex question, and the right balance between the two options remains highly context-dependant (Rosenow and Lowes, 2020). As noted earlier, UK homes are considered the most inefficient in Europe, with most UK buildings ‘leaking’ heat through poorly insulated roofs, walls and floors. ‘Fabric first’ has been a historical policy preference in the UK (as, for example, under the Green Deal).³ This implies focusing first on insulation measures, before making the switch to a low-carbon heating system, which some have argued is a vital first measure (CITB, 2021). Others have advocated for a ‘whole-house heat’ standard combining energy efficiency measures with the installation of low-carbon heating systems, unless additional insulation is not needed (Emden and Rankin, 2021).

While insulation can reduce carbon emissions by reducing energy demand, modelling by the Climate Change Committee (CCC) has estimated only modest reductions in this area.⁴ In addition, while some fabric interventions – such as loft insulation – are cheap and non-intrusive, other measures that imply deeper retrofitting are both expensive and disruptive (CITB, 2021). The CCC’s position is that the most expensive and disruptive energy efficiency measures are unlikely to be the most cost effective (CCC, 2022). Further, the advancements in the UK with cavity wall and loft insulation, mean most remaining homes needing insulation will need these more expensive measures (Friedler and Kumar, 2019). Faced with this panorama, and the fact that low-carbon heating systems deliver the bulk of carbon saving, some interviewees felt strongly that fabric first is no longer the best initial solution, particularly in the context of the UK’s rapidly decarbonising electricity grid.

Whether heat pump installation needs to go alongside significant investment in fabric measures, to ensure maximum efficiency, is an additional question. Given heat pumps operate most efficiently at lower output temperatures, reducing heat loss through insulation helps keep the upfront cost of heat pumps down, as less remedial work to radiators may be required. Greater efficiency also means less heat is required, bringing down running costs. But, in general, as heat pump manufacturing has improved, it is increasingly possible to get good performance in inefficient buildings and heat pumps do not require high levels of insulation to work effectively (Energy Systems Catapult, n.d.; Sissons and Gabriel, 2023). While numerous interviewees stressed the importance of energy efficiency measures for reducing energy demand, there was also recognition that *‘fabric efficiency standards should not hold back the roll out of heat pumps’*. At

3 The Green Deal was a UK policy that enabled homeowners to make energy-saving improvements to their homes and to find the best way to pay for them. Examples of improvements it typically covered include insulation, heating, draught proofing and double glazing. A flagship programme of the Conservative government, it was abandoned in 2015 (Thomas, 2023).

4 In residential homes a combination of energy efficiency and behavioural measures generated a 12% reduction in heat demand, for example, considering measures such as draught proofing, hot water tank insulation, loft and cavity wall insulation, and some solid-wall insulation (CCC, 2022).

the same time, over the medium term, fabric efficiency will undoubtedly remain important, as ‘the more efficient a building, the more flexible the operation of its heat supply’ (Rosenow and Lowes, 2020: 11). Adequate insulation lengthens the time for heating to be switched off, which delivers the flexibility to avoid using energy during peak periods and enables the use of renewable sources as and when available (Pagliano et al., 2023). This flexibility will be critical in future as electrification advances and demands on the grid increase significantly.

Government targets

The current government’s target is to deliver 600,000 heat pump installations per year by 2028, reaching 1.9 million installations per year by 2035, when gas boilers would be phased out (CCC, 2022). The CCC has recommended a more rapid scale-up, with a target of 900,000 heat pumps to be installed per year by 2028, necessitating a lesser peak of 1.4 million installations per year by 2035 (ibid.). The Labour Party’s targets are even more ambitious, with a plan to install 6.34 million heat pumps by 2030, which is almost double the government and CCC’s targets (Corbyn and Bailey, 2019). Currently, the UK is only installing around 60,000 heat pumps a year and the country remains very far from the pace necessary to meet installation targets (Sissons and Gabriel, 2023).

Energy efficiency targets are based on minimum standards. For the private rented sector, homes must reach EPC C by 2030. However, there are no specific targets set for social housing or owner-occupied homes, where reaching the standard remains voluntary (CCC, 2022). After the UK government removed support for insulation measures in 2013, there has been little progress in energy efficiency improvements over the last decade (Skidmore, 2022).

An overview of challenges

The government’s Heat and Buildings Strategy, published in 2021 and updated in March 2023, was welcomed by all interviewees as generally providing ‘*the right level of ambition*’. But ‘*there are no real policies as yet*’ and implementation is assessed as far too slow:

In terms of targets the aspirations are right. We need to get off gas as a nation. But we are a long, long way from being on that trajectory to deliver heat pumps at the sort of volumes that the government is suggesting.

While there are clear benefits to individuals and the wider economy of replacing gas boilers with heat pumps, the challenges to their widespread adoption in the UK are significant, spanning public policy and consumer-facing issues, and ultimately affecting business and stymieing the growth of the industry.

Public policy

Primarily, there is a lack of pace and clarity in current policy towards heat pumps (CCC, 2022; Skidmore, 2022). Until recently the government had kept the door open to other forms of low-carbon heat, such as hydrogen boilers, sending mixed signals to industry. At the same time, the very late phase-out date for gas boilers, which is not until 2035, and the fact that the Future Homes Standard has been delayed until 2025 is a major barrier.⁵ New homes are still being built without proper insulation and without heat pumps (with the majority still being connected to the gas grid), factors which are further delaying industry action (Skidmore, 2022).

Some supply-side policies are encouraging. There is a consultation on a heat pump mandate, to operate similarly to the zero-emissions vehicle mandate, encouraging boiler manufacturers to make more heat pumps. There are also small sums for innovation in heat pump manufacturing and installation. However, broader supply-side regulations, such as minimum standards for energy efficiency in the private rented sector, are indifferent towards heating technology and do not help to stimulate scale-up of the industry.

Alongside this, major challenges remain with regard to the financing available to encourage the take-up of heat pumps. For example, the Boiler Upgrade Scheme is a three-year, £450-million funding scheme (now extended to 2028) that provides £5,000 off the cost of an air-source heat pump or £6,000 for a ground-source heat pump (Ofgem, n.d.). For context the Inflation Reduction Act in the United States (US) provides up to 100% of the cost of a heat pump out of a potentially limitless pot (Winokur Monk, 2022). Many have called for UK financial support to be higher, especially for low-income households (Lowes et al., 2021; Fotherby et al., 2022). The predominantly market-based approach taken in the UK stands in contrast to other countries and poses risks to delivery and the reaching of government targets.

Consumer demand

Partly due to the ambition and scale of public policy, consumer demand has been insufficient. Retrofitting is a particularly difficult area, as measures require intensive and disruptive work within the home, a very different customer experience if compared to other areas of the green transition such as the take-up of solar energy or electric vehicles. Consumer barriers predominantly fall into three categories – awareness, cost and logistics.

5 The Future Homes Standard means homes built after 2025 will have to meet strict energy efficiency standards, which will include low-carbon heating systems such as heat pumps. The delay in implementing this standard means new builds in the UK will require retrofits that are likely to cost over five times more than the cost to meet the standard properly in the first place (Skidmore, 2022).

Awareness: There is a documented lack of awareness about heat pumps and their benefits (BRE, 2022). Interviewees also emphasised that if a gas boiler needs replacing, people are generally making a ‘distress purchase’ which, once combined with the low level of awareness of alternatives, makes the take-up of heat pumps even more difficult.

Cost: Heat pumps are currently expensive and out of reach for many.⁶ As production increases, the cost of heat pumps and their installation should fall as manufacturers and installers find efficiencies and develop new methods. Other cost barriers come from the continued high price of electricity in comparison to gas (Sissons et al., 2022).

Logistics: Installing a heat pump is (for most) different to a boiler. It looks different, takes up more space, and can be disruptive to install (MCS, 2021). Again, innovation will support these challenges; heat pump manufacturers are beginning to compete on design and size, for example. The government has also accepted the Vallance Review’s recommendation to alter planning rules, allowing heat pumps to be installed less than one metre from a home (HM Treasury, 2023). There is a raft of other incentives which would be helpful, for example, reforming Energy Performance Certificates which currently penalise heat pumps (Lawrence, 2022).

The private sector response

The private sector is struggling to expand its offering in this climate. This was one of the main recurring themes in stakeholder interviews, with the ‘*long-term uncertainty*’ and ‘*poor signalling to the market*’ frequently pinpointed as the biggest challenge for businesses. In the absence of more strategic support for the industry, the National Retrofit Hub has been recently launched – pushed strongly by industry associations – with the aim of driving forward a coordinated national strategy in this area (National Retrofit Hub, 2023).

These myriad challenges have resulted in the UK falling far behind the European Union (EU), where the Ukraine war and energy crisis have ‘turbocharged’ the energy transition, leading to significant increases in investment in clean technologies and record levels of heat pump sales (Cremona et al., 2023).

6 While costs vary across different types of home, the median cost of an air-to-water heat pump is around £10,500 (Sissons et al., 2022).

3 Workforce forecasts and labour gaps

This section presents the various forecasts regarding the expansion of the workforce necessary to meet retrofitting targets and discusses whether the existing workforce can transition to fill labour gaps. Given the need for new entrants to the sector, it provides analysis of the labour market context in the UK and particularly the shortages experienced by the construction sector.

Workforce forecasts

All stakeholders interviewed expressed substantial concern about how to achieve the kind of exponential growth needed in the industry to meet installation targets. Given the current government focus on increasing consumer demand, workforce development remains somewhat of a neglected area (including within the government's own Heat and Buildings Strategy) (Cretu et al., 2022). In Nesta's new policy plan for decarbonising the UK's homes, a rapid increase in the number of skilled heat pump installers is one of four key policy areas called for in their urgent 'Plan A' for action, alongside a commitment to phase out gas boilers by 2035 or earlier, make low-carbon heating affordable for all, and undertake better planning for electrification and low-carbon heating systems (Sissons and Gabriel, 2023).

A focus on workforce development is essential, not only to operationally deliver, but also to reduce the costs of heat pump installation, which will increase if consumer demand goes up without more trained installers being available to meet this demand (Sissons et al., 2022). Octopus Energy has made clear that the shortage of heat pump installation engineers is one factor keeping costs high (Dann, 2021).

