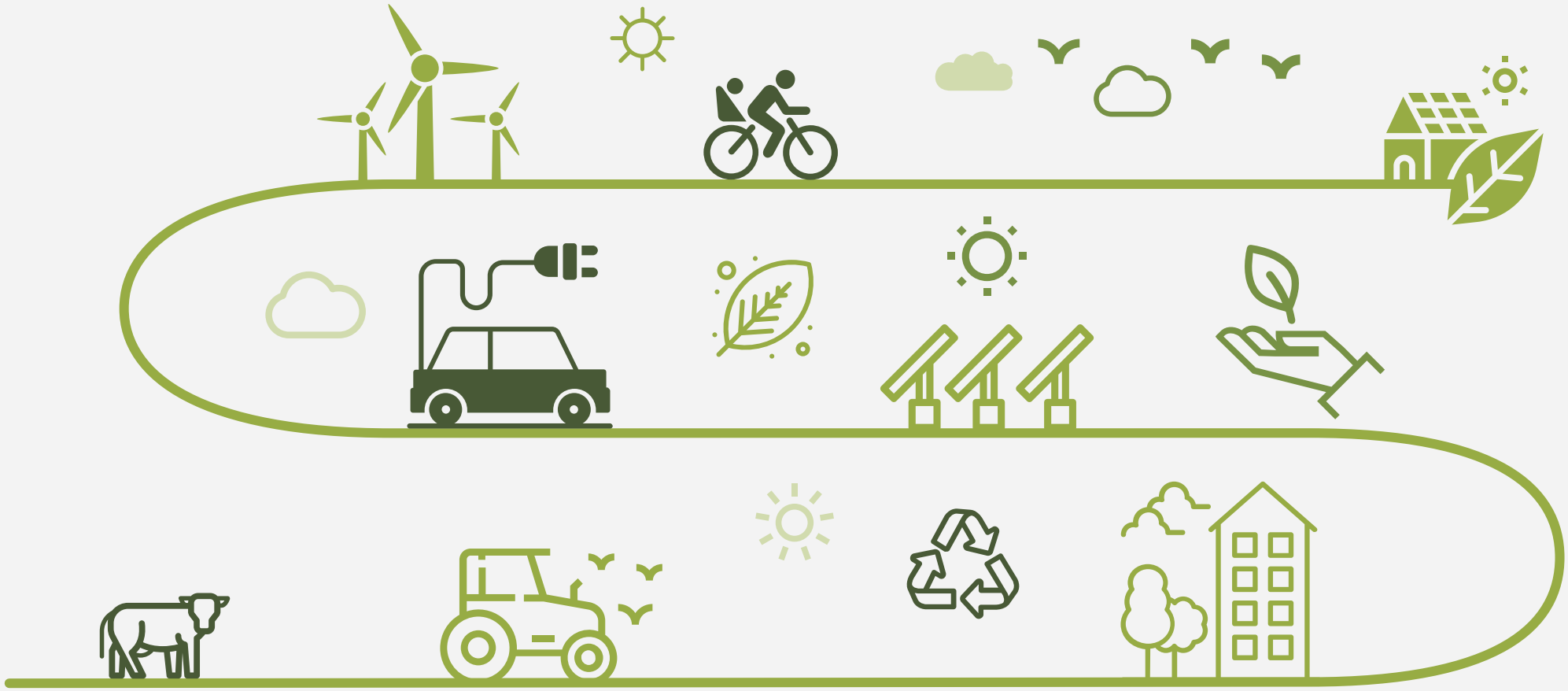
Skills Development Scotland

Climate Emergency Skills Action Plan (CESAP) Pathfinder

Final Project Report



Work Package 2: A more dynamic, responsive skills system: decarbonisation of heat in domestic and commercial buildings

December 2024

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List of Abbreviations

BE-ST	Built Environment Smarter Transformation
BESA	Building Engineering Services Association
CESAP	Climate Emergency Skills Action Plan
CITB	Construction Industry Training Board
CIOB	Charter Institute of Building
CPW	Colleges Partnership West
DYW	Developing the Young Workforce
FE	Further Education
HE	Higher Education
ESP	Energy Skills Partnership
EPC	Energy Performance Certificates
FA	Foundation Apprenticeship
GA	Graduate Apprenticeship
GCR	Glasgow City Region
GCRB	Glasgow Colleges Regional Board
HiBS	Heat in Buildings Strategy
HIE	Highlands & Islands Enterprise
JTSAP	Just Transition Skills Action Plan
LEP	Local Employability Partnership
LHEES	Local Heat and Energy Efficiency Strategies
MA	Modern Apprenticeship
MCS	Microgeneration Certification Scheme
NOLB	No One Left Behind Fund
NSET	National Strategy for Economic Transformation
PAS	Publicly Available Specification
PV	Solar Photovoltaics
RGU	Robert Gordon University
SDS	Skills Development Scotland
SFC	Scottish Funding Council
SG	Scottish Government
SIC	Standard Industrial Classification
SOAG	Shared Outcomes Assurance Group
SOF	Shared Outcomes Framework
SOC	Standard Occupational Classification
SNIPEF	Scottish and Northern Ireland Plumbing Employers Federation
SPF	Shared Prosperity Fund
UHI	University of the Highlands and Islands
WBL	Work Based Learning
WP1	Work Package 1
WP2	Work Package 2

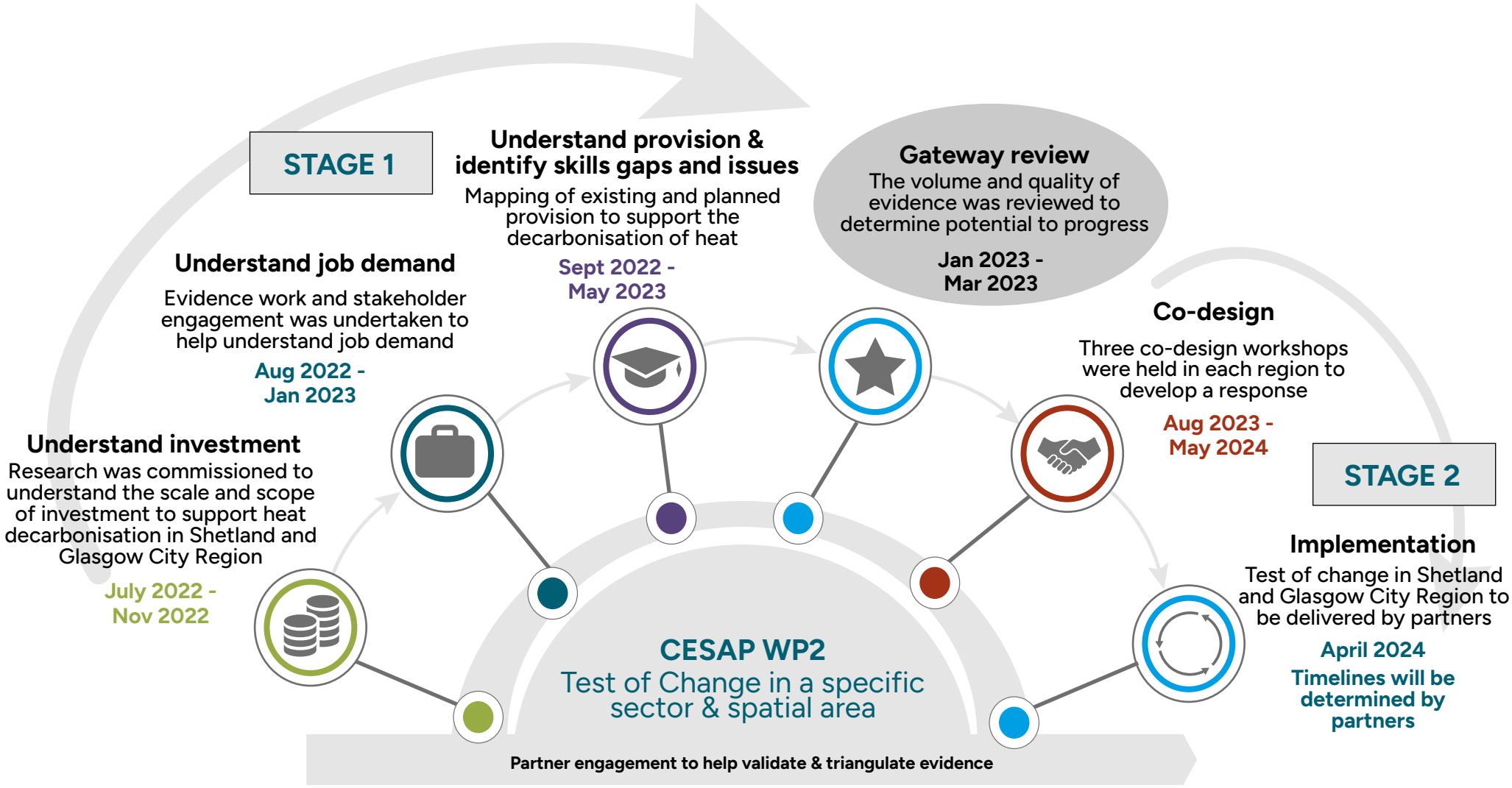
Executive Summary

1. Reaching Scotland's net zero ambitions by 2045 requires transformational change, supported by a skills system and a labour market that are more agile, proactive, responsive, and resilient than ever before.
2. The Climate Emergency Skills Action Plan (CESAP) 2020-25[1] outlined six priority areas for action to meet the needs of sectors central to the transition to net zero. Priority Area 2 of the CESAP set out the need to strengthen the evidence base, and the CESAP Pathfinder was designed to respond directly to this challenge.
3. The CESAP Pathfinder has two complementary work packages.
    - **Work package 1 (WP1) 'An Evidence Based Approach to Supporting the Transition to Net Zero'**, takes a comprehensive and systematic approach to understanding the demand for, and investment in, skills provision across further education (FE), higher education (HE) and work-based learning. This forms the basis for the development of a skills response, identification of any gaps and highlights appropriate areas for current and future focus.
    - **Work package 2 (WP2), 'Decarbonisation of Domestic and Commercial Heating Pilot'**, was designed as a test of change. Heat decarbonisation is the transition from fossil fuel heating to low carbon heat sources, including the delivery of clean heat and energy efficiency measures[2]. It was chosen as it is one of the early investment programmes being delivered as part of the Scottish Government's Climate Change Plan[3]. Desk-based review and engagement with industry, local stakeholders and Scottish Government (SG) policy leads identified Glasgow City Region and the Shetland Islands as areas to work with partners to co-design pilot approaches.
4. This Pathfinder was a Shared Outcomes Framework (SOF) project that reported into the Shared Outcomes Assurance Group (SOAG). It was led by Skills Development Scotland (SDS), with colleagues from Scottish Funding Council (SFC) and SG providing invaluable input, support, and challenge at all stages of the work.
5. CESAP WP2 is the focus of this report, which details the exploration of an end-to-end evidence-based approach to skills planning in a key CESAP sub sector in two regions. It sets out the policy and operating context and outlines the overall programme of work.
6. A series of broadly sequential actions to gather, analyse and review the available evidence and insight on investment, skills demand, provision, gaps and skills issues (summarised with stages and timelines in Figure 1) each contributed to enhancing understanding of both the challenges of developing a dynamic response to heat decarbonisation and the options to respond. This formed the basis for the development of a co-designed approach in each region. This was supported by a robust approach to monitoring and evaluation, critical to reviewing the progress against agreed actions and the identification of a series of underpinning principles that can support the development of a more localised response.

1 Skills Development Scotland (2020). Climate Emergency Skills Action Plan 2020-2025
2 Energy Systems Catapult (2024). A Guide to the Decarbonisation of Heat in the UK
3 Scottish Government (2020.) Update to the Climate Change Plan 2018 – 2032: Securing a Green Recovery on a Path to Net Zero.

Executive Summary

Figure 1 - CESAP WP2 key stages



Executive Summary

7. The approach required a combination of:
    - The effective identification, collation and analysis of relevant data.
    - The translation of the evidence base to provide accessible, meaningful support and/or challenge.
    - A deep understanding of national policy and the operating context in the sector and how this plays out across the two regions.
    - Authentic partnership working, supported by effective stakeholder management.
    - Strong facilitation, negotiation and project management skills.
    - The ability to read across all of the outputs from the work to design the approach, articulate next steps, and identify lessons learned.
8. The co-design element of the Pathfinder was the culmination of the earlier work to provide the necessary in-depth evidence base on investment, job demand, provision and skills issues to support the development of pilot activity. Whilst there was some variation across the two regions, the approach involved bringing skills providers and stakeholders together across a series of workshops and meetings to co-design an approach to implement change in response to the opportunities, gaps, and skills issues identified.

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Figure 5 - Shetland CESAP WP2 Action Areas

Shetland CESAP WP2 Workshop Action Areas		
Action Areas	**Current/Planned Activities**	**Aligns with the work of:**
1. Outreach activity to improve perceptions of decarbonisation of heat an buildings as a career choice.	Enhance the delivery of senior phase and/or FT access courses	DYW Shetland & SDS
	Development of new resources	
	Enhance Delivery of STEM resources in Schools	
2. Business engagement to Drive Employer Demand for Heat Decarbonisation Related Skills	Sharing of insight/intelligence	Shetland Islands Council & HIE
	Better signposting to existing available business support	
	Showcasing of potential training and associated technologies	
	Employer engagement to better understand employer demand for commercial training	
3. Enhanced Curriculum to Support Decarbonisation of Heat and Buildings.	Enhance MA content	UHI Shetland & SDS
	Carbon literacy CPD and training for a wide audience	
	Consider enhancing provision so a wider range of qualifications are available	
UHI Shetland to develop a web presence to host outputs of this work		

Executive Summary

Figure 6 - Glasgow City Region CESAP WP2 Action Areas

Glasgow City Region CESAP WP2 Workshop Action Areas		
Action Areas	**Current/Planned Activities**	**Aligns with the work of:**
1. Better understand, engage with, and build on existing heat decarbonisation activity in the region.	Support the development of the Glasgow city Region Domestic Retrofit Strategy	GCR Housing Retrofit Delivery Group
	Link to the wider actions identified in the Just Transition Skills Action Plan	
	Link more effectively into Local Employability Partnerships (LEPS)	
2. Help employers and their workforce respond to emerging heat decarbonisation opportunities through connecting to relevant training.	Support early engagement with businesses in the region	GCR Housing Retrofit Delivery Group
	Further explore the development of a 'retrofit hub'	
3. Promote and adapt existing curriculum to support decarbonisation of heat and buildings.	Enhance MA content	The six Glasgow Colleges through the Colleges Partnership West
	Carbon literacy CPD and training for a wide audience	
	Consider enhancing provision so a wider range of qualifications are available	SFC/GCRB

Executive Summary

9. The agreed action areas from the Shetland and Glasgow City Region workshops are summarised in Figures 5 and 6, showing planned activities and alignment with the work of key partners.
10. Partners have been identified to lead on next steps and implementation for the three areas of activity in each region. The governance of the individual actions will be taken through existing regional structures.
11. The CESAP Pathfinder WP2 was designed to develop and 'test' an end-to-end approach for a more dynamic skills system response to the decarbonisation of heat in buildings in two regions of Scotland. The case studies provide the opportunity to explore the approach in two very different operating contexts, but there are some commonalities in terms of agreed actions which in broad terms focus around:
    - A better understanding of the opportunities, in the Glasgow City Region from the perspective of building on existing heat decarbonisation activities, and in Shetland from the perspective of enhancing the perceptions of the industry as a career choice.
    - Meaningful industry engagement to share insight, better understand demand, and as a contributor to refining a response.
    - Promotion and enhancement of curriculum across college provision and Modern Apprenticeships.
12. Caution should always be applied to both direct comparison, and extrapolation based on two cases. However, the exploratory CESAP Pathfinder WP2 has highlighted a number of key areas which, when taken together, support the effective development of an evidence based co-designed response in a chosen sub-sector at a regional level.
13. Reflecting on the lessons learned in WP2, ten underpinning principles to support a dynamic skills response were identified:
    1. **Use clearly identified national / regional priorities as a means for driving focused collaborative action.**
    2. **Develop a clearly articulated plan.**
    3. **Identify and apply appropriate, dedicated expert resource.**
    4. **Ensure effective governance of overall approach.**
    5. **Seek clarity on current and planned investment in the sub-sector and/or region.**
    6. **Undertake early and meaningful engagement with key regional, policy and industry stakeholders.**
    7. **Build and utilise a strong evidence base of data and insight on demand and provision.**
    8. **Validate the evidence base with partners.**
    9. **Develop a facilitated and well-structured approach to co-design of skills response.**
    10. **Develop an approach to monitoring and evaluation**.
14. The CESAP Pathfinder has provided a number of useful lessons learned in terms of the gathering, analysis and application of data and partner insight, engagement with industry partners and the co-design of a skills response that involves regional and skills partners, alongside Scottish Government and its

agencies. This will also be a useful source of learning in the current context of the Scottish Government's programme of post-school Skills Planning Reform, both in terms of effectively engaging with industry and regional stakeholders and in strengthening elements of regional skills planning.

