

# Building Skills for Net Zero in Scotland





## Scotland has responded to the climate emergency with a legally binding target to reduce greenhouse gas emissions to Net Zero by 2045.

Reduce greenhouse gas emissions to Net Zero by

**2045**

Energy efficiency measures means retraining and creating new roles by 2028

**22,500**  
people

With 40% of total emissions coming from construction and the built environment across the UK, the construction industry has a key role to play.

This report, Building Skills for Net Zero, demonstrates that this target cannot be met without a rapid and lasting transformation of the construction sector. This revolution must include industry-wide investment in skills, far-reaching skills policy reform, and an unprecedented recruitment drive. The challenge is huge, and one in which every construction employer must play a role.

The climate emergency will be one of the biggest drivers of economic, political, and social change of our generation. And for construction, the Net Zero emissions target is also a huge opportunity to drive change both within the industry and in the wider world. It is a chance to increase diversity within the sector, opening ourselves up to new pools of talent, and to improve the environments in which we work and the quality of the assets we build.

This opportunity comes alongside the COVID-19 pandemic and an expected rise in unemployed workers coming from other sectors. Construction is therefore in a perfect moment to position itself as an attractive industry in which to work.

A 'business as usual' approach will not deliver Net Zero. While our research reveals a widespread lack of industry confidence that Government will do enough to create a pipeline of work to drive towards Net Zero, there is a small but growing group of businesses who are already engaged at the leading edge of low energy new build and energy efficiency retrofit. Our industry is already delivering, but it needs to happen at scale.

Using data from the Climate Change Committee (CCC)'s balanced scenario, our modeling suggests that an additional 22,500 FTE workers will be needed in Scotland by 2028, to be mainly involved in delivering improvements to existing buildings that will reduce energy demand. That represents an increase of around 9% of the current size of the workforce, based on current technologies and ways of working. This has the potential to give thousands of people a valuable new career opportunity as we emerge from a time of national crisis.

To tackle a recruitment challenge of this scale, the construction industry must do more to attract the best talent possible, and to change the image of the industry through a focus on bringing in more women, workers from BAME communities, people with disabilities, and other under-represented groups.

To create new pathways into construction and ensure the provision of lifelong learning, training providers must identify the key skills needs and where the most significant gaps will be. New qualifications and training courses must then be designed to plug those gaps.

However, the training sector is predominantly demand-led in the short term, so a likely rapid increase in the need for low-carbon skills in the long term — particularly in retrofit — will not be met unless that demand is created. Because of the time it takes to develop high quality training and mobilise the sector to deliver at scale, action on this must be taken immediately.

This is not something that the construction industry can tackle alone. It will require the industry to work with other sectors both within the built environment and outside. Our research in this area shows that collaboration is key. We will need Government to provide clearer signals about future pipelines of work, and a rapid response from the training sector to deliver the right skills.



## Building Skills for Net Zero

Our comprehensive research report on Building Skills for Net Zero draws on in-depth interviews with 48 industry stakeholders and a detailed survey of nearly 300 people across the UK. The aim of the research is to outline the skills implications for the workforce to achieve the Net Zero ambitions of governments across the UK.

We also used CCC data on their balanced scenario to model which skills will be required and to what extent over the next 30 years, for Scotland, Wales, and England, based on proposed solutions to the decarbonisation problem.



## Employer sentiment

Among respondents to our survey, there was broad agreement on the importance of the Net Zero agenda across the UK.

Of respondents have a good understanding of how they need to change their business

**70%**

Of respondents say they would be willing to diversify

**88%**

Of respondents would retrain if necessary

**90%**

Three quarters of respondents across the UK say that decarbonisation was either important or very important to themselves or their company. Furthermore, 70% say they have a good or very good understanding of how they will need to change their business because of the need to decarbonise, with a high proportion, 88%, saying they would be willing to diversify and 90% would retrain if necessary.

Whilst this shows a willingness in industry to adapt to the Net Zero future, the need to start that process of adaptation now is clear. More than three quarters (78%) of those we spoke to believe there will be a shortage of skills in their specific occupation when it comes to decarbonisation work.

The most regularly cited reasons for the absence of appropriate skills in specific roles were lack of training, lack of funding for training, regulatory changes, and an absence of agreed standards in that particular occupation.