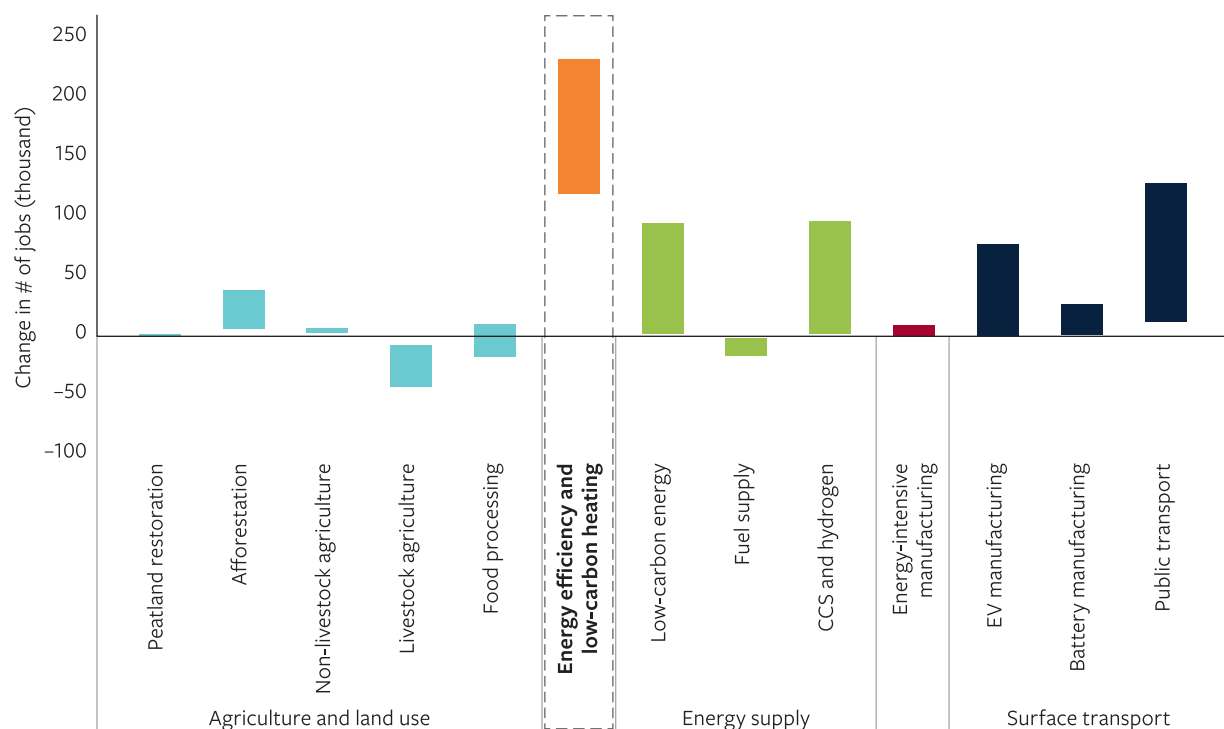
Workforce forecasts are considerable. The government uses estimates from the Construction Industry Training Board (CITB) that in the first four years, 7,500 heat pump installers will need to be trained per year (Department for Energy Security and Net Zero and the Department for Business, Energy and Industrial Strategy, 2021). In the following five to ten-year period, they estimate this will rise to a peak of 15,000 per year. These figures for annual expansion are considerably higher than the size of the current workforce, estimated at only 3,000 trained heat pump engineers, illustrating the scale of the challenge (Cretu et al., 2022). More recent industry research estimates show that even higher growth in the installation workforce would be required, due to the high numbers of sole traders and existing workloads related to appliance servicing and general plumbing and fitting work (HHIC, 2022).

While rapid annual growth in heat pump installer numbers is required, demand for workers is likely to dramatically accelerate in 2025 with the introduction of the Future Homes Standard for all new builds (CITB, 2021). In the longer term, demand for these workers will not drop off suddenly, as workers will be required for the next 20 years, with somewhat lower numbers needed in later

years for maintenance and replacements⁷ (Oswald et al., 2021). Similarly, workforce requirements are significant when it comes to improving the fabric energy efficiency of the UK’s buildings. The CITB’s (balanced scenario) modelling suggests around 12,000 new workers would need to be trained each year for around seven years to meet energy efficiency targets (ibid.). Unlike with heat pumps, demand for workers in this area is expected to drop off sharply when projects are completed (ibid.).

Taking into account all occupations required to install low-carbon heating and carry out energy-efficiency improvements, the CCC, in its recent workforce report, estimates that the sector could require between 120,000 and 230,000 new jobs by 2030 (CCC, 2023). This range of estimates places the construction sector labour requirements far in excess of the National Health Service (NHS) workforce shortage and most probably more than that of the adult social care sector.⁸ The CCC concludes that the direct employment impact of energy efficiency and low-carbon heating will generate far more new jobs than any other area of the UK’s net zero transition, highlighting the scale of the workforce challenge (see Figure 1).

Figure 1 Range of estimates of direct employment impacts of decarbonisation in 2030



Note: See CCC publication for full notes that accompany this graphic and which explain the estimates arrived at for each sector. Data taken from supporting information: ‘A Net Zero Workforce Charts and Data.’

Source: CCC, 2023

7 Air-source heat pumps are designed to last 15 years, similar to gas boilers (CITB, 2021).

8 NHS England reported over 112,000 vacancies in March 2023 (NHS Digital, 2023). Skills for Care reported 165,000 vacancies in England in its workforce report covering the 2021–2022 period (Skills for Care, 2022).

Can existing workers transition to fill labour gaps?

In line with just transition principles, workforce planning should prioritise reskilling existing workers. Under current government plans, gas boiler engineers are being encouraged to retrain for low-carbon heating technologies. Upskilling of gas engineers in the UK is necessary given heat pump installation requires new skills related to both design and installation, in particular around heat calculations and the correct sizing of pipes and radiators. For gas/heating engineers, reskilling can be done fairly quickly, with courses expected to take a week or less (Heat Pump Association, 2020; Department for Energy Security and Net Zero and the Department for Business, Energy and Industrial Strategy, 2021).

While retraining will make an important contribution, there is a consensus that meeting low-carbon heating targets will require new entrants into the sector. The Heating and Hotwater Industry Council has estimated that two-thirds of the heat pump workforce will need to be new entrants (HHIC, 2022). One explanation is the lack of interest of heating engineers, seen as linked to the age demographic of the workforce. Surveys and focus groups with industry indicate that 63% of the workforce of heating and cooling engineers are 45 years or older, with 37% aged over 55 years (Department of Energy Security and Net Zero and Department of Business, Energy and Industrial Strategy, 2023). Nesta's analysis of Gas Safe data paints an even starker picture, with 58% found to be aged 51 and over and only 6% of the gas engineer workforce under the age of 35 (Cretu et al., 2022). An interlinked issue is the demand factor:

Retraining to install heat pumps is not a big issue for gas engineers. However, they're currently focused on replacing the 1.6 million gas boilers a year, not the 20,000 or 30,000 heat pumps.

There was a very strong consensus on this point expressed by the stakeholders interviewed for this research, who simply do not believe the heat pump workforce can be made up of workers who transition:

The numbers are not there. The interest is not there to reskill. We need new talent trained up quickly.

Most gas boiler installers don't believe they need to learn how to install a heat pump. They think that in 10 years' time, they'll be installing the same or more boilers.

In relation to fabric insulation, there is a similar position that, while many construction workers can be re-skilled to meet the relevant standards, recruiting and training new entrants will also certainly be a necessity (CLC 2020; Emden and Rankin, 2021; GMCA, 2022b).

The UK's labour market shortages

The urgent increase required to the retrofitting workforce – and the need to attract new workers – is daunting given the current context of the UK's labour market. In recent years, the chronic labour shortages experienced across many sectors have become front page news; from social care to fruit picking, heavy goods vehicle (HGV) drivers to pig farmers, worker shortages are now a high-profile theme (REC and CBI Economics, 2022; Sumption et al., 2022). Generally, the UK is experiencing low unemployment rates and a tight labour market, with high vacancy rates a major challenge (ONS, 2023a; Thwaites, 2023). Office for National Statistics (ONS) data shows that from March to May 2022, vacancies in the UK reached a historic high of over 1.3 million, though this figure had fallen to 1.08 million by the February to April period this year (ONS, 2023a).

Though many countries have faced labour shortages since the Covid-19 pandemic, the UK's circumstances are particularly challenging. Notable is the UK's very high economic inactivity rate compared to other Organisation for Economic Co-operation and Development (OECD) countries (Murphy and Thwaites, 2023). The high levels experienced are driven by three key trends: the increase in the size of the over-65 age group, older workers retiring during the pandemic and the rise of long-term sickness (jumping from 460,000 people at the start of the pandemic to a new high of over 2.5 million in April 2023) (ibid.; Thwaites, 2023). While the Chancellor is pleading for the over-50s who have retired to return to work, this cohort is disproportionately from high-paying, professional jobs and judged highly unlikely to return (Jenkins, 2023; Murphy and Thwaites, 2023). The UK's particularly worrying long-term sickness trends are linked to lengthening NHS waiting lists and the prevalence of 'Long Covid', as well as generally inadequate support for those with disabilities and chronic conditions (Partington, 2022).

The future looks even more challenging. The Learning and Work Institute has projected that 1.4 million more people will retire over the next 17 years than young people will enter the workforce (Evans et al., 2023). The CCC also highlights the UK's ageing population, not only because this will result in a smaller working-age population, but also given the increased demand on workers in health and social care, which will present additional challenges for other sectors' recruitment (CCC, 2023).

Construction sector labour shortages

While the general outlook is fraught, what is particularly relevant for retrofitting is the situation facing the construction sector. It has the second highest percentage of businesses experiencing worker shortages, after the accommodation and food services sectors (Francis-Devine and Buchanan, 2023). There has been a significant rise in construction sector vacancies in recent years, as shown in Figure 2. This trend is generally in line with what is happening to the overall job market. However, comparing November to January 2023 with the immediate pre-pandemic period (January to March 2020), vacancies in construction were 65% higher, compared to an increase of 42% in the overall economy in that same period (MAC, 2023).