15. Whilst a continuous improvement approach should always be taken to design and implementation, the CESAP WP2 Pathfinder provides a strong basis for testing the approach developed across other sectors and regions.

Chapter 1: Background to CESAP Pathfinder Work Package 2

Operating Context

The post Covid-19 economic and political operating context is fast moving and provides a challenging operating context in which to develop the Climate Emergency Skills Action Plan (CESAP) Pathfinder Work Package (WP2). There are a range of factors driving change with the potential to impact on both strategic policy decisions and development of approaches to addressing skills issues. These include:

- The demographic trends of a shrinking working age population creating strong competition for talent.
- A post-Brexit landscape with its potentially significant impact on labour supply, trade patterns and inward investment decisions.
- The constant disruption and recurring occupational change driven by Industry 4.0[4] that requires significant upskilling and reskilling.
- The changing nature of work with its new working patterns and increased remote and hybrid work, seeking enhanced digital literacy and a strong emphasis on meta skills[5].
- The unprecedented dual crises of cost of living[6] and cost of doing business[7].
- And critically for this Pathfinder work, the all-pervasive impact of the transition to net zero offering the opportunity for transformational change across economy and society.

Policy Context

An awareness and understanding of the policy context is also critical, as it provides the backdrop to the design and implementation of the CESAP Pathfinder.

- A skilled population is fundamental to business productivity and economic prosperity. The Scottish Government's (SG) vision for Scotland, as set out in the 2022 National Strategy for Economic Transformation (NSET)[8] is of a wellbeing economy, that thrives across economic, social, and environmental dimensions, delivering economic prosperity for all Scotland's people and places. The ten-year strategy sets out a clear ambition towards supporting productive businesses and regions. The Skilled Workforce Programme, one of the key aspects detailed in NSET, focuses on ensuring that:

  '...people have the skills they need at every stage of life to have rewarding careers and meet the demands of an ever-changing economy and society, and that employers invest in the skilled employees that they need to grow their businesses.'

- The SG is committed to developing Just Transition Plans across sectors including energy, transport, land use, agriculture, built environment, and construction and a regional plan for Grangemouth.

4 Industry 4.0 is the fourth industrial revolution, marking a shift in industry and the labour market driven by digital innovations. Theories suggest that upskilling workers will be important as there will be some transformations in the skills required to thrive in the new digital labour market. More detailed information on Industry 4.0 is available here: What are Industry 4.0, the Fourth Industrial Revolution, and 4IR?.

5 Meta-skills are innate, timeless, higher-order skills that create adaptive learners. Examples of meta-skills include communication, collaboration, and critical thinking. More information on meta-skills can be found here: Skills 4.0: A skills model to drive Scotland's future

6 The Cost of living has risen sharply in the UK since 2022, particularly in relation to food and energy prices. Analysis from the ONS shows that prices of consumer goods and services rose by 9.6% in the year to October 2022, this was the fastest rate of increase in four decades, see Cost of Living Latest Insights for ONS analysis

7 The cost-of-doing business has also increased sharply from 2022. Increased costs in raw material prices, wages, and energy costs pushed up the price of owning and running a business. see Input price growth hits record-high

8 Scottish Government (2022). Scotland's National Strategy for Economic Transformation

Chapter 1: Background to CESAP Pathfinder Work Package 2 (WP2)

- SDS facilitated the development of the CESAP 2020-2025[9] with SG and key partners. This was published in December 2020 to coincide with the Climate Change Plan Update[10]. The SG intends to fully align green skills policy and planning behind its wider net zero priorities and will integrate the next phase of the work on green skills into the Just Transition Plans, a Green Industrial Strategy[11], and a Rural Delivery Plan.
- There are also a series of relevant policy documents that relate specifically to heat decarbonisation, most notably the Heat in Buildings Strategy (HiBS)[12]. These are set out in more detail in Chapter 2.

The CESAP Pathfinder

Reaching Scotland's ambition of becoming a net zero carbon emitter by 2045 requires transformational change. More skilled people will be required across a range of jobs to cut the carbon footprint and create new, environmentally friendly solutions. This requires both a skills system and a labour market that are more agile, proactive, responsive, and more resilient than ever before. The skills system has a key role to play in understanding changing demands, tailoring the supply of skills to meet growing demand, mitigating risks as they arise, and supporting individuals to secure emerging opportunities.

The CESAP outlined the need for action to ensure that current and future skills investment in support of net zero is strongly evidence based. This includes:

- Strengthening the evidence base on current and future demand for skills for net zero and articulating this to the skills system.
- Understanding current skills provision to support the transition to net zero across education, training, and work-based learning.
- Understanding the supply of people with skills relevant to net zero and creating upskilling and reskilling opportunities.
- Taking a highly collaborative approach to ensuring that the skills system is responsive to changing demands.

The CESAP Pathfinder was designed to respond directly to this challenge, as there is a need for a detailed understanding of the investment likely to create job opportunities and drive the demand for skills. Building better understanding and evidence of the future skills needs to support Scotland's transition to net zero is a priority area of focus for CESAP. In responding to the CESAP call to action, two complementary work packages were developed as part of the CESAP Pathfinder:

- **Work Package 1 (WP1): An Evidence Based Approach to Supporting the Transition to Net Zero.** This takes a comprehensive and systemic approach to understanding both the demand for skills across the key sectors of importance to the transition to net zero and the investment in skills provision across further education (FE), higher education (HE) and work-based learning to meet the identified need. More specifically, CESAP WP1 looked to advance the evidence base to identify current and future skills demand, establish a baseline of green skills provision and identify opportunities for action

9 Skills Development Scotland (2020). Climate Emergency Skills Action Plan 2020-2025.
10 Scottish Government (2020). Securing a green recovery on a path to net zero: climate change plan 2018-2032 Update
11 Scottish Government. Green Industrial Strategy - gov.scot (www.gov.scot)
12 Scottish Government (2021). Heat in Buildings Strategy – achieving new zero emissions in Scotland's buildings

Chapter 1: Background to CESAP Pathfinder Work Package 2 (WP2)

across the skills system to respond to the transition to net zero. The approach provided an evidence base to allow for the development of a skills response, identify any gaps and highlight appropriate areas of current and future focus.

- **Work Package 2 (WP2): Decarbonisation of Domestic and Commercial Heating Pilot.** WP2 focused on the decarbonisation of domestic and commercial heating. This was chosen as it is one of the early investment programmes being delivered as part of the SG Climate Change Plan[13]. Following desk-based review and engagement with stakeholders including industry, local partners, and SG policy leads, Glasgow City Region and the Shetland Islands were identified as areas in which to work with regional and skills partners to co-design pilot approaches.

Whilst the project was led by SDS, colleagues from SFC and SG (policy teams and skills division) provided invaluable input, support, and challenge at all stages of the work. This included, but was not restricted to:

- Direct involvement in the provision of data and evidence.
- Feedback on elements of design and process enhancement.
- Participation in the CESAP WP2 Delivery Group, which was set up to provide opportunities for review, support, and challenge throughout the project.
- Involvement in the co-design workshops, to help shape and pick up on relevant areas for action.

As a project, the CESAP Pathfinder was a part of the portfolio of activity covered by the Shared Outcomes Framework[14] (SOF) and reported into the Shared Outcomes Assurance Group (SOAG). SOAG was set up to provide collective and collaborative leadership and assurance across SG, the SFC and SDS for all projects and programmes covered by the SOF. This governance group is comprised of colleagues from SG, SFC and SDS.

The Project Report

CESAP WP2 is the focus of this report, which details the approach taken to explore an end-to-end evidence-based approach to skills planning in a CESAP sub-sector in two regions in Scotland. This report:

- **Sets out the policy context and operating context** for the decarbonisation of heat in buildings.
- **Outlines the overall programme of work,** including the two Stage process, the Gateway Review and the links to CESAP WP1.
- **Presents the co-design activity with partners** to develop a localised, dynamic response in Glasgow City Region and Shetland.
- **Sets out the conclusions and lessons learned** though the identification of a series of underpinning principles that support the development of a more localised response.

Formative evaluation was built into each element of the approach, with a series of lessons learned identified at each stage. These will help to shape any future roll out of the approach and inform the development of a monitoring and evaluation framework to support

13 Scottish Government (2020). Update to the Climate Change Plan 2018 – 2032: Securing a Green Recovery on a Path to Net Zero.2018-2032 Update

14 Scottish Government (2022). Shared Outcomes Framework

Chapter 1: Background to CESAP Pathfinder Work Package 2 (WP2)

partners' approach in for each region. This work is set out in more detail in a complementary Monitoring, Evaluation and Lessons Learned Report[15].

Preces and Supplementary Papers

This project report forms part of a suite of research undertaken as part of the CESAP Pathfinder across Work Package 1 and 2 to share the insights, intelligence and lessons learned. These are referenced throughout, and include the following reports which set out the key findings from the main elements of the CESAP WP2 programme:

- Mapping of Investment to Support Heat Decarbonisation in the Glasgow City Region and Shetland Islands Precis Report[16].
- Analysis of Job Demand for Decarbonisation of Domestic and Commercial Heating at a National and Regional Level Precis Report[17].
- Mapping provision to Support Heat Decarbonisation Precis Report[18].
- Mapping of Green Investments Across Scotland: Supplementary Evidence Paper[19].
- Supplementary Demand Evidence paper[20].
- Supplementary Provision Evidence paper[21].

In addition, this work was supported by documents such as:

- The Gateway Review, which, although unpublished, was shared with the Workpackage 2 Delivery Group.
- The Gap Analysis Summary Report, which was shared with stakeholders as the basis for the co-design work'

This work also builds on WP1 of the CESAP Pathfinder, linking to the following publications.

- Green Jobs in Scotland: An inclusive approach to definition, measurement, and analysis[24].
- WP1 Project Report: An Evidence Based Approach to Supporting the Transition to Net Zero[25].

15 Skills Development Scotland (2024). CESAP Pathfinder: A more dynamic, responsive skills system – Monitoring, Evaluation and Lessons Learned Report (unpublished)
16 Skills Development Scotland (2024). Mapping Investment to Support Heat Decarbonisation in Glasgow City region and Shetland Islands
17 Skills Development Scotland (2024). Analysis of Job Demand for Decarbonisation of Domestic and Commercial Heating at a National and Regional Level
18 Skills Development Scotland (2024). Mapping Provision to Support Heat Decarbonisation
19 Optimat (2022) Mapping of Green Investments Across Scotland (unpublished) (commissioned by Skills Development Scotland)
20 Skills Development Scotland (2023). Skills Development Scotland (2023) Supplementary Demand Evidence (unpublished)
21 Skills Development Scotland (2023). Supplementary Provision Evidence (unpublished)
22 Skills Development Scotland (2024). Gateway Review (unpublished)
23 Skills Development Scotland (2024). Gap Analysis Summary Report (unpublished)
24 Cardenas Rubio, J., et al. (2022). Green Jobs in Scotland: An inclusive approach to definition, measurement and analysis.
25 Skills Development Scotland (2023.) Work Package 1: An Evidence Based Approach to Supporting the Transition to Net Zero

Chapter 2: Decarbonisation of Heat in Domestic and Commercial Buildings

Definition of Heat Decarbonisation

Heat decarbonisation is the transition from fossil fuel heating sources to low carbon heat sources[26]. This includes the delivery of clean heat and energy efficiency measures in a domestic and commercial setting. An approximate 2.5 million occupied domestic dwellings in Scotland account for 13% of total national greenhouse gas emission and 30% of total energy consumption[27]. Approximately 220,000 non-domestic buildings account for a further 7% of total greenhouse gas emissions and 12% of total energy consumption[28]. Heat decarbonisation is therefore a critical part of meeting the statutory net zero commitments by 2045.

Whilst the CESAP Pathfinder WP2 project focused on Glasgow City Region and Shetland, awareness of both the national and regulatory picture is critical to fully understand the issues around heat decarbonisation and to identify an appropriate focus for action. Assessing the regional landscape alone underestimates the urgency and scale of the issues that surround heat decarbonisation, with an estimated £33 billion costs[29] - influenced by inflation, the price of heating systems, and legislation - to deliver significant adaptations to almost all of Scotland's existing buildings, both domestic and commercial.