As previously noted, skills to address the retrofit challenge appear to be the most urgently needed, as evidenced by both our quantitative and qualitative research.

Sam Allwinkle, Industry Chair, Sustainable Traditional Building Alliance, commented:

“The challenge facing the construction industry can only be addressed through and by the provision of a qualified and competent workforce that has the knowledge, skills, capability and capacity across all roles, functions, and levels applied to the building life cycle to achieve the net zero target.

The necessary provision, relating to the need, demand, and supply, for both skilling and upskilling to include training must be coherent, recognised, supported, and resourced if it is to be delivered at the scale and volume to achieve the necessary reach and impact”



# Emissions from the built environment sector can be broken down into three groups:

01. Energy-related emissions from existing buildings
02. Energy-related emissions from new buildings
03. Embodied emissions.

### EXISTING BUILDINGS AND RETROFIT

The UK Green Building Council estimates that up to 95% of emissions from the built environment over the next 30 years could come from the buildings that exist today.

Most of the effort to decarbonise must therefore be focused on the energy efficiency retrofit of existing buildings. Across the UK, at least some retrofit work will be required on around 27 million residential and two million non-residential buildings to reduce emissions over the next 30 years. Even with new ways of working, we will need to recruit, train and in some cases retrain large numbers of people to do the work.

Latest data from the CCC based on their balanced scenario estimates a cost of £254bn for domestic and £108bn for non-domestic retrofit across the UK over the next 30 years. Apart from some case studies and demonstrators, there is currently very little activity in Net Zero retrofit, and very little capacity. The scale of the task should not be underestimated, nor the urgency of action. This research shows that this can be done, but the amount of effort, and the degree of active planning and direction required, are unprecedented.

Previous CITB research has already identified a skills deficit in the specialist skills needed to repair, maintain and improve traditional buildings. The Skills Needs Analysis Report: Repair, Maintenance and Energy Efficiency Retrofit of Traditional (pre-1919) Buildings in England and Scotland,<sup>i</sup> found that 95% of surveyed contractors in Scotland do not hold formal qualifications relating to work on traditional buildings. Only 2% of contractors surveyed in Scotland had undertaken energy efficiency retrofit work on traditional buildings. Even before taking the additional demand created by the drive for Net Zero into account, we estimated that around 500 workers would have to be either recruited or retrained to meet the demand for work on older buildings.<sup>ii</sup>

### NEW BUILDINGS

Net Zero ambition will lead to tightened regulation around many elements of new building design and construction, particularly those aspects related to energy performance, such as insulation, airtightness, air quality and energy systems.

The consensus in our survey was that the industry is more than capable of building to higher standards, providing there is clarity from Government on what is required and the right incentives to take action are put in place.

For example, it is likely that tightened building standards will lead to increased adoption of smart digital construction including offsite. The standardisation of processes that results from a manufacturing approach to construction can help to reduce errors and defects in construction and can lead to greater energy efficiency performance. Increased use of manufacturing approaches creates skills challenges as well as opportunities. While manufacturing requires different sets of skills from traditional onsite construction, its increased use also has the potential to open up construction to new entrants from other sectors and increase diversity in the industry.<sup>iii</sup>

### EMBODIED EMISSIONS

Embodied emissions, such as those produced in the fabrications of materials and through construction processes, are a significant part of the sector's carbon footprint and will become increasingly important as energy-related emissions from buildings are reduced. The skills needed to reduce embodied emissions were not directly considered for this research, but plentiful training resources exist through initiatives like the Supply Chain Sustainability School.



## The retrofit skills gap



There are major shortfalls facing the industry in a large number of specific trades and professions. Modelling from the CCC requires rapid scaling up of supply over the next seven years reaching a peak in 2028.

We estimate that an additional 4,300 plumbers and HVAC workers will be required in Scotland, primarily in the installation of heat pumps, by 2028. The research also highlights that we require just over 4,600 project managers by the same date, this includes specific roles like Retrofit Coordinator. The demand for Building Envelope Specialists (which includes insulation installers) for Scotland will be 1,900 in 2028.

Achieving Net Zero therefore requires action now, with a clear plan on how to build supply sustainably over the next decade.