Figure 2 Construction sector vacancies, 2001–2023

Source: ONS, 2023b

Further, the Federation of Master Builders (FMB) trade survey finds that 51% of FMB members (which includes house builders and the Repair, Maintenance and Improvement sector) report that a lack of skilled tradespeople has impacted jobs, with 47% reporting it had directly delayed jobs (FMB, 2023a). This is an improvement over levels reported in 2022, but still represents an alarming gap given the requirement to rapidly scale up activity. Recruitment into the construction sector is generally considered difficult, given the perception issues, as explained by one interviewee:

Construction is still seen as a last resort. This is a long-term reality. Generally, there is a lack of thought and investment in vocational training and no coherent strategy to help skills development and address labour market gaps [...] We also recognise that there is a lack of professional pathways through construction. In that sense it is not like any other sector; it really needs professionalisation.

As will be discussed further in Section 6, immigration policy is particularly relevant to the construction sector, which was relatively dependent on EU workers before Brexit (with just under 8% of workers in the sector in 2018–2020 reported as EU-born) (Sumption et al., 2022). The sector is dominated by smaller employers, who cannot easily use the immigration system (given significant administrative barriers), hence EU workers have traditionally been an attractive source of additional labour (Portes and Springford, 2023). Post-Brexit, construction is one of the sectors experiencing large shortfalls of workers, with EU employment now well below previous levels and well below what would have been expected given pre-pandemic workforce growth rates (ibid.). The impact of Brexit in exacerbating shortages in the industry is a major concern of industry groups (FMB, 2023b).

The construction sector could bring in workers under the new points-based immigration system: 80% of the sector's occupations are eligible for the skilled worker visa route, given their skills and salary levels (MAC, 2023). However, since the end of freedom of movement for EU workers, there has been a relatively low take-up of skilled worker visas. In 2021 only 123 people were sponsored by employers across construction and building trade occupations (Sumption et al., 2022). This has increased with the most recent figures showing over 2,300 skilled worker visas issued for the construction sector in the year ending March 2023 (Home Office, 2023). Notable is that only 13 of these visas went to plumbing, heating and ventilation engineers. Overall, researchers have found no visible substitution of the sector's EU workforce by non-EU origin workers (Portes and Springford, 2023). Experts believe the main reasons for this are the financial and administrative costs and the fact that employers are not familiar with the immigration system, making it difficult for the sector to adjust to this new environment (ibid.; Sumption et al., 2022).

Also notable is that there are some construction trades that are experiencing extreme shortages, with the external insulation work done by cladders highlighted by several interviewees. These shortages are linked to the Grenfell Tower disaster⁹ and the ongoing programme of replacement of cladding on high-rise buildings across the UK. The CITB reports that this has 'absorbed all current capacity for external wall insulation' and that it 'should be assumed that existing capacity is negligible' (Oswald et al., 2021: 36).

The shortage of electricians also deserves a mention, given electricians are a dedicated complementary workforce to heat pump engineers that are essential to heat pump installation. This shortage was highlighted by several interviewees as a specific area of concern: '*we are crying out for more electrical workers*'. Vacancies in the trade have hit record highs this year, with the UK Trade Skills Index 2023 estimating that 100,000 new entrants will be needed to fulfil demand for electricians by 2032 (Professional Electrician and Installer, 2023). Investment in training and workforce development for electricians would have wider benefits, of course, given the trajectory towards the electrification of transport and growing demand for electric vehicles and solar energy.

An absence of workers is – and will continue to be – an extremely challenging issue for the UK government and one that, to date, appears to have elicited few coherent policy responses. The government has been robustly criticised for its lack of an overarching strategy for skills and employment, poor cooperation with the private sector on this issue, and a general failure to enact policies that would proactively address labour market shortages (MAC, 2022). The CCC has also expressed its concern around 'the risk of having insufficient workers to deliver sectoral targets and climate commitments' (CCC, 2023: 72). In particular, it highlights the sectors that will require the fastest-paced transitions as needing urgent interventions, including heat pumps and energy efficiency retrofitting, as well as offshore wind, electric vehicle and battery manufacturing, and afforestation and peatland restoration.

9 Seventy-two (72) people died in the Grenfell Tower disaster in 2017, when a fire broke out in a tower block in London. The cladding material used was found to be a primary cause of the rapid spread of the fire (BBC, 2019).

4 Skills development challenges

This section explains the specific skills necessary for retrofitting and presents a brief overview of current skills development initiatives and programmes. It then discusses the critical barriers to progress – the low incentives for upskilling existing workers, the unclear pathways for skills development and the low capacity of the further education system.

Skills development initiatives

While there are many barriers to scaling up retrofitting in the UK, multiple researchers and industry experts have pointed to the significant skills gaps in relation to heat pumps (Heat Pump Association, 2020; Branford and Roberts, 2022; Cretu et al., 2022). The UK government needs to significantly increase training provision for skills development (see Box 2 for an explanation of the specific skills required).

Box 2 Retrofitting skills

Skills required for heat pump installation can be divided into three categories (Cretu et al., 2022). The assessment and system-design category is the first. This typically requires a discussion with the customer about their needs, followed by a series of heat-loss calculations to determine the size of the heat pump required, and an analysis of the house's heating system to determine the sizing of radiators and pipework (ibid.). A high-quality assessment is critical for the heat pump to work efficiently and deliver both a comfortable, warm home and to avoid unnecessary energy costs.

The second category of skills required relates to system installation. Here, the skills are similar to those required for installing gas boilers and to other heating, ventilation and air-conditioning engineer roles (Cretu et al., 2022). The Microgeneration Certification Scheme (MCS), a UK standards organisation which certifies low-carbon installers, has created two separate Heat Pump Standards, one for Heat Pump Design and one for Heat Pump Installation. As such, engineers can specialise, and it is unlikely one person would do the whole job.

The third category is electrical work, which must be carried out by a qualified electrician who can assess the electrical network capacity, and configure a heat pump and its wiring. This implies different skills and training to those required for heat pump engineers and therefore creates a separate workforce challenge (ibid.).

Box 2 Retrofitting skills continued

With regard to energy efficiency, the CITB considers the skills required primarily in relation to insulation (of lofts, cavity walls, solid walls and floors) as well as airtightness and glazing (Oswald et al., 2021). Projects also require surveyors to assess the condition of the building, specialists to model energy efficiency improvements and project managers to supervise retrofits. While some aspects of installation will be classified as low skilled, others require specialist input, and pathways for workers with a range of skills will be necessary to create a 'retrofit army' (CLC, 2020: 12). Generally, more attention is being given to roles such as Retrofit Assessor and Retrofit Coordinator, occupations that are essential new roles for the retrofitting market (GMCA, 2022b).

There is, as yet, no national retrofit strategy in the UK and no detailed planning on how skills will be developed. While heating engineers can reskill rapidly to install heat pumps, it will take around three to four years to train to become a heat pump engineer via an apprenticeship or managed learning programme (Department for Energy Security and Net Zero and the Department for Business, Energy and Industrial Strategy, 2021). Currently, in order for a company to become Microgeneration Certification Scheme (MCS) accredited for heat pump installation, its worker/s require a level 2/3 National Vocational Qualification (NVQ) in domestic plumbing, alongside heat pump-specific training and on-the-job training for around six months. For the basic fitting of systems, a level 2 diploma can be gained in pipework (which takes a year at a local college). Under supervision, with on-the-job training, these workers can fit systems; not all need to be trained in the sizing and design of heat pump systems.

Multiple examples of skills development programmes and funds exist, from the Home Decarbonisation Skills Training Fund in operation since 2020 (which offers training in the energy efficiency, retrofit and low-carbon heating sectors) to the new Heat Training Grant launched in April 2023 (Department for Energy Security and Net Zero, 2023). While thousands of places are funded under each these schemes, interviewees pointed out that these do not directly translate to new entrants in the sector:

Government is funding 9,000 training opportunities for heat pumps but that does not mean you get 9,000 installers into the sector. A few hundred entered the sector last year we think.

The training is not the same as being an installer. The real barrier is many of these trainees are not ready to just install and you need experienced heat pump installers, but the base of expert installers is small. You can't just become a successful sole trader on your own.

The UK government has also supported the development of retrofit skills bootcamps across the country as part of the wider skills bootcamps, which are free and last 16 weeks (Department for Education, 2023). Stakeholders interviewed were somewhat sceptical regarding the take-up of

places on these programmes, with anecdotal evidence seemingly pointing to low demand for the places available. This challenge is illustrated by the experience of Greater Manchester, the Combined Authority of which has given retrofitting a very high priority and is experiencing some difficulty in this area (see Box 3).

Box 3 Retrofitting skills development: Greater Manchester Combined Authority

Greater Manchester is responsible for 3.6% of the UK's annual CO₂ emissions (GMCA, 2022a). The mayor has committed to reaching carbon neutrality by 2038 – 12 years ahead of the UK's national targets – though the city is not yet on track to meet its emission-reductions goals (GMCA, 2022b). After the mayor's re-election in 2021, the Greater Manchester Retrofit Task Force was convened to accelerate the city's retrofitting programme, with a detailed three-year action plan developed (ibid.).

The city is prioritising skills development in this area. Its evaluation has found that the existing talent pipeline in construction and retrofit is 'not encouraging', given existing construction-sector shortages and the lack of employers offering entry-level apprenticeships and training (GMCA, 2022b). In particular, the city has assessed that it has shortages of specialist retrofit workers, electrical workers, surveyors, bricklayers and roofers, and that the low numbers of external wall insulation installers is a particular vulnerability. To reach its targets, the city estimates that 80,000 existing construction workers will need to be upskilled, with a forecast shortfall of around 7,000–8,000 construction workers over the next five years (ibid.).

In 2021, Greater Manchester received £1.1 million from the European Social Fund (ESF) to set up a Retrofit Skills Hub to train 1,140 people to retrofit buildings across Manchester (GMCA, 2021a). The programme was designed to upskill workers already within the construction industry. However, in the end it only trained around one-third of the numbers targeted, finding *'the demand just wasn't there'*. There was clear recognition that it is difficult to attract the existing construction workforce into these types of programmes:

There's no impetus to upskill. You have work booked up for the next 6 months so why would you take time out, even for a funded training course, especially with all the uncertainty about heat pumps.

The city is also focusing on bootcamps after being awarded £7 million from the Department of Education for 2023/24 skills bootcamps, just under £1.5 million of which will fund construction and retrofit skills. This will train over 500 unemployed people or people changing careers in retrofit skills. This initiative is mainly focusing on basic construction skills, plant operation and repair/retrofit and includes efforts to match trainees to job vacancies in construction in the local area.

Source: Information provided directly at interview.