26 More information around low carbon heating is available at: Energy Systems Catapult (2024). A Guide to the Decarbonisation of Heat in the UK
27 Scottish Government (2021). Heat in Building Strategy – achieving new zero emissions in Scotland's buildings.
28 Scottish Government (2021). Heat in Building Strategy – achieving new zero emissions in Scotland's buildings
29 Audit Scotland (2024). Decarbonising heat in homes
30 Scottish Government (2021). Heat in Building Strategy – achieving new zero emissions in Scotland's buildings; Scottish Government (2022). Heat in Buildings Strategy: 2022 Update
31 Scottish Government (2023). Delivering net zero for Scotland's buildings - Heat in Buildings Bill: consultation

Policy and Regulatory Context

A key document that set out the vision for the future heat is the Heat in Buildings Strategy[30] (HiBS) which was published in 2021. This set out a framework for decarbonising Scotland's domestic and commercial buildings by 2045. Although further policy work, including the consultation on a Heat in Buildings Bill[31], has since been undertaken, this chapter focuses primarily on the original vision and ambitions set out in HiBS as this was the policy context in which the Pathfinder work was undertaken. The two primary heat technologies that are key to achieving net zero ambitions within HiBS are heat networks and individual heat pumps, with more detail on delivery targets outlined in:

- **The Heat Networks (Scotland) Act 2021**[32] which sets out its statutory target for 6 TWh of heat to be delivered by Heat Networks by 2030.
- **The Heat Networks Deliver Plan**[33] provided information on indicative scenarios to achieve the 2030 target.
- **The Heat in Buildings Supply Chain Delivery Plan**[34] published in November 2022, alongside the Heat Pump Sector Deal Expert Advisory Group Final Report[35].

The ambition in the HiBS was to reduce heat in buildings by 68% by 2030 in comparison to 2020 levels[36]. Low carbon heating installations must increase significantly, and the original ambition was that 124,000 systems needed to be installed between 2021 and 2026[37]. By 2030, the target outlined in the HiBS was that over one

32 Heat Networks (Scotland Act) 2021
33 Scottish Government (2022). Heat networks delivery plan
34 Scottish Government (2022). Heat buildings supply chains delivery plan towards industry green heat
35 Scottish Government (2022). Heat in Building Strategy – achieving new zero emissions in Scotland's buildings; Scottish Government (2022). Heat in Buildings Strategy: 2022 Update
36 Scottish Government (2020) Update to the Climate Change Plan 2018-2032: Securing a Green Recovery on a Path to Net Zero
37 Scottish Government (2021). Heat in Buildings Strategy: Achieving Net Zero Emissions in Scotland's Buildings

Chapter 2: Decarbonisation of Heat in Domestic and Commercial Buildings

million homes in Scotland would have converted to zero emissions heating along with 50,000 non-domestic buildings. The installation rate was expected to peak at over 200,000 new systems per annum in the late 2020s which is above the natural replacement rate for boilers[38]. From the first clean heating installation in 2010, installation rates have largely increased year on year, but still only reached 5,000 certified installations in 2022[39]. It is worth noting that the policy context around climate change is currently an evolving area and targets are being reviewed[40].

The work associated with this transition is not just about changing heating systems, but also to work on the fabric of buildings to improve energy efficiency. HiBS had an ambition that all homes would meet a good energy efficiency standard which was defined as Energy Performance Certificate (EPC) C or above. In 2021, it was estimated that approximately 45% of homes were at EPC C or above[41]. More recent figures from the 2022 Scottish House Condition Survey suggest 52% of domestic homes were rated as EPC band C or better[42]. Applied to the 2.55 million dwellings in Scotland, this would equate to 1.25 million homes being below EPC C. The original target in HiBS was that all homes should meet this standard as a minimum by 2033[43]. These types of measures have increasingly been captured under the blanket term 'retrofit'. This term covers a wide range of fabric first measures from deep retrofit[44] to Passivhaus[45] standards to more basic measures such as insulation, ventilation and draught proofing.

The nature of heat decarbonisation work is labour intensive and time-consuming, in comparison to a like-for-like fossil fuel replacement and stand-alone energy efficiency measures[46]. Due to the current nature of the technologies being considered (which are often low temperature heating systems such as heat pumps), many buildings will also need extensive energy efficiency measures introduced prior to low carbon heating installation for the technology to be effective[47].

The policy direction demonstrates the scale of ambition and the challenge in transforming our buildings to net zero. Regulations already place a responsibility on the public sector to transform and plan for change. Future regulations will legislate and signal the need for individual households to be prepared to invest in both energy efficiency measures and low carbon heat installation. The scale of opportunity spans millions of homes, workplaces and other buildings. The ambition within HiBS only lays the groundwork for changes to housing, and future changes are likely to go further in looking to reach net zero.

38 Scottish Government (2021). Heat In Buildings Strategy: Achieving Net Zero Emissions in Scotland's Buildings.
39 Audit Scotland (2024). Decarbonising heat in homes
40 Climate Change Committee Scotland report - next steps: Net Zero Secretary statement - 18 April 2024 - gov.scot (www.gov.scot).
41 Scottish Government (2021). Heat in Building Strategy Heat in Buildings Strategy: Achieving Net Zero Emissions in Scotland's Buildings (www.gov.scot)
42 Scottish Government (2022). Scottish House Conditions Survey 2022.
43 Scottish Government (2021) Heat in Building Strategy Heat in Buildings Strategy: Achieving Net Zero Emissions in Scotland's Buildings (www.gov.scot)
44 There is no agreed upon definition of 'deep retrofit'. The common thread amongst definitions is that deep retrofit involves significant renovation to buildings to transform them into ultra-low energy buildings and includes a range of measures such as renewable heating and insulation which in general will reduce energy requirements by 50% or more. See Changeworks (2019) Scoping study for a Warm Homes Programme for a review of definitions available in the literature.
45 Passivhaus is the low energy eco homes standard https://www.passivhaustrust.org.uk/.
46 UK Government (2021). Heat and building strategy
47 Energy & Climate Intelligence Unit. (2020). Energy efficiency and decarbonising heat

Chapter 2: Decarbonisation of Heat in Domestic and Commercial Buildings

Scottish local authorities were required to develop Local Heat and Energy Efficiency Strategies (LHEES) and Delivery Plans by December 2023[48]. LHEES set out the long-term plan for decarbonising heat in buildings and improving their energy efficiency across an entire local authority area in terms of:

- Improvements to the energy efficiency of buildings in the area
- Reduction of greenhouse gas emissions from heating
- Tackling fuel poverty

These also set out potential pathways for the deployment of zero emission heating (including heat pumps) and energy efficiency measures. In addition, opportunities for the development of heat network zones were highlighted although uncertainty remains on the scale of the heat network roll-out and the size of the market.

In the course of the Pathfinder work, the Scottish Government launched a consultation for the Heat in Buildings Bill[49]. The consultation invited views on the following proposals[50]:

- Prohibiting the use of polluting heating system in all buildings by 2045.
- Introducing a minimum energy efficiency standard to be met by private landlords by the end of 2028.
- Introducing a minimum energy efficiency standard to be met in owner occupied homes by the end of 2033.
- Providing local authorities with powers to require buildings within a Heat Network Zone to end their use of polluting heating systems.
- Providing local authorities with the power to require developers to connect new buildings within a Heat Network Zone to a heat network.
- Requiring all public sector buildings (those owned by a Scottish public authority) to be using clean heating systems by 2038.

The Heat in Buildings consultation closed in March 2024. At the time of writing, Ministers were considering the next steps from the consultation responses. In addition to this, a Heat in Buildings Monitoring and Evaluation Framework was also published in November 2023[51]. This framework is designed to show the extent to which the Heat in Buildings policies and programmes are delivering emission reductions. The most recent progress report for Heat in Buildings[52] was published in 2023 outlining progress including the establishment of the Home Energy Scotland Grant and Loan Scheme[53] and the Green Innovation Support Programme[54]. A new progress report was published in October 2024[55].

Quality Assurance Systems

In recognition that strong quality assurance will be required to ensure that work to deliver the decarbonisation of heat in buildings is carried out by appropriately skilled individuals and in line with enforceable industry standards and customer protection,

48 See The Local Heat and Energy Efficiency Strategies (Scotland) Order 2022
49 See Scottish Government (2023). Proposals for a Heat in Buildings Bill: Consultation
50 Scottish Government (2023). Delivering net zero for Scotland's buildings – Heat in Buildings Bill: consultation
51 Scottish Government (2023). Heat in buildings monitoring and evaluation Framework
52 Scottish Government (2023). Heat in Buildings: progress report 2023
53 See https://www.homeenergyscotland.org/home-energy-scotland-grant-loan
54 See https://www.scottish-enterprise.com/support-for-businesses/funding-and-grants/business-grants-and-funding-calls/green-heat-innovation-support-programme
55 See https://www.gov.scot/publications/heat-buildings-progress-report-2024/

Chapter 2: Decarbonisation of Heat in Domestic and Commercial Buildings

SG published a Heat in Buildings Quality Assurance Policy Statement[56] in 2022. The policy statement outlines the standards, skills and certification required for installers on SG schemes, ways to tackle scams and mis-selling, and how to improve public engagement.

Microgeneration Certification Scheme (MCS) accreditation has been maintained as a requirement for renewables and there is a new additional requirement on insulation installers to obtain TrustMark accreditation and demonstrate when appropriate that they are working to the PAS 2035 quality standard[57]. It also reinforces the role of the Scottish Installer Matrix[58], which outlines minimum qualifications and upskilling routes, and looks to integrate it into the Publicly Available Specification (PAS) used by the insulation industry.

At UK level, there are new quality standards for all insulation-related retrofit works (PAS2030 and PAS2035)[59]. All energy efficiency installers must be certificated to the new standard, and industry engagement as part of the pathfinder work suggests that this been challenging. PAS requirement stipulates new roles in the process and certification is now required (which was previously not needed) for staff who have to perform the roles of Retrofit Advisor, Retrofit Assessor, Retrofit Coordinator, Designer and Evaluator[60].

Stakeholder engagement and industry consultations as part of the pathfinder work raised a number of issues including:

- There is a lack of training centres that can deliver the required certification for the new PAS standard.
- The cost of travel and accommodation to get the workforce trained could also be prohibitive.
- Concerns that the firms who have delivered insulation measures in the past will not want to go to the expense of getting staff trained up and will withdraw from the insulation market. This is of particular concern in rural areas where there are already limited firms available.
- Concerns that the new PAS standard will drive up costs, reducing the number of measures that can be fitted through the various national insulation schemes which would be particularly challenging for smaller firms.
- Questions and uncertainties on when PAS applies, for example, in the case of private households who access funding to replace a heating system with a low carbon system, which comes with significant costs. Although the policy statement provides some clarifications, a number of issues remain, particularly in relation to which core occupations are in scope to upskill to a Retrofit Co-ordination role and the appropriate pathways to get there.
- A risk that the scale of the opportunity could result in businesses transitioning to this area who are not competent. A robust quality system is therefore essential to support the creation of a competent workforce but this does come with additional costs and training requirements for businesses.

56 Scottish Government (2022) Heat in Buildings Strategy: quality assurance: policy statement
57 MCS accreditation is an industry-led quality assurance scheme, more details are available at: MCS (2024). Becoming Certified
58 Energy Skills Partnership (2021). Scottish Installers Skills Matrix
59 Available on the British Standards Institution (BSI) website. https://www.bsigroup.com/en-GB/insights-and-media/insights/brochures/pas-2035-retrofitting-dwellings-for-improved-energy-efficiency/
60 See British Standards Institute (2023). PAS 2035 – Retrofit Dwellings for improved Energy Efficiency.

Chapter 2: Decarbonisation of Heat in Domestic and Commercial Buildings

Complexity of Operating Environment

Decarbonisation of heat in buildings will be undertaken in a complex operating environment, in which there are a number of external, and sometimes competing, factors at play beyond the control of the skills system. Policy ambitions and regulatory drivers are likely to shape demand, particularly in terms of the extent to which the take-up is mainstream. The construction stakeholder landscape is complex with multiple groups and organisations who connect to this agenda each with their own areas of concern and interests[61]. Whilst net zero and within this, heat decarbonisation, is recognised across industry groups as a policy priority, there is no clear consensus on action.

The issues around wider skills pipeline and regulation issues also drive discussions, in addition to calls for significant skills and funding interventions to support businesses transition. There is no doubt that the stakeholders and groups that play an important role in the industry are increasingly aware of the challenges and opportunities that heat decarbonisation will bring.

Stakeholder engagement and industry consultation as part of the pathfinder work highlighted:

- There is not yet a 'mass market' for heat decarbonisation products, but demand is increasing from early adopters.
- The significant uncertainties associated with technological developments, investment and funding support will all impact on the scale and pace of change.
- Much of the activity has been driven by industry stakeholders which demonstrates that, despite the scale and relatively short timescales for this work, most of the activity still resides within the innovation sphere and is not yet 'business as usual'.

61 National groups include the Construction Accord, the Construction Industry Leadership Group, the Construction Industry Forum, Construction Industry Connected Voice (CICV) Forum and CICV Green Skills Group, the Heat Decarbonization sub-group, Construction Industry Training Board (CITB) and the Building Environment Smarter Transformation (BE-ST).

Chapter 3: The CESAP Pathfinder WP2 Work Programme

WP2 of the CESAP Pathfinder builds on the enhanced evidence base developed in CESAP WP1, but with a specific focus on heat decarbonisation. This allows for a more detailed understanding of the:

- Scale and location of the investment driving growth in the sub-sector.
- Potential volumes and timelines associated with this investment.
- Job opportunities and the consequent demand for skills.

In turn, this provides the basis for the development of a more dynamic skills system response. Building on the following:

- **Enhanced evidence**
- **Insight from key industry stakeholders**
- **Insight from skills partners and regional stakeholders**

and working with current economic priorities and within existing skills structures (for example, Regional Economic Partnership skills workstreams), a pilot approach for each region has been co-designed with regional and skills partners to deliver on these ambitions.

Overview of Approach

CESAP WP2 offers an approach that gathers, analyses and reviews the available evidence and insight (including gaps) around the decarbonisation of heat in buildings and then uses this as the basis for the development of a co-designed approach. This requires a combination of:

- The **effective identification, collation and analysis of data** to develop an evidence base relevant to heat decarbonisation.
- The **translation of the evidence base** to provide accessible, meaningful support and/or challenge.
- A **deep understanding of national policy and operating context** in the sector and how this plays out across the two regions.
- **Authentic partnership working**, supported by effective stakeholder management.
- Strong **facilitation, negotiation and project management skills**.
- The ability to **read across all of the outputs** from the work to design the approach, **articulate next steps and identify lessons learned**.

A series of sequential actions each contributed to enhancing understanding broadly of both the challenges of developing a dynamic response to heat decarbonisation and the options to respond. The programme of work focused on:

- Building an understanding of the investment in heat decarbonisation.
- Building a better understanding of job demand.
- Undertaking a Gateway Review of the volume and quality of available evidence.

Chapter 3: The CESAP Pathfinder WP2 Work Programme

- Building a better understanding of skills provision and identifying gaps and issues.
- Co-designing a response for implementation.

The work was divided into two stages, with a Gateway Review[62] at the end of Stage 1. Whilst it was anticipated that there would be some gaps and challenges with the data and insight collected, a Gateway Review was built into the CESAP Pathfinder at the outset to provide the opportunity to pause, review and assess whether there was sufficient evidence available to move to Stage 2 and:

- Form the basis of a meaningful gap analysis of provision and skills issues.
- Facilitate the co-design of an approach with industry and stakeholders to implement a response linked to economic opportunity from heat decarbonisation in the pilot areas.