It must also be recognised that scaling retrofit will inevitably lead to more widespread adoption of innovative approaches, technologies and delivery models, not least as a response to the shortages of skills. The wider adoption of smart digital construction including offsite fabrication in retrofit is therefore highly likely. This will create demand for skills that are associated with manufacturing processes including surveying, design and energy evaluation, logistics and onsite assembly.

But in order for industry, training providers and employers to develop the right skills, we will need certainty that any investment made will not be wasted. Respondents to our survey and interviewees strongly felt that governments must create a viable market for retrofit and give a clear indication of a sustainable programme of work.

Dr Faye Wade, Chancellor's Fellow, University of Edinburgh, said:

“Supply chains are well positioned to deliver Net Zero homes. For supply chains to have enough confidence to invest in training and accreditation, it is absolutely critical that government policy provides long-term support, and assurance there will be a viable future market for this work.”



The need to carry out retrofit across the whole existing building stock creates a requirement for specific skills in accordance with retrofit best practice including:



### PRE-CONSTRUCTION

- Surveying skills to assess current condition and any requirements for repair
- Energy evaluation skills to model current performance
- Design skills for the design and specification of upgrade solutions.



### CONSTRUCTION

- General repair and maintenance as an essential first step prior to retrofit measures, including understanding of suitable approaches on traditional buildings
- Project management for the supervision of the retrofit programme and management of risk
- Tradespeople to implement measures, such as draft proofing, insulation or replacing a gas boiler with a heat pump.



### POST-CONSTRUCTION

- Building performance evaluation skills to test and assure the performance of the retrofit.



## Recruiting and retraining for Net Zero



Interviewees and respondents to our survey reported that the focus of training across the sector is currently on new build, traditional and onsite construction techniques, with the consideration of embodied emissions being negligible.

According to our respondents this has led to difficulties in meeting decarbonisation goals on new build projects and limited engagement on repair, retrofit, traditional buildings, and modern methods of construction (MMC). Interviewees also reported a lack of support for these disciplines at all levels of training.

Our model forecasts the skills requirements for the main decarbonisation pathways being considered by the CCC to achieve Net Zero. It is likely that a balanced scenario will be followed by governments, which comprises a sequenced combination of

all the measures on these pathways. This means that training for all these pathways will need to be ramped up.

Whichever route, or combination of routes we go down, there is potential for employers to tap into talent at a Further Education (FE) level, which has often been underutilised by the sector. Industry can work with FE colleges to design appropriate courses and facilitate collaboration with employers. FE will be particularly important in light of the threat to apprenticeships posed by COVID-19.





# Roadmap to Net Zero

A widespread programme of upskilling and reskilling will be needed to improve the industry capabilities in areas such as project management, system design and digitalisation.

Future demand will need to be constantly re-assessed as the industry transforms and we need to design training that helps the future workforce become highly adaptable. Training programmes, courses, qualifications and accreditations must all be designed to support workers through lifelong learning so that people can easily continue to retrain and upskill as demands evolve.

**To reach Net Zero by 2045 a combined approach of the pathways in the table will be required.**

COMPONENT PATHWAYS	SKILLS SUMMARY
<b>HYDROGEN DEPLOYMENT THROUGH THE GRID</b>	Conversion of existing gas boilers to hydrogen is straightforward, however conversion of the transmission and storage infrastructure is unproven and generation of heat by hydrogen would require six times as much generation capacity as would be required for heat pumps. There is an existing pool of gas safe engineers who could be upskilled to work on hydrogen, however these are geographically fragmented.
<b>FABRIC FIRST RETROFIT</b>	Surveyors and energy specialists will need to assess the condition and model the performance of buildings, while a variety of tradespeople would be needed to implement recommendations. There would need to be a rapid and vast deployment of training facilities and courses. After that, demand for some of these skills would be expected to wane, emphasising the need for a constant re-examination of training needs and a focus on a fair transition.
<b>HEAT PUMPS</b>	Again, this pathway would require rapid deployment and a rapid increase in training in the first ten years. There should be continued work for this workforce beyond that time, however, as installation work gives way to maintenance work. Heat pumps are certain to play some part in the decarbonisation strategy, and the skills needed to install and maintain them are highly sophisticated.
<b>HEAT NETWORKS</b>	Heat networks would require the quickest and most widespread increase in training, with much of the requirement likely to be at the strategic or systems level. Project planners, engineers, developers, design engineers and control system specialists would all be required. At an installation level, welders and general installers would need to be recruited and trained.
<b>ONSITE ENERGY</b>	This pathway includes a variety of technologies which can be used to enable decarbonisation, including onsite energy generation, energy storage, and smart systems. The installation of, for example, roof-mounted PV would not require significant amount of retraining, with traditional tradesmen such as scaffolders and plumbers likely to be able to upskill quickly.