The capacity for skills development within the industry is also relevant and has the potential to be significant (Heat Pump Association, 2020). Manufacturers of heat pumps often offer their own training to installers, who may then become accredited installers for that brand of heat pump. Octopus, which claims to be the market leader, says it is focusing strongly on cutting the cost of installing a heat pump and has committed to ‘training an army of engineers’, including those with heating and plumbing experience, and electricians (Dann, 2021). It is aiming for 1,000 trainees per year to pass through the company’s new research and development centre in Slough (ibid.).

E.ON has been focusing on upskilling its own gas technicians – with its own dedicated training centre in Kingswinford in the West Midlands – which has been sufficient for its delivery of heat pumps to date. However, in future, the company intends to focus its training efforts on its smart metering workforce. Under the smart meter programme, the company has grown its workforce exponentially over the last decade (moving from installing meters in around 12,000 households a year in 2011 to over 500,000 a year currently – for E.ON customers and those of other suppliers).¹⁰ These workers already have electrical skills and good communication and customer service skills, so there is an opportunity to complement this with a plumbing and heating skillset. In a similar fashion, Octopus aims to transition many of its electricians who have been working on installing smart meters to the heat pump workforce (Dann, 2021).

Nesta has drawn attention to the considerable logistical challenge of rapidly expanding an industry that relies heavily on specialised skills and experience, given the lack of experienced heat pump engineers who can act as supervisors, teachers and trainers, delivering courses and providing oversight within the industry (Cretu et al., 2022). In addition, many interviewees emphasised the need to build supply and demand simultaneously, not just to develop the industry but also to provide an opportunity for skills to be ‘exercised’:

There is also a prerequisite that there is the volume of work to keep these people occupied. You can’t just create the technical ability. You need to also have work for them to do immediately or they won’t keep their skillset up.

10 Information provided directly in an interview with an E.ON representative. It should also be noted that smart meter installations are rapid compared to heat pump installations. For non-domestic properties (with more complex installations than for domestic properties) the government estimates a capacity of three installations per day (Department for Business, Energy and Industrial Strategy, 2023). This implies a workforce in the hundreds for companies achieving 500,000 installations per year. By contrast, installing a heat pump is estimated to take between two and five days (Vishnubhotla, 2023).

Low incentives for skills development

As noted earlier, many gas engineers lack interest in reskilling opportunities. While some of this is driven by demographics, numerous other factors are influencing the take-up of places on reskilling courses. Equally, these factors are influencing companies in the construction sector on decisions relating to upskilling their staff. Three aspects stand out.

Firstly, low customer demand alongside high demand in other areas is considered a critical problem:

Construction businesses are already very busy. There is high demand generally and so within this context – when no one is coming and asking for insulation and heat pumps and other types of demands are very high – it just won't happen that people will focus on the green skills aspect.

Secondly, the cost to reskill and the lack of financial incentives form a major barrier. Existing workers often pay to be reskilled and take unpaid leave to complete training. This is particularly challenging for gas engineers, 77% of whom are estimated to be self-employed sole traders (Norman and O'Regan, 2022). The cost of training courses in addition to the loss of customer revenue means sole traders can incur losses in the range of £1,200–£2,500 (Cretu et al., 2022). Nesta also highlights the costs to register and annual fees (which are necessary to work as an installer) under the MCS contractor scheme, and the lack of a wage premium related to heat pump installations, meaning 'there is no obvious monetary and wage incentive for a gas engineer to retrain in heat pump installation' (ibid.: 33).

Thirdly, the general lack of confidence and lack of long-term certainty remains a hugely important recurring theme, which directly affects skills development. The lack of a long-term pipeline of retrofit work that gives the construction sector the confidence to invest in skills development has been repeatedly emphasised in studies and industry assessments.¹¹ A major issue is the 'distrust generated by previous grant/subsidy withdrawals' (GMCA, 2022a: 33). This was strongly highlighted by interviewees as a factor exacerbating lack of confidence, both in light of the abandoned Green Deal and the Green Homes Grant:¹²

Everything has been so stop-start. For example, with the Green Homes Grant, many of our members applied and some trained up staff. But then the scheme collapsed [...] Businesses fear they will invest money in training their workforce and then the scheme will disappear.

11 See, for example: CITB (2021); GMCA (2022b); Department for Energy Security and Net Zero and Department for Business, Energy and Industrial Strategy (2023).

12 The Green Homes Grant was the second major failed energy efficiency scheme after the Green Deal. It offered grants of up to £10,000 to households to subsidise the installation of energy efficient and low-carbon heating improvements. Though public interest was high, there was a low take-up of the scheme due in part to its complicated application process and delays in providing vouchers to households; of the first tranche of £1.5 billion, £1.4 billion went unspent and the programme was terminated early (EEIG, 2021).

There is a reluctance to upskill because we've seen it all before, like in the mid-2000s with the insulation boom. It all came in a big flurry and then disappeared.

Unclear pathways and low capacity of the further education system

Currently in the UK someone has to train as a gas and oil heating engineer or plumber (via an apprenticeship or further education college) before taking the additional step of training as a heat pump engineer, a complex route that is seen as a significant barrier (Cretu et al., 2022). The lack of suitable apprenticeships offering a direct pathway to become a heat pump engineer in the UK is a source of considerable disappointment, given the importance of this approach for skills development. Fortunately, through the Institute for Apprenticeships and Technical Education, the government has been developing a number of new apprenticeship standards that relate to green skills and as a result, a new pathway – the Low Carbon Heating Technician apprenticeship – will soon be available (Department for Energy Security and Net Zero, 2023).

There is also limited expertise in relation to low-carbon heating among college tutors (Cretu et al., 2022). The lack of widely available courses around retrofitting in further education colleges came up in interviews as a concern:

We did not map all providers of courses, but it's clear that opportunities are very spread out and only a handful offer it. If you don't have the training spread more widely then people won't travel large distances to go to the colleges providing the training.

In addition, there is concern that finding enough trainers for retrofit courses will be difficult, given the lack of expertise and much higher salaries offered in industry. The long-term funding challenges facing further education colleges is exacerbating these problems.¹³ Rather than addressing this directly, what is on offer is a complex landscape of training options and schemes that have been described as 'fragmented and insufficient to meet the scale of change required' (House of Commons Environmental Audit Committee, 2021: 25).

While the current landscape is bleak, interviewees cautioned that the real consequences of labour shortages and skills gaps are still far from being felt:

Skills are important but unless you have the right regulatory environment and incentives it doesn't feature because we have such a small number of installations. So, because we are doing such small numbers, workforce is not seen as a key problem. But if you did implement the climate committee targets then it would become a huge problem.

13 Total public spending on both adult education (funded through the Adult Education Budget) and for apprenticeships (funded via the apprenticeship levy) has fallen since 2010–2011 and will be 25% lower in 2024–2025 as compared with 2010–2011 (Sibieta et al., 2022).

As such, the problem is somewhat obscured but remains a major challenge that has been stored up for the (immediate) future. The recent CCC workforce report specifically calls for more proactive coordination and government leadership to avoid skills and labour shortages, particularly given the sector's predominance of small and medium-sized enterprises (SMEs) and in the context of the rapid pace of change that will be needed to meet decarbonisation targets (CCC, 2023).

5 The post-Brexit immigration system

This section provides a brief explanation of the UK's current immigration system, as a background to the immigration policy analysis in the next two sections. It includes a short summary of public attitudes and narratives around immigration given the political sensitivity of immigration policy reforms in the UK context.

The points-based system

The UK's immigration system has undergone a significant transformation with the ending of freedom of movement with the EU on 1 January 2020, after the 2016 Brexit referendum. The UK now operates a points-based system, which applies skill and salary thresholds for both EU and non-EU citizens seeking work in the UK. While the system has become much more restrictive for EU citizens, it is a relatively liberal system compared to many EU countries given the comparatively low salary and (intermediate) skill threshold applied (Portes and Springford, 2023).

As noted earlier, many of the occupations within the construction sector, such as heating engineers, plumbers and electricians, would be eligible for skilled worker visas given their skill levels and as long as their salaries passed the threshold (£25,600/year). A job offer is required from a qualifying employer, who has a sponsor licence in place. There are also visa fees and other charges, which are considered high by international standards (ibid.). Business feedback is that a more flexible immigration system is needed with the visa- and work-sponsorship systems seen as complex, overly bureaucratic and expensive (REC and CBI Economics, 2022; Sumption et al., 2022).

While jobs deemed low skilled are generally excluded from the skilled worker route, there are two main exceptions: the agriculture and adult social care sectors. The UK's agriculture sector has a long history of reliance on seasonal migrant workers, with a very high dependence on the EU workforce from 2013 until 2020 (ICIBI, 2022). Post-Brexit, a special seasonal worker scheme was set up.¹⁴ This scheme has a model of umbrella sponsorship, with scheme operators responsible for international recruitment, sponsorship of the workers and placing them with businesses in the sector. The UK's adult social care sector has also relied on migrant workers to fill labour gaps in the context of extremely high vacancy rates, with a high reliance on EU workers before Brexit (Kumar and Dempster, 2021; Kumar et al., 2022). Care workers have recently been added to the shortage occupation list and are eligible under the expanded Health and Care Worker visa (DHSC, 2021; MAC, 2021).