Figure 1 is a summary diagram of the key elements of the approach with timelines, each of which has a distinct contribution to make towards the point at which there is an opportunity for implementing change in terms of a more dynamic skills response to heat decarbonisation in Glasgow City Region and Shetland.

62 Skills Development Scotland (2023). CESAP Pathfinder WP2 Gateway Review (unpublished)

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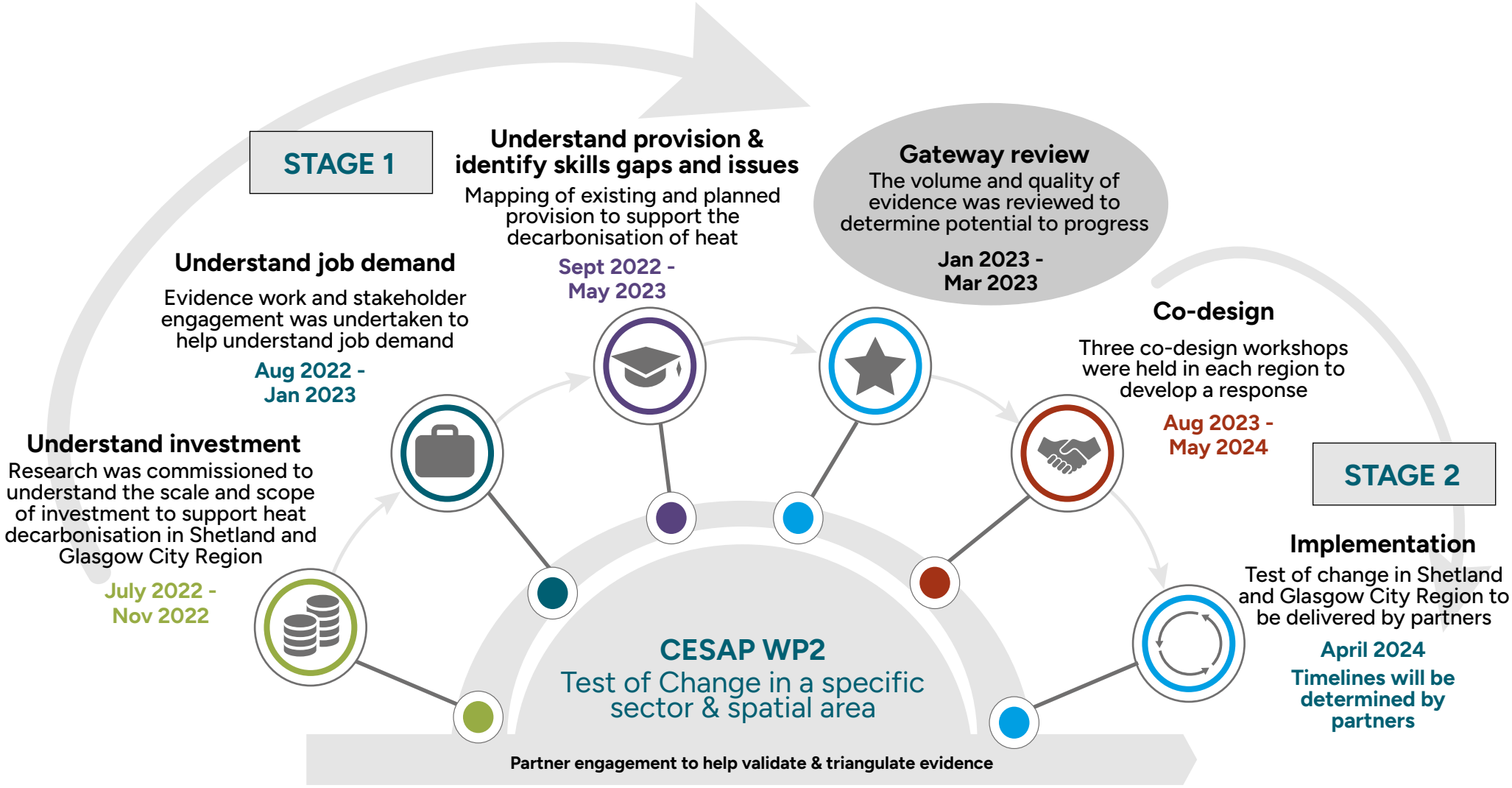
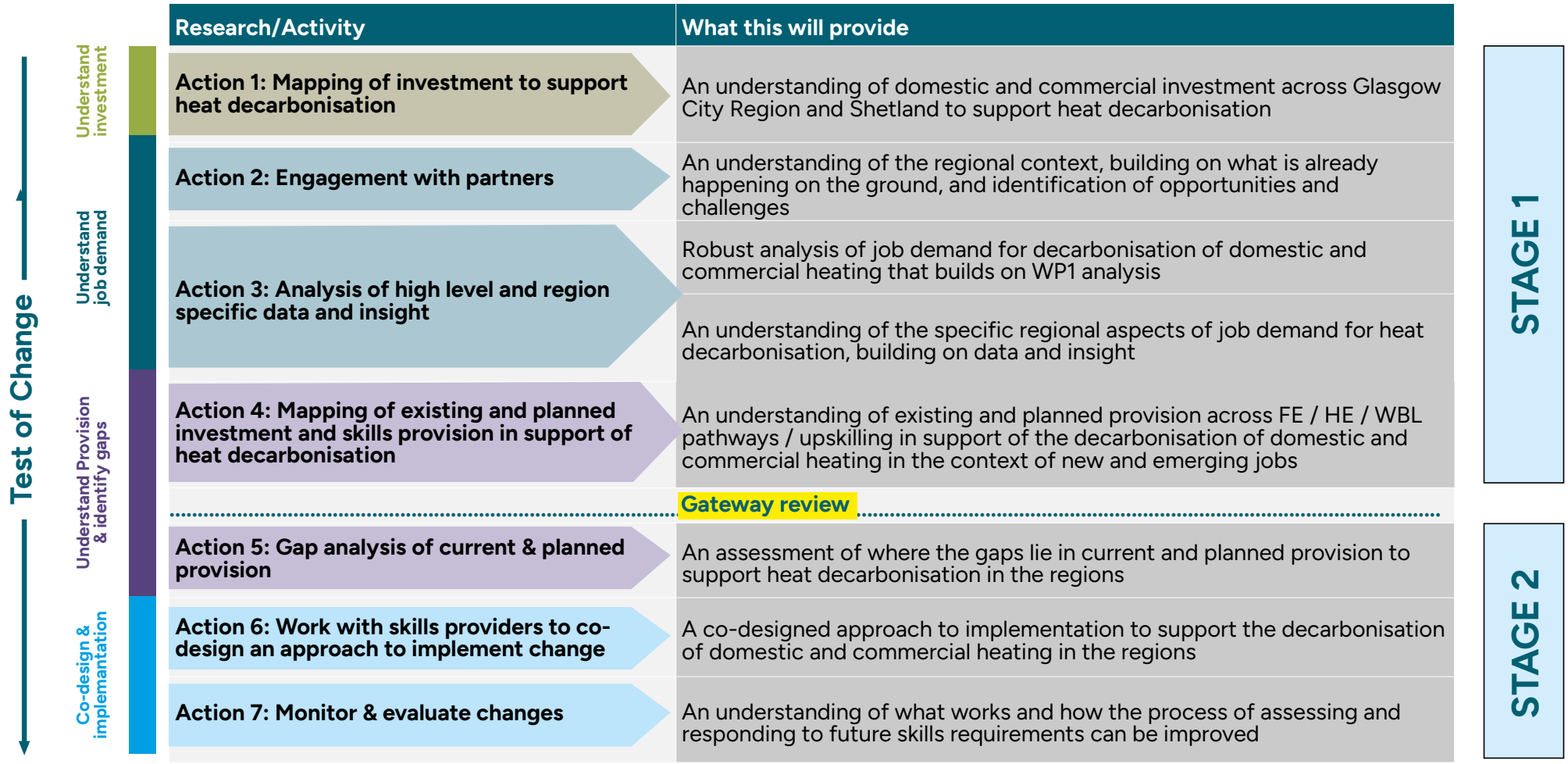
Figure 1 - CESAP Work Package 2 stages and timelines



Chapter 3: The CESAP Pathfinder WP2 Work Programme

Figure 2 below shows the individual actions for the complete test of change programme of work, as articulated at the start of the project. Each action is explained in terms of what it was anticipated to deliver in the context of the Pathfinder.

Figure 2 - Work Package 2 programme of work



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Each of the actions will now be outlined in turn to provide an overview of the activity in terms of its purpose and scope, highlight key findings and/or signpost to subsequent chapters in this report or the relevant individual reports.

Action 1: Mapping of investment to support heat decarbonisation.

Evidence of demand is a key component in developing a dynamic skills response. A detailed understanding of the investment to support decarbonisation of domestic and commercial heating which is likely to create job opportunities is needed to build a better understanding of the likely demand for skills. Action 1 of WP2 was an exercise to map the current and planned investment in supporting heat decarbonisation across Glasgow City Region and Shetland through a holistic approach combining desk-based research, sectoral expertise and stakeholder engagement. Pre-work began in July 2022, with the work being undertaken by an external contractor. Over a ten-week period from mid-September to mid-November 2022. This set out to provide an understanding of:

- The anticipated scale of investment in the decarbonisation of key domestic and commercial heating projects in the Glasgow City Region and Shetland in the short to medium term.
- The certainty and clarity of timelines in terms of the budget available to support these plans in the Glasgow City Region[63] and Shetland.
- The extent to which the ambitions for the scale of decarbonisation of domestic and commercial heating are in line with the realities of budget to support them.

It also looked to determine the types of jobs likely to be created as the result of current or planned investment to support heat decarbonisation across the two regions.

Heat decarbonisation investments in scope were:

- All types of energy efficiency measures including double and secondary glazing, external wall insulation, cavity wall insulation, ventilation, loft and under floor insulation, draught proofing etc.
- All types of heat technologies, including but not limited to heat pumps, smart control of electric heating, solar photovoltaics (PV) and battery storage to support green electrification of heat, heat batteries etc.
- Investment by both public and private sector organisations and by individuals.
- Commercial and domestic heat decarbonisation but excluding industrial decarbonisation.
- Measures applied to new buildings and retrofitted to existing buildings.

The CESAP Pathfinder WP2 allowed for the development of a meaningful framework to capture some of the planned investment in heat decarbonisation projects by type, volume, and location in the two regions. However, the uncertainties around the likelihood of progression and timelines for many of the projects identified made it particularly challenging to identify the scale and timing of job opportunities and specific skill demands that will flow from them. Some concerns were voiced that industry will not readily invest in

63 East Dunbartonshire, East Renfrewshire, Glasgow City, Inverclyde, North Lanarkshire, Renfrewshire, South Lanarkshire and West Dunbartonshire.

skills to support heat decarbonisation until there is greater clarity on the investment that will drive the pipeline of work. Policy intent is not enough. Looking ahead, it is future regulatory drivers in the sector that will be critical in changing demand and will drive most of the work in this field.

Key findings from Action 1 are included in Chapter 4 which focuses on the co-design work, but there is also a Precis Report, Mapping of Investment to Support Heat Decarbonisation in Glasgow City Region and the Shetland Islands, which complements this report[64]. This sets out the findings in more detail in relation to investment drivers and key funding sources, identified investment by geography, factors impacting on investment values as well as potential implications for job requirements and the evidence gaps and lessons learned.

Action 2: Engagement with Partners

Engagement with key partners at an early stage allowed for a greater understanding of the regional operating context, including existing activity, and the key opportunities and challenges across the two regions. Despite positive activity and focus, much of the work in both Glasgow City Region and Shetland is at an early stage and focused on small projects.

There was recognition that the skills eco-system is complex and that it takes time and investment to build capacity for the delivery of appropriate provision. This engagement built a firm foundation on which to develop the proposed co-design work later in the process.

Action 3: Analysis of High Level and Regional Data and Insight on Demand

This action was to undertake a robust analysis of likely job demand flowing from the known investments in heat decarbonisation. The research was undertaken between August 2022 and January 2023 and draws on data and insight at both national level and across the two regions, including a detailed assessment of the skill requirements for job opportunities in relation to the decarbonisation of domestic and commercial heating. From extensive analysis of available data sources and industry, regional, and national stakeholder consultations, it was possible to establish a reasonable picture of demand relevant to heat decarbonisation for Glasgow City Region and Shetland. This was a key component in the development of a more dynamic skills response.

This research was exploratory and looked at the demand for labour in the industries and occupations relevant to heat decarbonisation. The scope was not only to understand demand for entry level roles, but also demand across all required roles (including upskilling and reskilling). An inclusive approach was taken to define these occupations and industries, building on the method adopted in CESAP WP1, including roles that may require enhanced knowledge and skills around net zero heating. These industries and occupations were defined through consultation with industry experts and cross-checked with the Green Jobs in Scotland report[65]. The Standard Industrial Classification (SIC) codes used to classify heat decarbonisation Industries are available below in table 1, and the Standard Occupational Classification (SOC) codes used to classify heat decarbonisation occupations are shown in table 2.

64 Skills Development Scotland (2023), Mapping of Investment to Support Heat Decarbonisation in Glasgow City Region and Shetland Islands.

65 Cardenas Rubio, J., et al. (2022). Green Jobs in Scotland: An inclusive approach to definition, measurement and analysis.

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Table 1 - Heat Decarbonisation Industries by SIC Code

Heat Decarbonisation Industries					
2521	Manufacture of central heating radiators and boilers	3312	Repair of machinery	4331	Plastering
2751	Manufacture of electric domestic appliances	3530	Steam and air conditioning supply	4332	Joinery installation
2752	Manufacture of nonelectric domestic appliances	3600	Water collection, treatment and supply	4334	Painting and glazing
2812	Manufacture of fluid power equipment	4120/1	Construction of commercial buildings	4399	Other specialised construction activities n.e.c.
2813	Manufacture of other pumps and compressors	4120/2	Construction of domestic buildings	7111	Architectural activities
2825	Manufacture of nondomestic cooling and ventilation equipment	4321	Electrical installation	7112	Engineering activities and related technical consultancy
3311	Repair of fabricated metal products	4322	Plumbing, heat and air-conditioning installation	7410	Specialised design activities

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Table 2 - Heat Decarbonisation Occupations by SOC Code

Heat Decarbonisation Occupations		
1121: Production managers and directors in manufacturing	2482: Quality assurance and regulatory professionals	5317: Glaziers, window fabricators and fitters
1122: Production managers and directors in construction	3113: Engineering technicians	5319: Construction and building trades n.e.c.
1134: Purchasing managers and directors	3114: Building and civil engineering technicians	5321: Plasterers
1140: Directors in logistics, warehousing and transport	3131: IT operations technicians	5322: Floorer and wall tilers /1
1243: Managers in logistics	3541: Estimators, valuers and assessors	5323: Painters and decorators
2121: Civil engineers	3551: Buyers and procurements officers	5330: Construction and building trades supervisors
2123: Electrical engineers	3574: Other vocational and industrial trainers	7219: Customer service occupations n.e.c.
2127: Engineering project managers and project engineers	3581: Inspectors of standards and regulations	8113: Chemical and related process operatives
2129: Engineering professionals n.e.c.	4143: Customer service managers	8143: Routine inspectors and testers
2312: Further education teaching professionals	5213: Welding trades	8151: Scaffolders, stagers and riggers
2412: Solicitors and lawyers	5241: Electricians and electrical fitters	8159: Construction operatives n.e.c
2419: Legal professionals n.e.c	5246: Electrical service and maintenance mechanics	8160: Production, factory and assembly supervisors
2421: Chartered and certified accountants	5312: Stonemasons and related trades	9121: Groundworkers
2423: Taxation experts	5313: Bricklayers	9251: Elementary storage supervisors
2451: Architects	5314: Roofers, roof tilers and slaters	9252: Warehouse operatives
2452: Chartered architectural technologists, planning officers and consultants	5315: Plumbers and heating and ventilating engineers	9253: Delivery operatives
2454: Chartered surveyors	5316: Carpenters and joiners	9259: Elementary storage occupations n.e.c.