## Key CITB actions

Net Zero will only be achieved through a rapid and enduring transformation of the construction sector.

This will require an industry-wide investment in skills and training that must be early, planned, and based on clear future demand.

CITB is working with the Scottish Construction Leadership Forum to meet the Net Zero skills challenge. This report will help the Scottish Government to publish clear skills and jobs plans to support industry's energy transition.

In partnership with employers, we will continue to develop and review training standards that support the decarbonisation of the built environment. We will also work with the British Standards Institute to update existing PAS retrofit requirements, to ensure clarity and consistency for employers in the way that competency is assessed. We are supporting new training qualifications, and updates to existing qualifications which will be essential in meeting training needs associated with Net Zero. Employers will be able to access up to date, high-quality training courses through CITB's Training Directory, with courses provided by CITB approved organisations.

As the Scottish Government further defines how it will look to meet decarbonisation ambitions, CITB will work with industry to identify and address the emerging skills gaps associated with the different Net Zero pathways. CITB has already funded the Offsite Ready project to encourage uptake of MMC and digital technologies through training courses. We will ensure our key funds, including the Skills and Training Fund, meet emerging skills needs associated with retrofit programmes. Through our partnerships with initiatives such as the Supply Chain Sustainability School and the Transforming Construction programme we will continue to build industry capacity for transformation and improvement.

Net Zero is a challenge but it also provides a unique opportunity for industry to modernise, grow, and create a green jobs revolution. To do this, industry will need to attract a more diverse workforce into key occupations with large forecast skills shortages. These range from surveyors and project managers to assembly technicians, insulation fitters and general builders. We are beginning to address this challenge through our industry careers website Go Construct, employer apprenticeship funding, and by increasing work experience opportunities.

We will ensure that these activities are flexible so we can respond to the skills requirements as they change and grow. We will also support the industry's Fairness, Inclusion and Respect programme to make construction workplaces better for everyone and to open construction to a broader pool of talent.



## Scottish Government skills policy reform

As an industry, we need to work with governments to develop the skills for Net Zero.

Urgent action is needed now to ensure the education and training infrastructure is responsive to emerging skills requirements and the future training needs of employers. It is critical that the regulatory, investment and market approaches adopted by governments create a pipeline of the size and scale needed to hit Net Zero targets, and to give employers the confidence to invest in new skills.

In the short-term, governments must consider how programmes like the Net Zero Jobs Fund provide this clear pipeline and encourage industry to invest in creating a green construction workforce. Governments should also consider how procurement can drive Net Zero skills and training uptake.

We intend to work with Government in the following ways to support Net Zero skills and training adoption.

- ✓ CITB will continue to support the Scottish Government to map the skills implications of the plans they are currently developing to reach Net Zero in the built environment. We will seek to support local government approaches in the same way.
- ✓ Construction training standards need to be fit-for-purpose. We will work with Skills Development Scotland to support a review of construction apprenticeship standards to ensure that they continue to meet emerging requirements.
- ✓ Sustainability skills will need to be a central feature of any new pathway into industry. We are working with the Scottish Government to provide new pathways from FE into industry that will be responsive to developing Net Zero requirements.
- ✓ Existing qualifications should be regularly reviewed to ensure they deliver high-quality training for employers. Our engagement with the Scottish Qualifications Authority will support reform and improvement of construction qualifications.

<sup>1</sup>Skills Needs Analysis 2013: Repair, Maintenance and Energy Efficiency Retrofit of Traditional (pre-1919) Buildings in England and Scotland

<sup>2</sup>Skills Needs Analysis 2013: Repair, Maintenance and Energy Efficiency Retrofit of Traditional (pre-1919) Buildings in England and Scotland

<sup>3</sup>CITB Offsite Construction Research