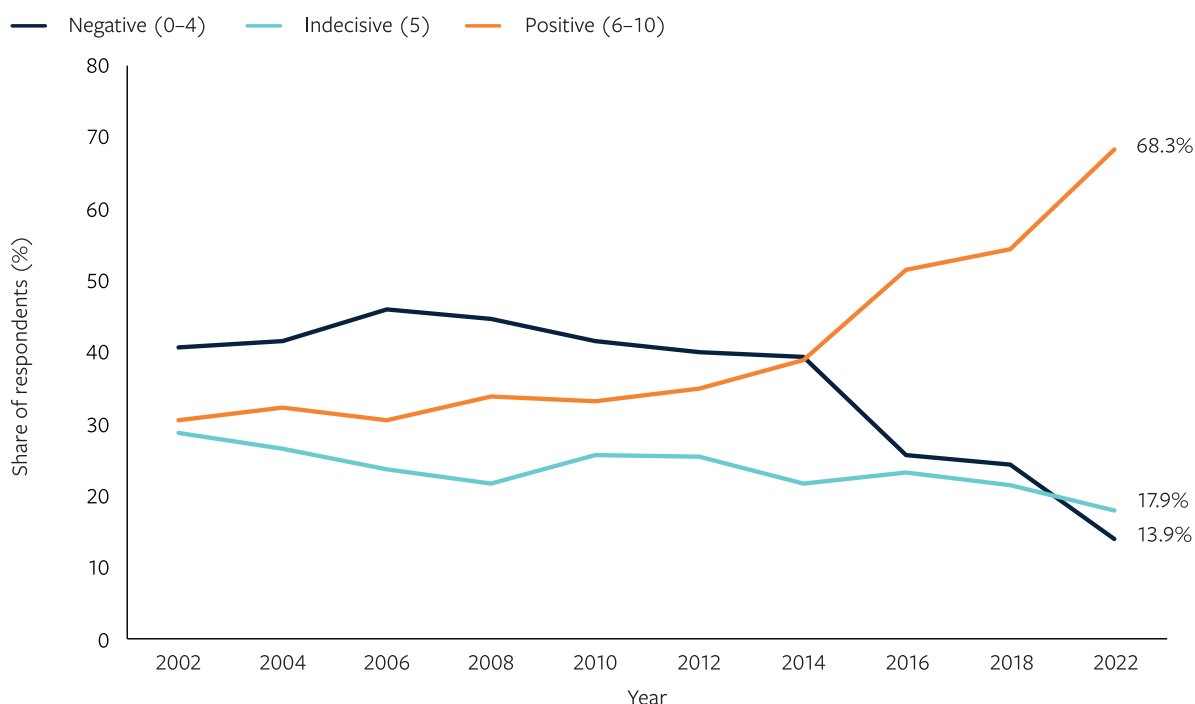
¹⁴ This has enabled around 66,000 agricultural workers to come to the UK for six months of work out of a 12-month period (ICIBI, 2022).

A major impact of the new immigration system is that it clearly favours skilled workers, regardless of their country of origin; it has also resulted in an increase in non-EU immigration (Portes and Springford, 2023). In addition, it has led to a reduction in migration of workers into low-paid positions, particularly those from the EU, aggravating labour shortages for sectors such as hospitality and transport (UK in a Changing Europe, 2023). At the same time, immigration to the UK has now reached record levels, though apart from the increase in work visas and study visas, a major reason for this lies in the humanitarian visas offered to people from Hong Kong and Ukraine (ibid.).

Public attitudes and narratives around migration

Immigration remains a subject which generates headlines and hostile political and media narratives in the UK (Reuters, 2022; Taylor, 2023a; 2023b). However, the escalation of hostile rhetoric is significantly out of step with British public opinion, which has shifted quite dramatically in favour of immigration (Kumar and Rottensteiner, 2023). ODI's research has found increasingly positive attitudes when people are asked whether immigration makes the UK a better or worse place to live (see Figure 3), with attitudes in 2022 now among the most positive in Europe.

Figure 3 Attitudes towards immigration: do immigrants make the UK a worse or better place to live?



Note: The survey scores respondents from 0 to 10. ODI has classified survey respondents who scored 0–4 in their answers to the question ‘Does immigration make the UK a worse or better place to live?’ as holding ‘negative’ views, those scoring 5 as being ‘indecisive’ and those scoring 6–10 as holding ‘positive’ views. Wave 10 of the European Social Survey (ESS) should have taken place in 2020 but was delayed due to the Covid-19 pandemic.

Source: European Social Survey, n.d.

These positive trends are confirmed by many other surveys: for example, Ipsos research with British Future finds a huge increase in the share of respondents reporting that they believe immigrants' skills and labour are necessary for Britain's economic recovery (Rolfe et al., 2022). The UK also topped an international league table this year as the country that is the most accepting of immigration and the least likely to want strict limits on foreigners entering the country (UK in the World Values Survey, 2023). Even more recent polling finds strong support for making immigration easier for workers in jobs where there are shortages (Kantar Public and Migration Observatory, 2023). The British public also show very strong support for allowing asylum seekers to work six months into their application process, a policy that has long been called for by civil society (Refugee Action, n.d.) and for which the private sector has also advocated (REC and CBI Economics, 2022).

Immigration is no longer a highly salient issue for the British public, with those citing immigration as a top concern declining significantly since the Brexit referendum. Experts suggest this trend is unlikely to change significantly as the size of the group of 'strong migration sceptics' has declined sharply over the last decade (Ford and Morris, 2022: 5). While all evidence points to the public being ready for less-polarised debates and more constructive solutions, the current political climate and hostile narratives could certainly act as an impediment to the consideration of appropriate immigration policy responses in light of net zero challenges.

6 Immigration policy and the retrofitting workforce

Whether migrant workers will be necessary to enable the UK to meet its decarbonisation targets is not a question that is often asked. Very few of the stakeholders consulted had ever heard of immigration policy being proposed as a relevant tool to address workforce challenges in the context of retrofitting, or indeed the wider net zero transition. This is shifting somewhat with the MAC consultation around the construction sector occupations that could qualify for the shortage occupation list (see more on this below), though this is a recent development. Two interviewees pointed out that it is also a topic being discussed in Scotland. The Scottish government, in collaboration with Scottish Renewables, is shaping its participation in the UK's Displaced Talent Mobility Pilot¹⁵ with a view to recruiting engineers for the renewable energy sector.

While the recent CCC workforce report acknowledges the tight labour market, the ageing population and changing immigration system – and the risk these collectively pose for the availability of skilled workers – it does not explore immigration aspects in depth, a gap this paper seeks to fill. One reason for the lack of attention to immigration as part of the solution is, no doubt, that the narrative around the large domestic economic opportunity is strongly embedded. The government has ambitious targets around the acceleration of the number of green jobs, and their quality, alongside a commitment to increase diversity and inclusion in the green workforce (House of Commons Environmental Audit Committee, 2021). Generally improving the diversity of the workforce is increasingly proposed as a solution, both for the heat pump industry and for occupations within the construction sector (CCC, 2023; Kizilcec and Caiger-Smith, 2023).

While none of the stakeholders interviewed felt international recruitment should be a first preference solution, several expressed that *'it should be an open proposition'*, and that it might well be necessary *'to make the retrofitting doable'* given the scale. The rest of this section explores this rationale and the various implications of using immigration policy to meet aspects of the retrofitting challenge.

Is immigration policy a relevant tool to help develop the retrofitting workforce?

There is strong rationale for immigration policy to be employed as a tool to aid workforce development, given the critical and urgent nature of the country's net zero transition. Several interviewees drew attention to the fact that retrofitting should be seen through the lens of a

15 The Displaced Talent Mobility Pilot is being implemented by the UK government in collaboration with Talent Beyond Boundaries. It aims to support refugees (or forcibly displaced peoples) to come to the UK under the Skilled Worker visa route (Talent Beyond Boundaries, 2021).

'national mission'. Retrofitting is seen as *'not just another sector without people, but a sector that needs to deliver on an important national target'*. This context is key:

There are a lot of shortages of workers in the UK, but for a sector like net zero its mission critical to meet targets.

It is important to put this into context with other sectors of the UK economy that, alongside the construction sector, have seen significant shortfalls in workers due to Brexit, and where non-EU workers are not filling these gaps (UK in the Changing Europe, 2023). While experts have observed that lower employment is a possibility, with businesses potentially reducing output or turning to automation (Sumption et al., 2022; Portes and Springford, 2023), the assessment is necessarily different if applied in the context of the climate crisis and the UK's decarbonisation targets. It is absolutely not an option for the construction sector to reduce output and, in relation to retrofitting, the construction sector cannot automate in many areas.¹⁶

In addition, the UK's delayed progress means it will not easily replicate what other countries have achieved in developing their domestic worker pipeline for heat pump installation. Several interviewees reflected on the immigration question in the context of other European countries. One concluded:

If European countries can install high numbers and it's not an issue, should it be an issue over here? I think we've made ourselves different through inactivity.

Certainly, the UK government has shortened the timeframe for skills development. The key question, therefore, is not 'does the domestic workforce have the skills?', but instead 'can the domestic workforce develop the skills in the timeframe available to meet decarbonisation targets?' The three to four-year training period means there will be a significant lag between the government-planned increase in training programmes and the availability of fully trained heating engineers. The one-year training period for installers (followed by the six-month on-the-job training required) also implies some delay. Recruiting heat pump engineers, electricians, and retrofit assessors and coordinators internationally – or upskilling those already qualified as plumbing, heating, or ventilation and cooling engineers, for example – offers a faster option, if workers can be attracted to the UK.

16 Industry experts interviewed explained that with regard to fabric efficiency, there are no automation possibilities given that the main task is simply the installation of insulation. However, with regard to heat pumps, there are some areas for efficiency gains linked to what is achieved during the manufacturing process in factories and particularly as heat pump design moves more towards a single integrated unit. This can make installation more efficient and cost effective. But even using the most efficient integrated unit design will still require a huge scale-up of the installer workforce.

In the main, this does not imply altering visa eligibility rules, as plumbers, heating and ventilation engineers and electricians would generally be eligible for skilled worker visas given their skill and salary levels. However, for energy efficiency measures there may be some occupations that would fall below these thresholds, though several of the relevant building tradespeople have already been added to the shortage occupation list (as discussed below).

It is also clear that the UK would benefit from recruiting an experienced cohort of heat pump engineers who could act as teachers, trainers and supervisors. Several interviewees highlighted this specifically:

The overseeing angle is key... We would probably need a few hundred expert engineers to train up the domestic workforce.

We need supervisory roles most desperately.

Interviews also pointed to the fact that *'immigration could help deal with spikes in installation'* and *'to help manage the pace of change'*. In particular, the rapid increase in heating engineers and installers needed from 2025, when gas boilers can no longer be fitted in new homes, could effect a major step change.

Where would workers come from?

Many interviewees highlighted the mature European heat pump market – and countries such as Sweden, Norway, the Netherlands, Poland and Germany – as the most appropriate place to look for workers. In Norway, two-thirds of households have a heat pump, while in Germany there was a 53% increase in sales of heat pumps in 2022 and the government expects to reach annual sales of more than 500,000 units in 2024 (EHPA, 2023a). Poland's dramatic growth in its heat pump market in 2022 has also been noted as particularly impressive; it increased significantly (by 120% in the last two years) under the government's Clean Air Programme, which has enabled the replacement of old coal heating systems (Morawiecka and Rosenow, 2022; EHPA, 2023a). Poland is considered well positioned with its skilled workforce, given its excellent technical education and successful efforts to boost vocational training courses in heat pump installation (Morawiecka and Rosenow, 2022; EHPA, 2023b).