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As heat decarbonisation is a new and emerging sub-sector, many jobs, particularly those that are unique and specific to this sub-sector, are not classified within the Office for National Statistics (ONS), SIC and SOC definitions. Therefore, it is difficult to report demand at a granular level based on official national sources.

The research identified the likely job demand flowing from heat decarbonisation activity in Scotland, and in line with best practice, drew on a range of sources (quantitative and qualitative). For example, when looking at employment and forecast data, vacancy information was also used to provide more real-time analysis of current trends along with employer insight. It explored regional demand in the two case study areas of Glasgow City Region and the Shetland Islands. The work was also supported by a wider literature review.

However, it is important to note that demand data is difficult to obtain for the relevant sectors in Shetland due to small sample sizes. This highlights the importance of the industry engagement and employer interviews which were crucial to identifying demand at a more detailed level. The interviews took place with employers in the two regions, as well as industry experts with a knowledge of the national picture. They sought to capture the views and experiences of employers to understand:

- **How industry is experiencing the transition to net zero heating.**
- **What the skills and workforce requirements are to meet the targets.**
- **What the challenges and opportunities are in this area.**

Through a mixture of stakeholder consultations and analysis of data, it was possible to establish a sufficient picture of the scale of current and future demand by industry to support heat decarbonisation in Glasgow City Region, and to a lesser extent Shetland. Importantly, the research identified data limitations and gaps.

Key findings from Action 3 are included in Chapter 4, which focuses on the co-design work, but there is also a Precis Report, Analysis of Job Demand for decarbonisation of domestic and commercial heating at a national and regional level[66]. This report considers demand in Scotland as well as Glasgow City Region and Shetland, provides employer and industry insight into the challenges of the sector and sets out limitations to the current data, key gaps and recommendations for improvement.

Action 4: Mapping of Existing and Planned Skills Provision to Support Heat Decarbonisation in Glasgow City Region and Shetland

This action set out to provide an understanding of existing and planned skills provision across higher education, further education, apprenticeship pathways and upskilling and reskilling in support of the decarbonisation of domestic and commercial heating across the two regions. The analysis is exploratory in attempting to map provision for heat decarbonisation skills, using the data available to examine the pipeline of skills in the most robust way possible.

66 Skills Development Scotland (2023). Analysis of Job Demand for decarbonisation of domestic and commercial heating at a national and regional level.

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The focus was on mapping provision to the industries[67] that have been identified as relevant to heat decarbonisation[68]. These are the industries that will be directly involved in decarbonising Scotland's heating, including manufacturing and construction industries, as well as engineering and architecture activities.

From the extensive analysis of data across higher education (HE), further education (FE) and apprenticeships, it was possible to establish a reasonable picture of provision relevant to heat decarbonisation for Scotland and the two regions (although less so for Shetland than Glasgow City Region as the small sample sizes impact on the ability to fully understand the numbers of people coming out of the skills system and going on to work in heat decarbonisation industries).

However, it is also important to note that whilst provision, in broad terms, may align well to the industries that support heat decarbonisation and have a high demand for workers this does not in itself ensure that demand is met in a specific locality.

More importantly, this work has allowed for the identification of limitations and gaps.

- A significant challenge with the data is that each provision type is measured in different ways, with no common outcome measures, and in some cases at different points of study/ completion of study. It is not possible therefore to achieve a clear picture of the cumulative skills pipeline across post school provision to support heat decarbonisation.
- There is a significant gap in upskilling and reskilling data, which makes it difficult to understand the type and volume of provision that is on offer and more importantly assess how that demand might be met. Upskilling and reskilling data is vital given that the consultations identified upskilling and reskilling as part of the response to address skills demands to support heat decarbonisation. Whilst much of the provision relevant to upskilling and reskilling that takes place in further and higher education institutions will be included in the data used in this research, it is difficult to isolate from wider FE/HE provision. In addition, there will be employer funded upskilling activity that is taking place across Scotland, but there is no straightforward or recognised mechanism to gather this, so it could not be identified through this work.
- It is not currently possible to establish figures for the numbers of college students who enter heat decarbonisation-related industries, as the college provision data is based on a manual mapping of courses to jobs and industries. It will be important to address this critical gap going forward given the significant role college provision plays in supplying the skills pipeline for the heat decarbonisation industry.
- Data on outcomes of college students would help identify if provision in the regions is leading to employment in these industries and occupations.

Key findings from Action 4 are included in Chapter 4 which focuses on the co-design work, but there is also a Precis Report Mapping Provision to Support Heat Decarbonisation[69] which complements this report. This outlines a mapping of skills provision to the industries relevant to heat decarbonisation. All data used in this research were the most recently available at the time of analysis, but the report cautions that as data were not readily available on a consistent

67 Industries were identified at the 4 digit SIC level. Provision relating to the decarbonisation of heat has been classified in accordance with Standard Industrial Classification (SIC) codes and Standard Occupational Classification (SOC) codes identified as part of the CESAP Pathfinder 2, Action 3 activity.

68 Industries that were identified as being relevant to heat decarbonisation are listed in Technical Annex 1

69 Skills Development Scotland (2023). Mapping Provision to Support Heat Decarbonisation

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basis across all provision types and timeframes, direct comparisons should not be made across the provision types. The findings focus on the scale of provision across the skills system to support heat decarbonisation, the data and methodological approach taken to mapping post school provision at a national and regional level and the limitations of the available data, key gaps, and opportunities for improvement.

Gateway Review

A Gateway Review was built into WP2 of the CESAP Pathfinder at the outset, to provide the opportunity to pause and review the strength of evidence gathered in Stage 1 (Actions 1-4). This was to determine whether the evidence, in terms of both data and insight, was of sufficient volume and quality for it to make sense to move to Stage 2 (Actions 5-8) and the co-design of pilot approaches on the ground (as set out in Figure 1). Whilst there would undoubtedly be some gaps and challenges with the data and insight collected, the review looked to assess whether there was enough evidence available.

The Gateway Review was finalised in March 2023 and shared with the CESAP WP2 Delivery Group, with the decision to proceed to Stage 2 of the work endorsed by the group in May 2023. This allowed for:

- Progression to Action 5, a meaningful gap analysis of provision and wider issues with the potential to impact on the development of a response.
- Initial planning around the co-design of an approach with industry and stakeholders in the two regions.

Action 5: Issues and Gap Analysis

The gap analysis was undertaken to improve understanding of any potential gaps (real and/or perceived) in provision required to develop the skills needed to support the range of identified opportunities flowing from known investment in Glasgow City Region and Shetland, and to highlight other issues likely to impact on skills for heat decarbonisation. This included engagement with key partners and provided the opportunity both to further validate the existing data and explore ways to strengthen/fill gaps ahead of the development of any co-designed operational response.

The findings of the gap analysis, which draws on the findings of Actions 1-4, provides the basis (albeit partial) to:

- **Help inform provision**
- **Improve the responsiveness of the skills system to the needs of employers**
- **Open opportunities for individuals brought about through the transition to net zero.**

It informs the starting point for the co-design work with regional partners and skills providers to respond to the issues identified.

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A Gap Analysis Summary report was shared with stakeholders and used as the starting point for the co-design work. This report summarises the findings of the gap analysis, which brought together the evidence gathered through desk-based analysis and consultations with industry and regional partners from earlier elements of the CESAP WP2. This included the work on the context and operating environment, known investments and opportunities, the demand for skills, skills provision and identified skills issues.

Action 6: Co-Design

The co-design element of the work was the final stage of the CESAP Pathfinder and the culmination of the earlier work (Actions 1-5) that provided the necessary in-depth evidence base on investment, job demand, provision and skills issues and informed the development of pilot activity in Glasgow City Region and Shetland. The development of any pilot needs to be supported by the key stakeholders that will be involved in developing, and ultimately delivering any approach, which includes a shared understanding of the opportunities and challenges. This formed a key part of the approach. The co-design work across the two regions is set out in detail in Chapter 4.

Action 7: Monitor and Evaluate Change

Developing a robust approach to monitoring and evaluation has been an important aspect of the CESAP Pathfinder from the outset and has been critical both to reviewing progress against agreed actions and the identification of lessons learned.

The need for actions to evaluate changes in provision and the impact of any changes, sit at the implementation stage beyond the end of the CESAP WP2 project. They were built on the assumption that changes in provision would be the sole outcome for the work, whereas in reality, additional complementary actions have also been identified and agreed by regional partners.

To support this, a high-level monitoring framework for each region has been proposed to underpin the future implementation of the co-designed pilot approaches in Glasgow City Region and Shetland, built on the specifics of the agreed activity. Where possible, it is important that monitoring and evaluation goes beyond the measurement of activity, albeit that, the challenges of attribution remain.

More specifically, an Evaluation and Lessons Learned report that sets out the approach to monitoring and evaluation in detail across WP1 and WP2 of the CESAP Pathfinder[70] complements this report. The report covers the points raised above in more detail and:

- Provides background information about both work packages, the Shared Outcomes Framework (SOF), and the overall approach to monitoring and evaluation.
- Provides more detail on the SOF and how the monitoring and evaluation approach is embedded within this.
- Sets out the lessons learned from both work packages.
- Proposes a monitoring framework for partners in Shetland and Glasgow City Region to help measure progress for the implementation stage of Work Package 2.

70 Skills Development Scotland (2024). CESAP Pathfinder Evaluation and Lesson Learned Report (unpublished)

Chapter 4: Co-design with Regional and Skills Partners

National Backdrop

Ahead of the regional co-design sessions, a workshop was held with key national stakeholders to validate the findings of the gap analysis of provision and skills issues analysis undertaken at Action 5. This workshop was attended by representatives from SFC, BE-ST, Chartered Institute of Building (CIOB), Construction Industry Training Board (CITB), The Building Engineering Services Association (BESA), The Scottish and Northern Ireland Plumbing Employers Federation (SNIPEF), WarmWorks, AC Whyte, Arcadis, Robertsons Group, Renewable Heat, North Ayrshire Council, Unite, Scottish Enterprise and representatives of the College sector.

Participants were presented with the key findings of the gap analysis of provision and skills issues and were given the opportunity to ask questions, make observations and challenge what they heard. The workshop discussion is summarised below:

- Partners agreed that the key findings of the gap analysis resonated with their understanding of sectoral challenges and issues.
- Demand for apprenticeships on some construction and building frameworks is high and leading to access issues connected to training supply.
- Apprenticeships are not always suited to older workers looking to transition into the sector or to upskill, due to the length and nature of the programme. There is demand from some employers within the industry for alternative pathways for adults.
- Lots of learners are proficient in skills, but not 'industry competent', with more needing to be done to improve work readiness of learners.
- The complex funding landscape at a national level reduces the ability of providers to deliver and employer's ability to upskill their existing workforce.
- It is legislation that will drive demand and pace of course delivery. Until then, business confidence in the pipeline of work remains low, which in turn impacts on investment in skills.
- Access to funding will play a central role in the addressing the skills needs of the sector.

Participants also highlighted the need at a national level to:

- Look at developing additional pathways into heat decarbonisation for career changers.
- Increase the number of construction apprenticeship places.
- Ensure that learners are competent and work ready.
- Get a better understanding of the new and emerging skills required by industry.

Whilst these issues were identified within the national context, this insight provided a backdrop to the discussions in the two regions in terms of shaping and supporting a response.

The Approach

Work was undertaken with skills providers and stakeholders to co-design an approach to implement change in response to the opportunities and the gaps and skills issues identified. Whilst there was some variation to accommodate partners across the two regions, the approach involved bringing partners together in three SDS facilitated workshops, supported by a series of additional conversations to identify and agree actions. In broad terms, the approach was as set out in Figure 3.

Chapter 4: Co-design with Regional and Skills Partners

Figure 3 - Approach to co-design with regional partners

As part of Action 2, regional insight was gathered in Glasgow City Region and Shetland to understand what was already happening on the ground and to identify key issues and opportunities in addition to investment in terms of regulation and technology. This insight provided the context for the development of pilot approaches in the two regions.

Shetland Case Study

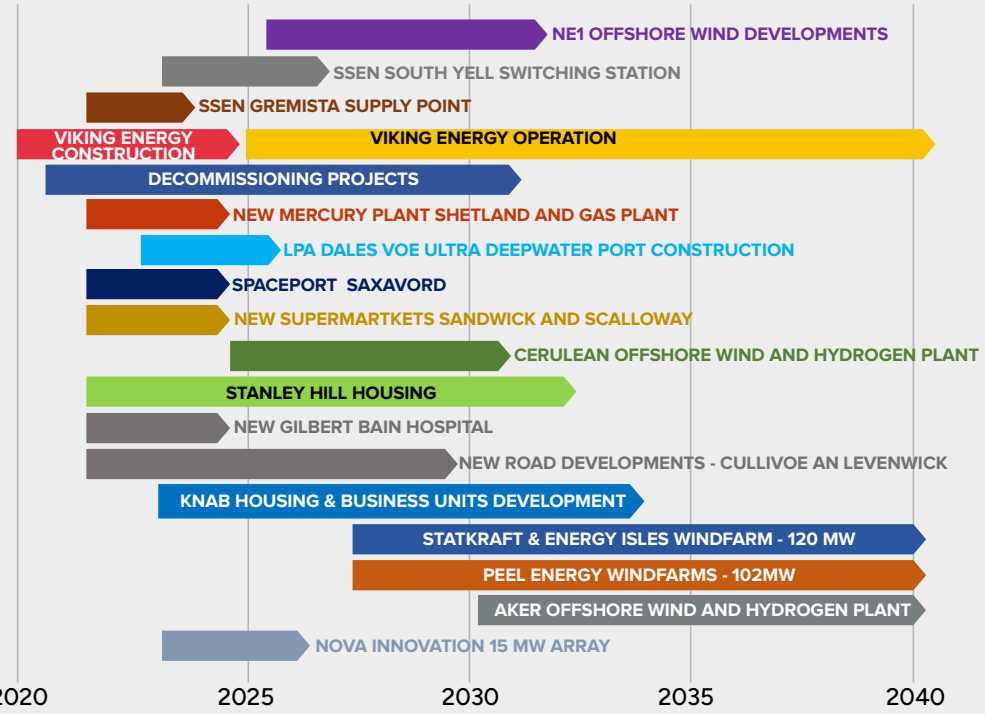
Summary of the Shetland Evidence

This summary of evidence across identified investment and opportunities, skills demand and skills provision draws on the key findings from the outputs of Actions 1-4 of the CESAP Pathfinder WP2[71] of relevance to Shetland.

Investment and Opportunities

- **A total of £19 million (£18 million domestic and £1 million mixed) of current investment was identified for Shetland,** focused on combined energy and low carbon heat. The majority is committed to retrofit projects.
- **The National Islands Plan**[72] acknowledges the resilience and innovation of Islanders in effectively responding to the climate emergency. Partners identified a number of projects aimed at reducing emissions and acting on climate change. These included the ORION Clean Energy Project aiming to position Shetland as a green energy hub using wind and tidal power to generate hydrogen and electrify oil and gas installations in new housing developments, with an ambition to work toward Passivhaus standards and expanding Community District Heating Schemes. This builds on significant previous experience stretching back to the development of the Shetland Heat Energy and Power (SHEAP) in 1991. Figure 4 outlines planned major infrastructure developments in Shetland 2021-2040 that may also stimulate demand for skills.

Figure 4 - Planned major infrastructure developments in Shetland 2021-2040[73]



* Please note this is an indicative guide to illustrate planned and proposed developments that have been publicly announced for Shetland. Timelines are estimates and a guide only and should not be used to inform commercial and/or investment decidions.

71 Further detail is available in the published suite of Precis and supplementary evidence reports

72 Scottish Government (2019). The National Islands Plan: Plana Nàiseanta nan Eilean

73 Chart detailing planned Shetland investments from Highlands and Islands Enterprise (2023)

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Summary of the Shetland Evidence

Partners also identified several current and planned funding opportunities in Shetland that will both stimulate additional demand for heat decarbonisation activity and support uptake of related skills training. These include:

- Shetland Islands Council has developed a three-year investment plan to guide distribution of local allocation from the UK Shared Prosperity Fund, which includes grant funding of £350,000 to Shetland UHI for 'green skills' development. A refreshed offer from UHI is currently under development, which includes funding towards development of STEM and marine courses and modules, and investment in marketing and engagement, with a focus on retraining workers to enable transition to net zero and maximise benefits for local economy.
- The Scottish Academy for Construction Opportunities (SACO) has £1.3 million to enable construction career opportunities for people from local communities, to create a talent pipeline to meet the needs of local construction employers.
- £3 million through the Islands Growth Deal TalEntEd Islands Programme. In partnership with SDS, Robert Gordon University, Herriot Watt, Highlands and Islands Enterprise, Orkney Islands Council, Shetland Islands Council and Comhairle nan Eilean Siar, UHI are leading the development of a programme that will create opportunities for education, skills, entrepreneurship and commercialisation which will help respond to demographic challenges and the outmigration of young people from the Islands, drive an increase in sustainable green jobs, and fast-track Island decarbonisation. A key outcome of this programme is the development of new net zero related work based learning.
- Funded from the SG's Local Authority Covid Economic Recovery (LACER) Fund, the Shetland Business Transition Fund was developed by Shetland Islands Council to support and incentivise businesses to adapt to new ways of working or generate investment to remain competitive. The fund offered grants of between £1,000 and £10,000 for businesses to invest in adaptations and new ways of work for example, implementation of new online systems, new machinery, investment in green technology to reduce costs, etc. The Fund provided around £200,000 in adaptation grants to local businesses in 2022, which included investment in decarbonising premises.

Skills Demand

- There were an estimated 1,300 people in employment in Shetland in heat decarbonisation industries in 2021, making up 0.7% of total employment in these industries across Scotland[74]. This is based on the inclusive SIC definition that was developed as part of WP2[75]. It is important to recognise that not all of the people employed across all SIC codes that have been identified as part of the industry will currently be

74 Office for National Statistics (2022). Business Register and Employment Survey. [Accessed via Nomis October 2022].

75 It is worth noting that the definition of heat decarbonisation that was developed for WP2 was different from the overall definition of green jobs developed as part of WP1. The initial work on green jobs was used as a starting point for WP2, however, this definition was tweaked based on industry feedback on heat decarbonisation and the types of SIC codes that would capture this.

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Summary of the Shetland Evidence

directly involved in heat decarbonisation, but the figure gives an indication of the proportion of the wider workforce with the skills and knowledge to potentially contribute.

- The construction workforce in Shetland is currently stretched and facing labour shortages across a number of key roles (particularly trades roles including heating engineers).
- Despite reported labour shortages, there is currently a very small number of job vacancies in heat decarbonisation industries in Shetland. In January-September 2022, there were 100 job postings relevant to heat decarbonisation, accounting for 12% in Shetland[76,77]. However, the number of vacancies for these job roles increased by 92% in Shetland between 2018-19 and 2021-22, suggesting a growth in demand for labour in recent years. Job posting data pointed to a particular demand for engineering professionals and engineering technicians.
- There will be a requirement to grow the workforce to meet net zero heating targets, particularly due to a high replacement demand forecast in the construction sector. In the medium-term (2022-2025), 200 job openings are expected and 400 are expected in the longer-term (2025-2032).[78] This may pose a challenge for the region to attract new talent and retain existing talent if it is to meet heat decarbonisation targets.
- Consultation evidence highlighted the necessity for investment in upskilling and reskilling across the region to meet the upcoming demand.

Skills Provision

- The share of college enrolments aligned to heat decarbonisation industries is higher in Shetland than in Scotland overall (23% compared to 19%) suggesting these courses are popular in the region[79]. College provision may help to address some labour shortage gaps in Shetland.
- In addition, the majority of these enrolments are aligned to architectural and engineering activities, technical testing and analysis industry (78%) with the remaining enrolments aligned to the construction of buildings (22%). This presents an opportunity to grow the architectural and engineering activities workforce which currently makes up only 13% of employment in heat decarbonisation industries in the region.
- Enrolments aligned to heat decarbonisation occupations are largely aligned to electrical and electronic trades (55%) followed by construction and building trades and science, engineering and production technicians (both 18%). These courses would provide college students with the skills to enter some of the occupations in demand in Shetland, including engineering roles and plumbing and heating engineers.
- There are only a small number of MAs undertaking training in heat decarbonisation industries and occupations in the Shetland Islands. In 2021-22 there were less than 50 MA starts working in heat decarbonisation related industries and 100 working in heat decarbonisation related occupations[80].

76 Lightcast (October 2022).
77 Please note that vacancy data covers online advertised vacancies only, so may miss job opportunities advertised through other channels.
78 Oxford Economics Forecasts (September 2022).
79 Scottish Funding Council (2022) Further Education Statistics.
80 Skills Development Scotland (2022). Modern Apprenticeship Statistics.

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- Due to small sample sizes, data on university provision and upskilling and reskilling in Shetland aligned to heat decarbonisation industries was unavailable. Having this data would help draw more conclusions, particularly due to the importance of upskilling and reskilling in the heat decarbonisation space. More data is also required to better understand the outcomes of college students in Shetland, particularly in relation to how many leavers remain in Shetland. This would help strengthen understanding of the scale of provision required in Shetland to meet demand.

Identified Skills Issues and Gaps

- The issues identified at a national level (see page 31) resonate in Shetland, however, several issues specific to the region were identified that provide the context for the development of a skills response.
- **There are limited pathways available.** Many of the critical roles within construction and engineering rely on apprenticeships as the sole entry level route. This adds a layer of complexity as entry level opportunities in Shetland are restricted by employer ability and desire to recruit, employ and support apprentices through training.
- Another key issue in the Shetland region is the retention of skills within the region. **Many people leave Shetland to study elsewhere or leave the region after studying due to job opportunities elsewhere.**
- There are some MAs working in the heat decarbonisation occupations that are in high demand in Shetland currently, including engineering technicians and engineering plumbing roles, and the number of MAs in these occupations has grown in recent years. This provides an opportunity for the region to capitalise on these skills and **try to retain these apprentices in the construction industry in the region**.
- Few job vacancies in heat decarbonisation industries could suggest that, despite labour shortages, very few construction employers in the region are hiring. This could be due to **financial constraints**, which were raised in consultations as a **barrier to growing the workforce**. Other factors may be that there is simply very little heat decarbonisation activity underway relative to 'mainstream' construction activity or that the businesses in the area are happy with their current workforce model.
- **Limited Local skills provision means many employers are unable to source training locally.** In addition, the cost of travel and accommodation to get the workforce trained can also be prohibitive. Without significant investment, current provision in the area is unlikely to meet the skills requirements for new and emerging technologies relating to heat decarbonisation. Moreover, there is no networked further education offer, resulting in apprentices in related heat decarbonisation occupations (for example, plumbing), being trained in UHI Inverness or UHI Perth. In Shetland, fewer and smaller companies also mean less employment

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opportunities for apprentices and additional limitations due to a lack of employer opportunities. Employers often have to send apprentices to providers elsewhere in Scotland to access required training. For example, whilst demand data and evidence from consultations indicates high demand for customer service occupations to assist with heat decarbonisation activity, there were no MA starts working in customer service occupations in Shetland.

- **Fuel poverty - is a significant issue in Shetland** with reports at the time of the workshops suggesting rising fuel costs could increase to the point where 96% of households are spending 10% of their income on energy[81]. This compounded the effects of the cost-of-living crisis on communities.

Co-design of Skills Response with Shetland Partners

Key national and local partners were invited to a series of three face to face and online workshops across the period September 2023 to January 2024 (as set out in Figure 3). These workshops had representation from both strategic and skills delivery organisations, with participation from Shetland Island Council, HIE, UHI Shetland, DYW Shetland, the SFC, SDS, Energy Skills Partnership (ESP) and Built Environment - Smarter Transformation (BE-ST).

Workshop 1 was held in September 2023 and provided partners with the opportunity to discuss, challenge and validate the findings from the work on investment, skills demand and provision issues and challenges identified at both a national and a Shetland level. While the national skills demand and provision issues identified by the research resonated with partners in Shetland, new insights into the skills issues and gaps were shared which subsequently has informed this work.

The key issues arising from the Workshop 1 discussion were as follows:

- There is major concern over the capacity of the skills system in Shetland to deliver on the skills needs of the industry to support the transition to net zero. As an island community, it does not have the same volume of providers as mainland Scotland, and economies of scale mean that it is more challenging for UHI to respond to emerging demand.
- Shetland's business base is dominated by micros and SMEs which require extra support around skills investment to ensure these businesses are ready to capitalise on opportunities arising from the net zero transition.
- There are concerns around talent attraction and retention, and competition for labour and skills across sectors which will likely be heightened by increasing demand for heat decarbonisation. For example, there is already significant investment in offshore energy in Shetland which is impacting on construction employers' ability to recruit and retain talent. The scale of the offshore energy opportunity locally is well understood, with a view that renewable energy potentially offers the most

81 See Shetland Islands Council (2022). Shetland's Household Energy Situation in Numbers. it is worth nothing that this research was published in 2022 at the time when the pathfinder work was being conducted and fuel prices have since fallen..

Shetland Case Study

Summary of the Shetland Evidence

significant step change in Shetland's economy since the discovery of North Sea oil and gas.

- Partners thought that the size of the estimated workforce (drawn from ONS data) currently engaged in heat decarbonisation activity seemed high. Whilst the estimates are technically correct, they are subject to caveats. Heat decarbonisation is a new and emerging sector that is not yet classified in the SIC used to gather the data. As a result, a wider definition has been used as a 'best fit' to capture the activity in the area which likely overestimates the figure.
- Partners confirmed that there are many existing and planned investments in Shetland that could be harnessed to address the skills issues and gaps identified. These include a green skills project, funded by Shetland Islands Council through Shared Prosperity Funding, and the £3 million Islands Growth Deal TalEntEd Island Programme. Investment through Shetland Islands Council, for example, is already actively driving demand through existing funding schemes including the Coastal Communities Fund and the Shetland Rural Retail Services Scheme, which can provide grant support towards projects which decarbonise community assets and business premises.

This workshop also allowed for sharing of early thinking from the group on the potential skills response, including the need to **improve both the talent pipeline and route into employment**. This included the importance of building on existing provision with strong ties to industry, for example, graduate apprenticeships. However, there was clear agreement that **new legislation and market demand** will ultimately shape the volume of individuals looking for training in heat decarbonisation and that any response **must be developed at a local level**.

Workshops 2 and 3 allowed for a facilitated and more in-depth discussion on what a local skills response to these identified gaps and skills issues might look like in practice. This included a range of different options proposed by partners as well as discussions on challenges in implementation and potential resource implications. The outcome of the workshops is summarised below and provides an action plan focused on the following three agreed action areas:

Action Area 1: Outreach activity to improve perceptions of decarbonisation of heat and buildings as a career choice.

Action Area 2: Business engagement to Drive Employer Demand for Heat Decarbonisation Related Skills.

Action Area 3: Enhanced Curriculum to Support Decarbonisation of Heat and Buildings.

Action Area 1: Outreach Activity to Improve Perceptions of Decarbonisation of Heat and Buildings as a Career Choice.

Through the desk-based research and subsequent local consultation, talent attraction and retention challenges were identified as a recurring issue. It was confirmed in the workshop that it is a significant concern for employers in Shetland, which has a tight labour market and an overheating construction sector which continues to put pressure on the available labour supply.

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Co-design of Skills Response with Shetland Partners

To address this challenge at an early stage with young people will require a focus on embedding heat decarbonisation learning early in the curriculum in current and planned Science, Technology, Engineering and Mathematics (STEM). School activity was identified as a priority to raise awareness and increase in the sector.

DYW Shetland and SDS have agreed to lead this action area which aims to **improve the perception of jobs in the decarbonisation of heat and buildings, helping to position this as an attractive career choice to a future workforce.** To achieve this outcome a series of complementary activities are planned.

(1) Enhancing the delivery of senior phase and/or full-time access courses. Partners will consider emerging best practice nationally. CITB, ESP and BE-ST are well placed to share best practice, and this project provides an opportunity for greater collaboration. For example, BE-ST could enhance the delivery of National 5 Skills for Work (SfW) construction and the planned delivery of SfW Energy by UHI Shetland in academic year 24/25.

(2) Development of new resources. The Island Growth Deal Shetland Campus Redevelopment investment aims to develop modern learning facilities and support the development and delivery of learning opportunities for the people of Shetland. Through the workshops, partners identified that there is no heat decarbonisation related Science Skills Academy (SSA) Newton Room modules currently. This project will explore the potential for developing new resources for adoption. Associated technologies could be adopted for use such as the ESP funded VR technology and headsets.