While heat pump industries and workforce development are certainly more advanced in many European countries, attracting these workers to the UK is a difficult proposition. Firstly, given this is a critical clean technology, competition in the recruitment of heat pump engineers and installers is likely to grow, especially in the context of the widespread labour shortages across Europe that are threatening the continent's climate ambitions (Strauss, 2023). In addition, the UK's position is unenviable given its new immigration system is 'much more restrictive, costly, and less flexible for EU citizens than the one that preceded it' (UK in a Changing Europe, 2023: 10). This is evidenced in the data showing that EU citizens' use of the new visa system has been relatively low

(Sumption and Walsh, 2022). And further, as pointed out by interviewees, even under a special ‘net zero visa’ route that could offer reduced costs (like the Health and Care Worker visa), this is still unlikely to attract EU workers. Again, this is borne out in the data, given the Health and Care Worker visa has, so far, hardly attracted EU workers at all.¹⁷ The consensus appears to be that the UK is not an attractive destination for EU workers, given reduced privileges and increased costs and bureaucracy. It is not impossible that this will change, but for now it does seem that the UK will not easily take advantage of the EU’s skilled workforce in relation to retrofitting or the wider net zero workforce, without significant efforts to make its immigration system more attractive.

This leaves options from outside the EU. The question, in this case, is whether the required skills exist in non-EU countries. Certainly, international recruitment is feasible when it comes to plumbing, heating and ventilation engineers, electricians and potentially other retrofitting categories (fabric insulation). Whether qualifications are comparable to UK qualification standards requires consideration, though this does not always present a barrier. An instructive example comes from Germany, where the Public Employment Service is working with the public employment agency in Colombia under a placement agreement to recruit Colombian electricians.¹⁸ They have found standards are not lower and that the requisite training courses are available to meet German requirements. Under their placement programme, all that was necessary to ensure German standards were met was an adjustment to the combination of technical courses taken at the national training institute (e.g., adaptation rather than upskilling). Electricians are now directly recruited under a special pathway to work in Germany and can apply without any pre-travel process of formal qualification recognition.¹⁹

Given the unfamiliarity of UK gas boiler systems and the fact that heat pump technology is new, what is likely to be necessary for international recruitment outside the EU is upskilling in heat pump technology and to meet some new retrofitting standards. Fortunately, if upskilling plumbing professionals or ventilation and air conditioning engineers, for example, skillsets are considered very similar to heat pump engineers and rapid upskilling is feasible. Therefore, this would represent a smaller burden than the 1–1.5 or 3–4 year training pathways required for completely new entrants. This upskilling requirement, however, does mean that proactive investment would be needed. Such investments can be made via skills mobility partnerships in the area of green skills, as illustrated by the example from Germany (see Box 4). Other examples exist including ‘Move Green’, a circular mobility scheme between Andalusia in Spain and Northern Morocco which provides skills to Moroccans seeking to work in the renewable energy sector (Migration Partnership Facility, n.d.).

17 From 1 January to 30 September 2021, for example, EU citizens applied for 25,200 work visas, with only 590 applications made under the Health and Social Care visa route (Sumption and Walsh, 2022).

18 This is not a government-to-government agreement, but a public-entity-to-public-entity agreement between the public employment agencies of both countries.

19 Information provided directly at interview.

Box 4 Germany's renewable energy expansion, skills partnership and immigration reform

The expansion of renewable energies from wind and solar is one of the top priorities of the federal government in Germany in relation to the country's energy transition. Renewable energies covered almost half (47%) of the country's power consumption in 2022, and the government has decided to rapidly scale up renewables to reach 80% by 2030 (Appunn et al., 2023). It has been estimated that around 216,000 skilled workers are needed for the expansion of solar and wind energy, across a wide range of occupations (Malin et al., 2022).

There is a high level of awareness among both the government and the private sector that existing labour and skills gaps pose significant challenges for the energy transition (Meza, 2022; Wehrmann, 2022). As such, Germany is now looking overseas to help fill its labour gaps in this sector. BSW (Bundesverband Solarwirtschaft), the German solar industry association, recently signed an agreement with the Skill Council for Green Jobs in India to secure Indian workers for the German solar industry (Kyllmann, 2023). To date, 51,000 solar workers have been trained in India, with many of these expected to contribute to photovoltaic (PV) expansion in Germany (Ernst, 2023). At the same time, the German government channels complementary aid funding to support the development of solar energy in India.

The effectiveness of the partnership between a German trade association and the Indian skills council depends partly on the new immigration law set to pass in Germany imminently. This law, agreed by the Cabinet in November 2022, aims to attract skilled workers from non-EU countries. It offers visas under three pillars: a 'skilled worker' pillar, an 'experience' pillar (which requires two years' work experience in a relevant sector and a degree or vocational training), and a 'potential' pillar under which third country nationals with relevant work experience are given the opportunity to reside in Germany to look for work (Keller, 2023). The new law will also streamline immigration procedures, digitising applications and speeding up the process, as well as facilitating the immigration of family members (Federal Ministry for Economic Affairs and Climate Action, 2022; Wehrmann, 2022). Migration for education is also included as a key aspect in the new legislation, which includes measures to attract people to vocational training schemes (Wehrmann, 2022). This immigration reform has been framed by government ministers as an essential move in the competition for talent from overseas (Federal Ministry for Economic Affairs and Climate Action, 2022).

Will the construction sector be able to use the immigration system effectively?

While workers can be found (and prepared with purposeful intervention), the construction sector still needs to be able to manage international recruitment. As noted earlier, employers in the sector

have sponsored comparatively few skilled worker visas under the new immigration system, with lack of familiarity with the system and administrative costs known to be key barriers. Also relevant is the fact that many heat pump installers are micro-businesses and small traders (Cretu et al., 2022). While using the immigration system is not straightforward, it is also the case that construction businesses are expressing more support for immigration as a response to shortages. A trade survey by the FMB found that 48% of its members supported the introduction of targeted immigration for the building sector, provided there was also investment in UK-based training opportunities, while only 21% were opposed (FMB, 2023b). This was not an inevitable result, as explained by an interviewee:

We could have expected very different responses across the industry and across geographies as generally builders can feel quite differently about migration and its impacts based on these circumstances. For example, some working in the Repair, Maintenance and Improvement (RMI) sector may have seen migrants as increasing competition in the past.

In February 2023, the UK government instructed the MAC to conduct a rapid assessment of the construction and hospitality sectors in advance of the full shortage occupation list review. The MAC recommended that the following construction sector occupations (as classified under standard occupational classification (SOC) codes), be added to the shortage occupation list: 5,312 ‘bricklayers and masons’, 5,313 ‘roofers, roof tilers and slaters’, 5,315 ‘carpenters and joiners’, 5,321 ‘plasterers’ and 5,319 ‘construction and building trades n.e.c. [not elsewhere classified]’. The government has now accepted these recommendations, which means these occupations will now benefit from a reduced salary threshold under the points-based system and slightly lower visa fees (Kollewe, 2023; MAC, 2023). The MAC’s reasoning was that despite efforts to improve training pathways, recruitment and retention, shortages show no signs of abating and, indeed, they felt that demand for workers is likely to increase markedly. They also gave ‘substantial weight to the strategic importance of construction for the UK economy’ and felt it met the ‘criterion of public value’ (although there was some debate on this fact within the committee) (MAC, 2023: 14). However, no direct mention was made of net zero or the green transition in the report.

A particular challenge in the review was that certain occupations do not easily fall under current SOC codes used by the ONS and important for shortage occupation list designations. This applies, for example, to ‘retrofit coordinators’, which construction sector employers suggested can be classified under 5,319.²⁰ The lack of appropriate SOC codes is a particular challenge when it comes to green jobs and gathering data on the growth of these occupations and demand for these trades (Dempster et al., 2022). Without reform, this is likely to remain problematic in future.

20 Under the law, employers must choose the code that they feel is most appropriate. This suggested classification was not disputed by the MAC. However, legally it has no ability to determine whether a particular occupational code can be used, given this is purely an issue for the Home Office (MAC, 2023). Generally, this is a difficult area as the Home Office is still using SOC codes from 2010 and has not yet transitioned to the 2020 SOC codes.

Though the addition of these occupations on the shortage occupation list has been welcomed by industry, there is still some concern that the response of employers is not guaranteed. As one interviewee told us:

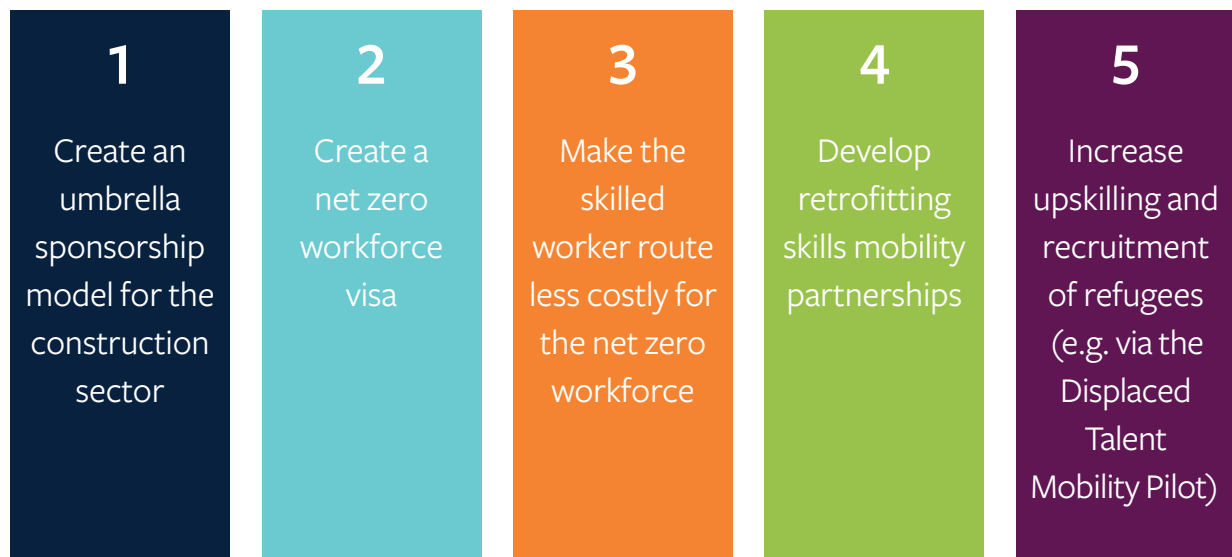
There is concern that the shortage occupation list will not actually make a difference. Builders may not look to international recruitment as this is not something that they have been very comfortable with in the past. Migrant workers would have been common on large construction works with big companies but it's not really the same with small builders who are not used to it, even in the house builder group.

This is a barrier that could be directly addressed by policy reform, such as the option of an umbrella sponsorship model, as discussed in the next section.

7 Setting out the immigration policy options

Although many of the occupations involved in the green transition would qualify for a skilled worker visa, the current immigration system is unlikely to facilitate what is required for the retrofitting sector. As noted in Section 6, the EU workforce is unlikely to materialise, non-EU workers with the exact skillset are not a readily available pool, and the construction sector is ill-equipped to use the immigration system. Therefore, a more purposeful approach will be required, as explored in the following five options for immigration policy reform (Figure 4).

Figure 4 Immigration policy options to support retrofitting workforce development



Option 1: Create an umbrella sponsorship model for the construction sector

If the government wants the construction industry to make better use of the immigration system, then the main option to make take-up easier is to implement an umbrella sponsorship model, with a body taking responsibility for administration and making sure sponsorship requirements are met. As noted earlier, given the main barrier is not related to eligibility, this option seeks mainly to address the method of sponsorship. The Construction Industry Training Board (CITB) has advocated for this in the past, calling for a ‘clearing house model’ where a sectoral body would be responsible for compliance duties and enabling small employers to more easily access a pool of skilled labour (CITB, 2019). This is not necessarily an easy task within a fragmented and competitive sector and would require government leadership and collaborative public–private effort with construction sector trade bodies to design and monitor such a scheme. It would also be important to reflect on the many challenges this model has faced with regard to seasonal agricultural workers, before emulating this approach (see Box 5).

Box 5 Challenges with the umbrella sponsorship model in agriculture

As agriculture is considered a high-risk sector for exploitation, this visa route entails compliance-monitoring requirements by scheme operators, focused on both immigration compliance as well as pay and working conditions. Significant welfare issues have been identified, with the assessment of the first pilot finding problems with the provision of safety equipment, the quality of accommodation, and discrimination and mistreatment by managers (Department for the Environment, Food and Rural Affairs and Home Office, 2019). Later assessments by Home Office compliance officers documented incorrect pay, poor standards of accommodation and difficulties accessing healthcare (ICIBI, 2022). Several media reports last year documented illegal recruitment fees (Dugan, 2022; Mellino et al., 2022) and experts have generally raised concerns about recruitment practices, debt bondage and the inability to leave the employer (Focus on Labour Exploitation and Fife Migrants Forum, 2021). In addition, the Home Office has been criticised as not acting ‘promptly or seriously’ in response to findings in their own compliance visits; it has been urged to do more to ensure that scheme operators are meeting compliance requirements and to engage fully with the numerous stakeholders involved (ICIBI, 2022: 7). The MAC has stated its significant lack of confidence that the UK government ‘will be in a position to prevent exploitation of migrant workers whose visa ties them to low-wage jobs’ (MAC, 2022: 40).

As Box 5 illustrates, concerns around these types of schemes can be significant. Risks are particularly high when employer-sponsored visas are used for low-wage jobs: with immigration status tied to an employer and without access to most benefits, the power imbalance between employer and worker is particularly acute (Sumption et al., 2022). This is not an irrelevant issue for the construction sector and needs to be considered if an umbrella sponsorship model is to be applied. For mid- or high-skilled positions – such as heat pump engineers (designers and installers) – risks are likely to be small. However, there could be issues in other areas of retrofitting, with one interviewee assessing that *‘the risk mainly lies with the fabric aspect’*. Risks include health and safety issues on site, including respiratory problems linked to insulation. While standards tend to be higher and better monitored on large building sites, small projects in domestic properties may be completed cash-in-hand and with poor protective equipment, which could translate into a risk of exploitation of migrant workers. There is a considerable amount of learning in this area about what to take into consideration, including: migrants’ knowledge of their rights, the supply chain for worker recruitment, the nature of employment contracts, unionisation and the nature of work. In particular, the ‘employer pays principle’ (meaning that recruitment fees and related costs are not borne by migrant workers) and the ability to change employer are central principles of fair and ethical international recruitment (IOM, n.d.)

An umbrella scheme for the construction sector could also offer additional opportunities. The government could consider, for example, offering visas under the scheme that specifically include vocational training or apprenticeships in the sector. This would emulate approaches taken in

Germany and Belgium (EMN, 2022; Wehrmann, 2022). Given the ability to upskill those already qualified as plumbing, heating or ventilation and air conditioning engineers in a rapid timeframe, offering visas that enable vocational training, linked to industry placements under the umbrella scheme, is likely to be seen as an efficient option.

Setting up a successful umbrella sponsorship scheme – and guarding against the exploitation of migrant workers – requires purposeful intervention and effective coordination. Given the fragmented nature of the construction sector and the high presence of SMEs, government leadership, a strong role for trade association bodies and active support from the Home Office would be critical. Such prerequisites for the effective use of immigration policy tools chime closely with the CCC's conclusions, highlighting the retrofit sector as one which needs proactive intervention and enhanced government leadership. Its rationale is three-fold: the backdrop of a tight labour market, the fact that home retrofit is one of the key 'grow sectors' where the pace of change demanded is rapid, and the fact that it will primarily be delivered by SMEs (CCC, 2023). The requirement to 'make the immigration system work for the sector' can be added to that list.

Option 2: Create a net zero workforce visa

The UK's skills-based immigration system is 'broadly neutral' and not well attuned to the government's domestic economic priorities: it does not prioritise sectors or occupations (the main exceptions being health and social care) (UK in a Changing Europe, 2023). There is an option for the UK government to more explicitly link immigration policy to high-priority sectors with skills gaps, such as retrofitting. The creation of a net zero workforce visa is one way to do this. This does have the disadvantage of creating more exceptions within a broadly neutral system, which interviewees noted would not be welcomed by all. However, some have argued that such exemptions are beneficial 'for occupations of particular economic and social value' (Ford and Morris, 2022: 7). There is possibly no other area of more economic and social importance than the net zero workforce. Creating a tailored visa category, as has been done for health and social care, would be an important symbolic policy to communicate the importance of the net zero workforce. This option could be adopted in parallel to Option 3 (which would lower costs) to attract more workers under this new visa category. In addition, it could be implemented in tandem with investments in targeted skills mobility partnerships aimed at developing the retrofitting skills workforce in a number of origin countries (Option 4).

Option 3: Make the skilled worker route less costly for the net zero workforce

The UK had exceptionally high fees for its visas by international standards, even before the very recent large fee increase was announced in July 2023. Costs incurred by non-UK nationals in coming to the UK under the skilled worker route include the headline visa application fee: £1,235 for a visa for more than three years in a non-shortage occupation, a figure now set to increase by 15% (Carter, 2022; Yeo, 2023). Added to this visa fee is the immigration health surcharge, which was £624 for each year of the visa but has just been increased to £1,035 per year in the government's new announcement (Carter,

2022; Yeo, 2023). Family members accompanying the worker to the UK are liable for the same visa fee and health surcharge, meaning costs can spiral: under the previous fee rates, costs could quite feasibly pass £10,000; under the new system costs will be much higher. Employers, who in some cases will take on the costs borne by workers, also have to pay for their sponsorship license, a certificate of sponsorship for each worker they are recruiting and the immigration skills charge. The immigration skills charge is costly, standing at £1,000 for the first year for a medium to large employer, and costing £5,000 for a five-year period (Carter, 2022). Reducing these costs would be advisable, particularly with a view to attracting the highly qualified EU workers who could act as teachers, trainers and supervisors to train up the domestic heat pump workforce.

Visa fee reductions could be introduced, targeted by SOC code, to lower fees across retrofitting-relevant occupations. Applying reductions by SOC code is an approach that is already used; for example, some research-related jobs are exempt from the immigration skills charge (UK Government, n.d.). More generous concessions – including reductions of the visa fee, health surcharge and immigration skills charge – could be provided to priority net zero workforce occupations²¹ with a view to attracting more applications under the net zero workforce visa category. Generally reducing fees, improving the ability for family reunification and making the citizenship offer more attractive are also important incentives to attract migrant workers and could be considered in this case (Ford and Morris, 2022).

Option 4: Develop retrofitting skills mobility partnerships

Purposeful intervention in a skills mobility partnership would help create a ‘pipeline’ of workers for the UK construction sector. The UK does have some relevant history in this area, given the numerous government-to-government agreements established to facilitate international recruitment into the health and social care sector (including with the Philippines, India, Nepal and Kenya) (DHSC, 2022). There is a possibility of building on this foundation of bilateral labour agreements, to develop skills mobility partnerships. These are partnerships that seek to promote skilled migration and mobility in a way that benefits both countries of origin and destination, as well as individuals and employers. Benefits include the alleviation of labour and skills shortages in countries of destination; the upskilling, employment and wages provided to migrant workers (and the remittances sent back to families and communities as a result); and the training benefits received by wider cohorts of workers in countries of origin through skills development programmes implemented locally. While a recognised policy tool, their use is not yet widespread, though they have been used in healthcare, information and communications technology (ICT) and agriculture, with Germany and Belgium having long-standing experience in this area (EMN, 2022). The International Organization for Migration UK (IOM UK) has pointed out that the UK is well positioned to pursue objectives of mutual benefit, by developing green

21 With retrofitting in mind, this should include at a minimum: plumbers, heating and ventilation engineers; electricians; higher education teaching professionals in this field; and the building trade occupations now included on the shortage occupation list. However, it could be expanded to include exemptions for other net-zero-related occupations such as wind-turbine technicians if labour shortages are critical barriers in that area.

skills mobility partnerships that invest in the development of green skills in countries of origin, and by encouraging the migration of a smaller subset of trainees to the UK (Dempster et al., 2022).