(3) Enhancing the delivery of STEM in School. The Shetland STEM Partnership (SSERC, SDS, UHI, DYW, Shetland Islands Council) are currently assessing how delivery partners in Shetland can better collaborate and align their activities. This project will look to respond to any identified gaps in delivery. DYW Shetland have already identified the opportunity to support development of a work-based learning project for a primary school with a local construction company.

Action Area 2: Business Engagement to Drive Employer Demand for Heat Decarbonisation Related Skills

Despite the available evidence of both significant investment and job demand identified through Actions 1 to 3 of CESAP pathfinder WP2 and related research by UHI, current demand from employers is still low. Partners agreed the importance of continued engagement with the construction sector in relation to availability of skills.

Shetland Islands Council and HIE Shetland have agreed to lead this action area which aims to drive employer demand for heat decarbonisation related skills. To achieve this outcome a programme of business engagement is planned which will include:

(1) The sharing of insight and intelligence, including outputs of CESAP Pathfinder WP2, with a focus on known and planned

Co-design of Skills Response with Shetland Partners

investment (as market demand is a key driver), job demand and provision analysis. It is proposed that where possible, a client led approach is taken, providing employers with information on planned investment and demonstrating future projects to employers, for example from Shetland Islands Council, HIE Shetland and Hub North Scotland.

(2) Better signposting to existing available business support, including the offers from HIE, Business Gateway, UHI, Energy Saving Trust, Warmworks, and Industry bodies.

(3) Showcasing of potential training and associated technologies through BE-ST, ESP and UHI Shetland.

(4) Employer engagement to better understand employer demand for commercial training. This planned activity provides the opportunity to test proposed enhancements to curriculum with employers to inform subsequent planning and investment.

Action Area 3: Enhanced Curriculum to Support Decarbonisation of Heat and Buildings.

The CESAP Pathfinder WP2 mapping of provision (Action 4) evidences the opportunity to build on the existing provision offered through UHI Shetland, to respond to investment opportunities and derived demand for heat decarbonisation skills.

UHI Shetland and SDS have agreed to lead this action area which aims to enhance the current curriculum and commercial training offer in response to employer demand. To deliver on this outcome the following activity is planned:

(1) Enhancing MA content SDS is currently undertaking a comprehensive review of construction apprenticeships that have direct relevance to heat decarbonisation. This includes construction crafts such as the carpentry and joinery and plumbing and heating apprenticeship frameworks. UHI are now contributing to this development. The carpentry and joinery MA review is considering how to include retrofit activity, with new MA carpentry and joinery units (based on National Occupational Standards - NOS) agreed nationally. This will also include enhanced knowledge content on building performance. Ahead of completion of this exercise, enhancements could be made to existing MA delivery. There are examples of colleges which have already introduced different models of learning and teaching to better respond to the needs of the sector. For example, Edinburgh College, working with the Verdancy Group, has introduced a Green Skills for Construction programme.

(2) Carbon literacy CPD and training for a wide audience (staff, students, and the wider community). BE-ST advise that the upskilling of educators in zero carbon skills is a priority and should be considered ahead of introducing any new programmes, therefore the initial focus should be to provide training for UHI academic staff.

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Co-design of Skills Response with Shetland Partners

(3) Enhance provision. Subject to employer engagement and consultation (linked to Action Area 2), a broader range of qualifications and training could be considered by UHI Shetland. Options include, for example:

- Delivery of SVQ Level 2 & 3 in Insulation and Building Treatments, enabling SMEs to upskill their workforce and meet the requirements of PAS certification.
- BE-ST have been developing short duration accredited retrofit and Passivhaus training and there is an opportunity for UHI Shetland to engage in the process. Existing retrofit assessor and retrofit coordinator qualifications could also be considered.
- ESP Mobile Heat Pump Training Unit can be accessed to provide training. The vehicle is a British Plumbers Employers Council (BPEC) approved training and assessment centre. Students can be trained and certified on air source and ground source heat pump systems. They can also gain their water regulations and byelaws, and domestic vented and unvented hot water storage qualifications if required. The Mobile Heat Pump Training Unit visited Shetland in 2024 following discussions as part of the Pathfinder project. Employees from Shetland Islands Council and Nordri visited the training unit to learn more about heat pumps[82].
- Delivery of full or units within the Level 3 Award in Energy Efficiency Measures for Older and Traditional Buildings as a knowledge element for the joinery students.
- Other providers such as Robert Gordon University (RGU) have training that can be delivered remotely at no cost to employers, including upskilling and graduate apprenticeships. This project will look to promote all learning opportunities to Shetland employers relevant to decarbonisation of heat and buildings.

Wider Activity

The CESAP Pathfinder WP2 has also been a catalyst for UHI Shetland to develop a web presence to host many of the outputs of this work, in addition to the wide range of Shetland green skills content and information about opportunities. Figure 5 below outlines the workshop action areas and planned activities that will help support each action.

82 Shetland Islands Council (2024). Heat pump training unit arrives in Isles.

Shetland Case Study

Co-design of Skills Response with Shetland Partners

Figure 5 - Shetland CESAP WP2 Action Areas

Shetland CESAP WP2 Workshop Action Areas		
Action Areas	**Current/Planned Activities**	**Aligns with the work of:**
1. Outreach activity to improve perceptions of decarbonisation of heat an buildings as a career choice.	Enhance the delivery of senior phase and/or FT access courses	DYW Shetland & SDS
	Development of new resources	
	Enhance Delivery of STEM resources in Schools	
2. Business engagement to drive employer demand for heat decarbonisation related skills.	Sharing of insight/intelligence	Shetland Islands Council & HIE
	Better signposting to existing available business support	
	Showcasing of potential training and associated technologies	
	Employer engagement to better understand employer demand for commercial training	
3. Enhanced curriculum to support decarbonisation of heat and buildings.	Enhance MA content	UHI Shetland & SDS
	Carbon literacy CPD and training for a wide audience	
	Consider enhancing provision so a wider range of qualifications are available	
UHI Shetland to develop a web presence to host outputs of this work		

Shetland Case Study

Co-design of Skills Response with Shetland Partners

Governance and Next Steps

The partners engaged in the development of the three agreed action areas will be taking these forward from the co-design stage to implementation. All three of the action areas will be taken forward by the Shetland Green Skills Group. This group has representation from Shetland Islands Council, UHI Shetland, RGU, the European Marine Energy Centre, The Islands Centre for Net Zero, HIE Shetland, Shetland Net Zero Energy Forum, DYW Shetland and SDS. This group aims to ensure that green skills issues across Shetland are well understood, and that appropriate training provision is in place to address challenges and capitalise on opportunities that will arise as Shetland progresses its energy transition ambitions. As part of CESAP Pathfinder WP2 implementation, SDS has developed monitoring and evaluation framework to share with partners. This will allow partners to monitor progress in terms of deliverables and provide the basis for looking to assess impact over the longer term.

These agreed action areas are the outputs from the CESAP Pathfinder WP2 and represent initial work to better support the decarbonisation of heat in buildings in Shetland. The actions were developed from a structured end-to-end approach to identifying investment, reviewing the operating context, assessing demand for skills, assessing skills provision, identifying gaps and issues, and working with both national and local partners to respond.

This co-designed skills response is a live document, and partners will continue to respond to and seek to align with funding opportunities as they arise. Given the significant pressure on Scotland's public finances, colleges and universities are working in an increasingly challenging financial operating environment and UHI have implemented planned money-saving proposals. UHI recognise the importance of responding quickly to any alternative and/or additional funding opportunities as they are identified. This includes private sector funding and opportunities arising from community benefits, particularly from the offshore energy sector.

Glasgow City Region Case Study

Summary of the Glasgow City Region Evidence

This summary of evidence across identified investment and opportunities, skills demand and skills provision draws on the key findings from the outputs from Actions 1-4 of the CESAP Pathfinder WP2 of relevance to Glasgow City Region.

Investment and Opportunities

- **A total of £370 million (£289 million commercial and £80 million domestic) of current investment was identified for Glasgow City Region.**
- Regional partners identified several current and planned heat decarbonisation activities in the region, including the Glasgow City Region economic strategy, the Clyde Mission and the Glasgow **Green** Deal[83].
- Furthermore, a number of investment projects were considered opportunities, including:
  - The research undertaken to estimate the cost of bringing properties in Glasgow City Region up to EPC C (estimated to be around £10 billion).
  - Glasgow District Heating Network, scaling up the achievements of the £154 million Glasgow Recycling and Renewable Energy Centre (GRREC) to kick-start a wider district heating network.
- Whilst there are a wide range of other potential projects, many are uncertain, requiring significant investment to proceed and require external investment to proceed.

83 The Glasgow City Region economic strategy includes 'accelerating climate action' as one of the transformational opportunities for the city region. Clyde Mission aims to drive sustainable and inclusive growth, incorporating the Energy Masterplan that supports the identification and development of a portfolio of heat and energy related investment opportunities. Glasgow Green Deal is a 9-year mission to deliver equitable, net zero carbon, climate resilient living.

Skills Demand

- Similar to the national picture, demand is also set to grow in Glasgow City Region over the next decade, particularly to replace people who leave the workforce. Mid-term (2022-2025) forecasts **estimate 14,500 job openings are expected, and 30,500 job openings are expected in the longer-term** (2025-2032)[84].
- There were 800 job postings in heat decarbonisation industries and occupations in January-September 2022. This was 34% of total job postings in these industries and occupations across Scotland, **highlighting the prominence of these jobs in Glasgow City Region**. The number of vacancies for these job roles increased by 189% in Glasgow City Region between 2018/19 and 2021/22. This growth was at a faster rate than the vacancies for these jobs across Scotland overall (which was 131% for the same time period), suggesting a **growth in demand for workers in Glasgow City Region in recent years**.
- Demand is high for key occupations such as **plumbers and heating and ventilating engineers**, which currently account for almost half of the relevant job postings in heat decarbonisation industries. Most job postings were in specialised construction activities (58%) followed by construction of buildings (18%) and architectural and engineering activities; technical testing and analysis (12%).
- **Vacancy data and industry consultations suggest that there will be demand for more people who are trained for these roles.**

84 Oxford Economics Forecasts (September 2022).

Glasgow City Region Case Study

Summary of the Glasgow City Region Evidence

Skills Provision

- The region has six higher education institutions and six colleges; therefore, a large proportion of relevant training provision in Scotland is delivered in the Glasgow City Region. The region accounts for around 22% of university graduates from Scottish institutions working in heat decarbonisation industries[85], 43% of Modern Apprenticeship (MA) starts[86] and 40% of Graduate Apprenticeship (GA) starts[87]. Almost all Foundation Apprenticeship (FA) starts with work placements in relevant industries are based in Glasgow (93%)[88] and 32% of all college enrolments in relevant courses are based in the Glasgow Region[89].
- Colleges **in the Glasgow City Region provide many of the training courses explicitly linked to energy efficiency and microgeneration**, including training in heat pumps and insulation. In 2020/21 around 86% of all enrolments in these courses across Scotland were in Glasgow City Region institutions.
- The region also has a **strong retention of university graduates** employed in heat decarbonisation aligned industries – 79% of graduates working in these industries in the Glasgow City Region had also studied in the region[90].
- **College provision in the Glasgow City Region, in broad terms, aligns well to the industries that will support with heat decarbonisation and have a high demand for workers, although, as noted earlier, provision in itself does not ensure that demand is met in a specific locality**. In 2020/21, there were 7,500 enrolments aligned to heat decarbonisation industries, the majority of which were in construction of buildings (52%) or architectural and engineering activities, technical testing and analysis (43%). 30% of heat decarbonisation related job postings in Glasgow are for jobs in one of these two industries. **This provides an opportunity to retain these students in the region.**
- **Apprenticeship provision in Glasgow provides opportunities to address labour demand.** MAs are currently being trained in industries with the highest employment figures and job vacancies. Around 200 MA starts were working in plumbing and heating and ventiliation engineer occupations in Glasgow in 2021/22, indicating a potential opportunity to address labour demand for this job role in the region.
- The data suggests that college provision, in terms of volume of enrolments, is **generally aligned to the broad areas where there is demand** to support heat decarbonisation.
- At a high level, enrolment data in volume terms, points to current provision aligning relatively well with identified demand in Glasgow CIty Region. However, as outlined previously there is no data that shows whether college students end up working in the Glasgow City Region and/or in heat decarbonisation industries. **Data on outcomes of college students would help determine if the provision on offer in the region leads to employment opportunities in**

85 Scottish Funding Council (2022). Graduate Outcomes Survey 2018/19.
86 Skills Development Scotland (2022). Modern Apprenticeship Statistics.
87 Skills Development Scotland (2022). Graduate Apprenticeship Statistics.
88 Skills Development Scotland (2022). Foundation Apprenticeship Statistics
89 Scottish Funding Council (2022). Further Education Statistics.
90 Scottish Funding Council (2022). Graduate Outcomes Survey 2018/19.

Glasgow City Region Case Study

Summary of the Glasgow City Region Evidence

heat decarbonisation. Similarly, **more data is also needed to better understand upskilling and reskilling activities** in **the region and the number of individuals that require reskilling or upskilling**.

Identified Skills Issues and Gaps

- The issues identified at a national level (see page 31) resonate in the Glasgow City Region. More specifically, it is worth noting that the **workforce in the Glasgow City Region has an important role to play in the transition to net zero heating in Scotland**. The region accounts for around 33% of total employment in the industries that will contribute to heat decarbonisation across Scotland[91] (although the construction workforce is transient, and many will work across other areas). However, some issues specific to the locality were identified that provide the context for a skills response:
  - **Investment timelines are uncertain** as many of the major projects are speculative and require external investment to proceed. Consequently, skills providers are reluctant to introduce new provision without confidence that vacancies will follow through.
  - There is reluctance by providers in the city region to upscale **existing skills provision** without greater clarity around timelines and funding.
  - There are multiple reviews underway relating to governance in the city-region – including of the regional college boards in Glasgow and Lanarkshire, and the extension of membership of the regional partnership to include a representative of Colleges Partnership West.
  - **Utilising best practice.** There are examples of good practice within the city region that could be utilised,, for example BE-ST (formerly the Construction Skills Innovation Centre) which sits out with the main existing structure.

Co-design of Skills Response with the Glasgow City Region Partners

Key national and local partners were invited to a series of three face to face and online workshops across the period August 2023 to January 2024 (as set out in Figure 3). These workshops had representation from both strategic and skills delivery organisations, with participation from Glasgow City Council, City of Glasgow College, South Lanarkshire College, Glasgow Clyde College, West College Scotland, Glasgow Kelvin College, Glasgow Colleges Regional Board, BE-ST, SG, SFC and SDS.

Workshop 1 was held in August 2023 and gave partners the opportunity to discuss, challenge and validate the findings from the work on investment, skills demand and provision issues and challenges identified within the CESAP pathfinder research at both a national and a Glasgow City Region level. While the national skills demand and provision issues identified by the research were confirmed with partners in Glasgow, new insights into the skills issues and gaps were shared which subsequently has informed the co-design phase of this Pathfinder WP2 work.