Skills mobility partnerships are notable for five components: formalised state cooperation, multi-stakeholder involvement (with a strong private sector role), training, skills recognition and a mobility element (EMN, 2022). They may also include vocational training in the country of origin or destination, internships in the destination country, or scholarships. The development of a training curriculum is essential, and strong involvement of private sector partners is desirable to elaborate the skills and training requirements. In this area, the UK already has well-prepared organisations and content.²² Adaptation would no doubt be necessary, including in collaboration with local private sector partners in the country of origin, to ensure skills developed also match local job market requirements. Key challenges are the costs of training and complex organisational requirements with multiple stakeholders, as well as language barriers and the fact that these partnerships are often small-scale, niche initiatives (ibid.).

Little government-to-government experimentation on these types of partnerships has taken place around the green skills agenda. ‘Mutualisation’ of these partnerships – where multiple destination and origin countries participate in the same programme – is also, so far, an untested model. However, this could be a relevant and efficient option for skills development in relation to retrofitting, given the high demand for these workers and skills across Europe. In addition, while to date skills mobility partnerships have not included refugees or other non-nationals because governments are generally keen for benefits to flow to their nationals, it would be useful to rethink this limitation. Green skills mobility partnerships could involve incentives to include refugees and displaced people in training programmes.

It is opportune to ask whether the UK could specifically emulate Germany’s approach, looking to India for a skills mobility partnership. There is significant rationale for the UK to look to India, not least the close cultural and diplomatic links, well-established Indian diaspora in the UK, shared fluency in English, and the significant (and increasing) migration from India to the UK.²³ This is a sector where shared skills development would likely be highly valued by India, given green construction is forecast to be one of the most important green job-creating sectors.²⁴ The country’s

22 This includes the Heat Pump Association, which has proposed a three-day Heat Pump Foundations course for heating engineers; BPEC, a specialised provider of industry-recognised qualifications and training courses across the plumbing, heating, gas and wider energy sector that provides services to colleges, private training centres and employers (BPEC, n.d.); and Heat Geek, which is supported by the Department for Business, Energy and Industrial Strategy and has developed training curriculums for several courses to enable upskilling for heat pump design and installation (Heat Geek, n.d.). Heat Geek courses were strongly praised by interviewees for their excellent content and effective learning model.

23 Migration statistics for the year ending June 2022 revealed India was the top nationality granted study and work visas by the UK (British High Commission New Delhi, 2022).

24 The International Labour Organization (ILO) estimates 11 million jobs will be created in green construction in India by 2030, placing the sector third behind water and waste management, and more important than renewable energy (solar, wind, hydro, biomass, clean cook stoves) (ILO, 2019).

heating, ventilation and air conditioning industry is a growing sector, with a strong manufacturing base, significant investment in research and development, and is considered a promising career option by engineering graduates (Kadyan, 2020; The Hindu Businessline, 2023). While qualifications in the industry might not match UK qualifications and standards exactly, any gaps can be filled alongside upskilling around low-carbon heating technologies and energy efficiency. The first step in the formulation of any skills mobility partnership would be to conduct an analysis of competencies and skills across both countries – and to identify local priorities for skills development (e.g., low-carbon technologies for cooling) – before designing any upskilling interventions.

Option 5: Increase upskilling and recruitment of refugees

The UK could scale up its retrofitting-related recruitment under the Displaced Talent Mobility Pilot, which has been in operation since 2021. This pilot project aims to enable employers to recruit refugees (and the forcibly displaced) on three-year skilled worker visas to come to the UK. It is implemented in collaboration between the UK government and Talent Beyond Boundaries (see Box 6 for details).

Box 6 The UK's Displaced Talent Mobility Pilot

Talent Beyond Boundaries supports UK employers' international recruitment through its Talent Catalog, which records details of refugees' skills, education and work history, and is used to identify potential candidates. The organisation supports the immigration application process and arrangements for relocation of successful candidates, providing mentoring and cultural orientation, as well as support for settling in during the first year in the country.

Through the programme, the UK government has addressed procedural and administrative barriers that refugees typically face, where necessary waiving some administrative requirements (which has been important given that refugees often lack documents and bank accounts, for example). The government has also provided a dedicated desk for processing applications and fast-tracking the processing of visas (which generally takes place within five days). To date, the pilot has resettled over 200 skilled workers mainly to the healthcare sector, with Talent Beyond Boundaries working in close coordination with the Department of Health and Social Care and the Nursing and Midwifery Council. After working for three years, there is the option to renew the visa and to reach the five-year period, at which point candidates will be eligible to apply for Indefinite Leave to Remain, providing criteria are met.

Source: Information provided directly at interview; Talent Beyond Boundaries, 2021.

Ultimately this pilot aims to demonstrate that the recruitment of displaced talent is a viable option. Talent Beyond Boundaries' ambition is for this programme to be an integral part of wider workforce planning, particularly for skills that are in shortage. So far, its relevance to the green skills agenda has been minor, and limited to Scotland, but there is high potential for tailoring this programme to the retrofitting workforce. Talent Beyond Boundaries' Talent Catalog records almost 6,000 engineers, almost 2,000 electricians, over 650 plumbers and pipe fitters, and over 9,000 other tradespeople (Talent Beyond Boundaries, n.d.).²⁵ Retention rates are high as refugees tend to be very loyal to the post that they take, a factor that might be attractive to construction firms. There is also scope for a cohort-hiring approach, with employers working in consortium with Talent Beyond Boundaries to more efficiently recruit internationally. With some small adjustments, this model also has the potential to be applied with upskilling in mind, with workers recruited for vocational training in the UK, followed by placements in the sector. In addition, a 'train to hire' model – where upskilling of cohorts takes place overseas – is something being discussed among those actively working on refugee labour mobility and could be initiated by a private sector consortium of construction firms.

The private sector has already advocated for allowing asylum seekers to work after a shorter period of time to allow businesses to access more skilled workers (REC and CBI Economics, 2022). Providing asylum seekers and refugees who are already in the UK with support to access vocational training and labour markets, could also help meet the needs of the retrofitting workforce.

Taking reform options forward

For most effective results, ideally all five options would be pursued in parallel to ensure construction companies can use the immigration system, that the UK is able to attract workers and that a pipeline of suitably skilled workers is available. Failing that, Options 2 and 3 (creating the visa category and lowering costs) are readily available tools the government already has which imply little in the way of partnerships and operations (though with some cost implications).

It should also be noted that for several options, the private sector role is critical. This is clear for Option 1 and the implementation of an umbrella sponsorship model which demands close public-private cooperation. It is also the case for Option 4; here the private sector could take the lead developing partnerships, as has been done in Germany by the solar trade association. In addition, for Option 5, individual bodies and trade associations can already work in partnership with an organisation like Talent Beyond Boundaries to take advantage of skilled worker visa routes to recruit 'displaced talent', as is being pursued by firms in the renewable energy sector in Scotland. As such, the private sector can act now.

25 This is out of over 65,000 people who have registered in the database; 74% of those registered have intermediate or higher-level English language skills (Talent Beyond Boundaries, n.d.).

At the same time, it is clear that if international recruitment is a tool to be used more broadly, the government should look at this proactively as soon as possible. Immigration policy is not a quick fix, given the need for changes to be made to immigration rules, for workers to apply and for their visas to be processed (Sumption et al., 2022). And as the UK's own recent history has shown, proactive action is far preferable to waiting until drastic shortages are curtailing industry action.²⁶

26 The last minute visa offered to HGV drivers when the UK's food and transport supply chains experienced a breakdown in autumn 2021 is the most relevant example here. The HGV workforce has been described as ageing, lacking in diversity and subject to poor working conditions (MAC, 2021). Alongside a steep loss of domestic workers, it also lost around 12,000 EU workers between June 2019 and June 2021, with the Covid-19 pandemic an exacerbating factor (ibid.). The government's issuance of a last minute, short-term fix was criticised by the MAC as a poor solution to the crisis. There was also a very low take-up of these emergency visas (Sumption et al., 2022).

Conclusions and recommendations

The UK's severe lack of progress in the area of retrofitting is undisputed. It is without question that the country needs to speed up efforts to decarbonise its building stock and that greater government leadership and intervention is needed. While the real consequences of the labour shortages and skills gaps in the UK have not yet been felt, due particularly to the low-carbon heating industry not taking off, the workforce challenge will be severe. The CCC highlights the very real possibility that workers will simply not be found in time given the pace of transition required.

The scale of the challenge is considerable, with workforce needs in energy efficiency and low-carbon heating reaching the hundreds of thousands and surpassing forecasts for all other areas of the UK's decarbonisation strategy. The ability to meet this need should be evaluated against the very challenging labour market context in the UK, with an ageing population, unusually high levels of economic inactivity, the loss of the EU workforce in certain sectors and widespread labour shortages.

A retrofitting workforce development strategy is urgently required to attract new entrants. And while this will prioritise domestic skills development, using the immigration system to fill gaps is a rational complement of that strategy. The parallels with health and social care are clear. Both benefit from a dedicated visa route and, in the case of the NHS, a workforce development strategy, partnerships and labour agreements to develop a pipeline of talent. The immigration policy options presented here show how similar approaches can be used to support the development of the retrofitting workforce.

As the CCC has made clear, proactive management is required to decarbonise the UK's buildings, not least because of the geographic spread but also the prevalence of small and medium-sized construction firms. This applies equally to making immigration work for the sector. In this light, the main recommendations for the UK government are as follows:

1. With the utmost urgency, create a workforce development strategy for retrofitting.
2. Monitor the take-up of the new building trades included on the shortage occupation list to assess the impact of recent policy changes.
3. Pursue a dialogue with the construction sector on whether and how to implement a new umbrella sponsorship model.
4. Create a net zero visa workforce category and significantly reduce visa fees for workers filling retrofitting-related occupations.
5. Explore the use of visas that combine vocational training and upskilling in the UK with industry placements.
6. Investigate the opportunities for retrofitting skills mobility partnerships and explore the potential role for the UK aid budget to support these.
7. Scale up recruitment under the Displaced Talent Mobility Pilot, targeting people with retrofitting-related skillsets.

Political barriers to considering immigration solutions may appear considerable in the current juncture. However, this by no means reflects public attitudes. As Ford and Morris (2022: 5) have pointed out, ‘a progressive approach to immigration – far from being an electoral liability – can be an important political asset’, given the significant changes in public attitudes towards immigration that the UK has experienced. There is now considerable scope for a more open immigration system, as long as rules are clear and competently enforced. Given the urgency of the challenge, which will accelerate from 2025 with the Future Homes Standard, now is the time to proactively explore these possibilities.

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