91 Office for National Statistics (2022). Business Register and Employment Survey. [Accessed via Nomis October 2022].

Glasgow City Region Case Study

Co-design of Skills Response with Glasgow CIty Region Partners

The key issues arising from the Workshop 1 discussion were as follows:

- There was clear agreement that **new legislation and market demand will shape the volume** of individuals looking to undertake training in heat decarbonisation, and that **any response will need to be developed at a local level.**
- Concerns were raised over the over the ability of colleges to **sustain delivery in response to demand within the current funding landscape**. Whilst there is a range of available resource in the Glasgow City Region in terms of provision aligned to heat decarbonisation, these courses can be expensive to run due to the cost of materials and delivery. Participants raised that on occasions where the cost per student is not fully met, **additional costs need to be covered or subsidised by employers and/or training providers**. This is particularly the case with sub-contracted programmes.
- Although the numbers engaged in apprenticeships in areas relevant to heat decarbonisation such as construction are strong, **the sector still struggles with issues of talent retention**.
- Whilst out-sourcing work to EU labour is an option to mitigate against skills shortages and costs, more entry level opportunities are required across the sector to increase the talent pipeline at a local and regional level.
- There was an appetite for increased apprenticeship places across frameworks of relevance to support heat decarbonisation in the region, although **caution was advised around solely relying on the apprenticeship model** as entry to the sector, and **alternative entry routes should be explored and promoted**.
- Partners confirmed that across the Glasgow City Region, there are a **range of existing resources available that could be harnessed** to address the skills issues and gaps identified through the gap analysis research. This included potential opportunities to tap into existing discretionary funding (such as the UK Shared Prosperity Fund and No One Left Behind via the Local Employability Partnerships) and to support workstreams and investment aligned to the Glasgow City Region regional priorities, including Innovation Accelerator and Investment Zone.

The workshop also allowed for sharing of early thinking and discussion from the group on the potential skills response. Discussion identified that each college across the region has a **unique specialism that could be capitalised on and marketed through collaboration between institutions**, to provide the necessary skills for the transition to net zero. Colleges also expressed that **greater flexibility in terms of credit funding would allow them to respond more quickly and effectively** to new emerging skills demand and evolve to deliver courses in line with industry need.

Workshops 2 and 3 allowed for a facilitated and more in-depth discussion on what a local skills response to these identified

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gaps and skills issues might look like in practice, including a range of different options put forward by partners, challenges in implementation and potential resource implications. The outcome of the workshops is summarised below and provides an Action Plan focused on three agreed action areas:

Action Area 1: Better understand, engage with, and build on existing heat decarbonisation activity in the region.

Action Area 2: Help employers and their workforce respond to emerging heat decarbonisation opportunities through connecting to relevant training.

Action Area 3: Promote and adapt existing curriculum to support decarbonisation of heat and buildings.

Action Area 1: Better Understand, Engage with and Build on Existing Heat Decarbonisation Activity in the Region

There is consensus that significant retrofit work to improve energy efficiency and transition to low carbon heating will be needed across millions of buildings both domestic and otherwise in Scotland to meet ambitions in the Heat in Buildings Strategy[92]. This includes a fabric first approach to allow low carbon heating systems to work as intended. Some of the known challenges around retrofit were discussed in the workshops, including the up to four-year lead time for training critical roles, the difficulties of upscaling training quickly due to costs and availability of existing college workshop space or costs of setting up additional workshops, equipment and materials for practical subjects; and the limited options available for plugging labour and skills shortages as well as skills gaps in the existing workforce.

Nonetheless there is a clear interest in retrofit amongst regional partners, and there is significant work already undertaken dating back to 2021 when Grant Thornton was commissioned by partners to identify the number of domestic properties within the city-region requiring to be insulated and the costs associated with this. Their report concluded that 428,000 domestic properties had energy performance certificates below C level, and a 10-year programme to retrofit them would cost £10.7 billion.

Investment opportunities relating to net zero – including an ambitious housing retrofit programme – was included in the refreshed regional economic strategy, launched December 2021[93].

The importance of skills in delivering this has been recognised throughout and the development of the Glasgow Just Transition Skills Action Plan[94] (JTSAP) was part of the rationale for this region being a focus of the CESAP Pathfinder work. JTSAP was developed and written by Glasgow City Council with support from Skills Development Scotland and formally adopted and published by the council in November 2023.

The working group that was previously focused on city-region retrofit opportunities has been reconstituted as the Glasgow City Region Housing Retrofit Delivery Group – convened by the Glasgow City Region with a membership drawn from

92 Scottish Government (2021). Heat In Buildings Strategy: Achieving Net Zero Emissions in Scotland's Buildings

93 Glasgow City Region (2021) Regional Economic Strategy

94 Glasgow City Council (2023). Glasgow Just Transition Skills Action Plan

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representatives of the eight local authorities with Scottish Enterprise and SDS. The group meets frequently with the purpose of progressing action on the city region's retrofit strategy through 2024, to be adopted by the Cabinet and Regional Partnership by the end of the year.

Skills issues have consistently been recognised as a potential barrier to the delivery of retrofit activity at the city-region level. The scale and focus of retrofit activity will also be informed by the Local Heat and Energy Efficiency Strategies (LHEES) being produced by all Scottish local authorities[95].

As skills is a derived demand, flowing from the investment in, and scale of the work being driven by heat decarbonisation activities, it is critical that partners work together to better understand, engage with, and build on existing heat decarbonisation activity in the region. As set out earlier, Action 1 of the CESAP Pathfinder WP2 identified a **total of £370 million (£289 million commercial and £80 million domestic) of current investment** in the region, with a significant programme of investment linked to the potential **£10 billion Home Energy Retrofit Programme**. Alongside other identified opportunities outlined in the City Region Economic Strategy, the Clyde Mission, and the Glasgow Green Deal this will potentially drive activity aligned to decarbonisation across the region.

To align with existing and planned investment, a key action of the Glasgow City Region CESAP WP2 Pathfinder co-design work will be **partner agreement to link into the key existing strands of work, which include:**

(1) To support the development of the Glasgow City Region Domestic Retrofit Strategy. This is a key document which will be developed through 2024 and will be taken to the Cabinet for approval in December 2024. This will outline the key challenges specific to retrofit and critically where there are opportunities to overcome these **challenges collectively.**

- The actions from CESAP WP2 will inform the Regional Retrofit Strategy which is currently being progressed through the City Region Housing Retrofit Delivery Group. This group is convened by Glasgow City Region Programme Management Office and includes the eight member Local Authorities, Scottish Enterprise and SDS. The group reports into the Regional Economic Partnership which now includes representation through Colleges Partnership West.
- Anticipated completion of Regional Retrofit Strategy is the end of 2024.

(2) To link to the wider actions identified in the Just Transition Skills Action Plan. This has specific objectives and associated actions around investing in green jobs and the skills ecosystem, including 'developing a series of green skills bootcamps for heat decarbonisation, housing retrofitting, and transport and to 'scale up a city-wide green apprenticeship scheme in a range of areas such as retrofit, construction and renewables'.

- Governance for the Just Transition Skills Action Plan will continue through existing Glasgow City Council structures,

95 Local Heat and Energy Efficiency Strategies (Scotland) (Order) 2022

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but GCR CESAP WP2 Pathfinder findings and action areas will inform and support the work.

(3) To link more effectively into Local Employability Partnerships (LEPs). Local Employability Partnerships manage a number of discretionary funding streams including SG's No One Left Behind (NOLB) funding and the UK Government's People and Skills programmes within the Shared Prosperity Fund (SPF). Whilst aware of the funding potential, partners at the co-design workshop confirmed no direct engagement with the LEPs. An opportunity exists for regional partners to tap into existing available funding such as NOLB and the Shared Prosperity Fund and any potential successor funds to explore how these could be used specifically in the support of heat decarbonisation skills investment.

- Recommendations from the GCR CESAP WP2 Pathfinder will be shared with the eight local authority LEPs via the Housing Retrofit Delivery Group to explore the potential for available funding such as NOLB (tapping into any specific strand for green skills investment).

Action Area 2: Help employers and their workforce respond to emerging heat decarbonisation opportunities through connecting to relevant training.

Discussion at the workshops underlined that much of the demand for skills provision will be driven by legislation, specifically the mandating of heat decarbonisation technologies, carbon neutral building requirements and business practices, particularly in the case of large-scale investment that might in future be directed through Glasgow City Region or the member authorities.

While it is recognised that this is the likely direction of travel, businesses are not yet ready to invest in new skills without a clear profitable pipeline of work. Consequently, skills providers are reluctant to introduce new provision as they lack the certainty that there will be individuals and/or employers in sufficiently large volume to undertake the training.

Although partners agreed that the central role of legislation is driving market demand, they also highlighted the potential of businesses who form the supply chain in acting as a catalyst to drive additional demand, therefore early engagement with businesses was viewed as important. Through the gap analysis research and co-design workshops, partners expressed an interest in the setting up of a 'hub' or other mechanism to support retrofitting across the region.

The concept of a 'retrofit hub', to support regional partners to identify and deliver retrofitting training to build a strong supply chain was identified as an option to explore. It also has a clear fit with the ambitions of the Glasgow Just Transition Plan. In broad terms, this is envisaged as an online resource and would be a central hub with a primary aim of connecting the retrofit supply chain to the relevant training within Glasgow. There could also be potential for additional functionality given the maturity of the retrofit market to be a central point to connect and support potential retrofit customers.

To support this through the CESAP Pathfinder WP2, BE-ST undertook a research exercise to explore the potential demand for a 'hub', including the needs of a range of customer types, the activities that it could support, existing training information that

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could be included and some of the resource implications.

The key findings from the research show that:

- Partners welcome the idea of a retrofitting 'hub'.
- The most critical operating function would be linking employers in the supply chain to the available face-to-face training across the region.
- A role to support navigation of the national and regional stakeholders would also be considered valuable.
- Any development of a 'hub' must consider regional and national bodies who operate in this space to ensure no duplication and to limit silo working.
- Strong feedback that there were additional benefits to be had if the 'hub' were able to operate as a trusted gateway between end-users, supply chain and decision makers to help overcome some of the perceived complexity barriers.
- There is a need for funding to support creation, but consideration would need to be given on approaches to generate income to ensure sustainability.

The research output will be shared with Glasgow City Region partners, and will providing a basis to support decision making and potential next steps around the development of a 'hub' model.

In line with the above agreed area for action, partners will be looking to:

(1) Support early engagement with businesses within the region who could form the supply chain as this could help accelerate the demand required for provision to increase, thus helping build the skills pipeline for heat decarbonisation in the region. This could build upon the business base already engaged, including those who have previously accessed funding for skills support through the Flexible Workforce Development Fund.

(2) Further explore the development of a 'retrofit hub' with the aim of helping regional partners deliver retrofit training. One aspect of the hub could be to gather and improve data on retrofit upskilling and reskilling provision. Partners should review models of practice for the hub as income generation would be required and funding is likely to be required to set this up in the first instance.

Action Area 3: Promote and Adapt Existing Curriculum to Support Decarbonisation of Heat and Buildings.

Through the Pathfinder WP2 desk-based research and subsequent regional consultation, it was identified that a substantial proportion of relevant decarbonisation training provision in Scotland is delivered in the Glasgow City Region. Many of the colleges in the region provide training courses explicitly linked to energy efficiency and microgeneration, including heat pumps and insulation. However, engagement with regional providers identified that although there exists a multitude of training opportunities, these opportunities could be better promoted to learners across the region.

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Partners expressed a willingness to explore a more strategic approach that would look to develop a coherent Glasgow City Region wide offer for heat decarbonisation, reflecting and respecting individual colleges respective strengths and sub-sectoral specialisms. A regional offer would provide clearer provision pathways for learners in the system, and would also make it easier to identify gaps, and/or a lack of consistency in terms of training and provision.

If taken forward, a robust partnership between the regional colleges would be central to the success of this type of model, both in terms of determining the provision on offer and ensuring that all colleges have equal access to candidates and emerging opportunities. The six colleges - Glasgow Clyde College, Glasgow Kelvin College, City of Glasgow College, New College Lanarkshire, South Lanarkshire College, and West College Scotland - have agreed to lead on this action area. The colleges will mobilise through the newly formed Colleges Partnership West (CPW), which would also provide a governance structure and reporting mechanism for this work.

As the regional approach to responding to heat decarbonisation develops, there may also be the potential to connect the identified training offers through the colleges into the retrofit 'hub' model if this is taken forward.

Partners also recognised the need to adapt the training offer in response to changing demands for relevant heat decarbonsation training. It was noted that this could potentially happen at pace. Colleges expressed a need for greater flexibility in the existing credit allocation system, to allow them to deliver courses and provision that is more 'in-line' with sectoral needs. Glasgow Colleges Regional Board (GCRB[96]), who currently manage credits on behalf of the three Glasgow colleges (City of Glasgow, Glasgow Clyde and Glasgow Kelvin), has agreed credit flexibility to prioritise provision within this area within its level of devolved responsibility. SFC has also noted the issues raised through the CESAP Pathfinder WP2 workshops. The SFC will continue to explore credit flexibility as a potential response to supporting heat decarbonisation in the region.

To support the identified area for action, partners will be taking forward the following activities:

(1) Ensure learning opportunities around heat decarbonisation are better promoted to learners. This was identified as a challenge to uptake for the current training provided around heat decarbonisation in the region.

(2) Further consideration of the development of a regional approach to heat decarbonisation provision which builds on colleges' sub-sectoral strengths. The benefits of such an approach were clearly articulated in the workshop including visible and clear pathways for learning being easier to develop and colleges being able to articulate their strengths.

(3) Look at opportunities for flexibility in the current college credit system. SFC (in discussion with GCRB) should continue to explore opportunities as this was noted as a barrier for colleges to deliver training.

96 Scottish Government are undertaking a consultation on Review of the Regional Strategic Bodies within the Glasgow and Lanarkshire college regions

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There may be an opportunity to progress action areas 2 and 3 through the discussions of the Regional Skills Devolution Group as this work aligns with the sectoral priorities identified by the group.

Figure 6 summarises the agreed actions from the Glasgow City Region workshops.

Figure 6 - Glasgow City Region CESAP WP2 Action Areas

Glasgow City Region CESAP WP2 Workshop Action Areas		
Action Areas	**Current/Planned Activities**	**Aligns with the work of:**
1. Better understand, engage with, and build on existing heat decarbonisation activity in the region.	Support the development of the Glasgow City Region Domestic Retrofit Strategy	GCR Housing Retrofit Delivery Group
	Link to the wider actions identified in the Just Transition Skills Action Plan	
	Link more effectively into Local Employability Partnerships (LEPS)	
2. Help employers and their workforce respond to emerging heat decarbonisation opportunities through connecting to relevant training.	Support early engagement with businesses in the region	GCR Housing Retrofit Delivery Group
	Further explore the development of a 'retrofit hub'	
3. Promote and adapt existing curriculum to support decarbonisation of heat and buildings.	Enhance MA content	The six Glasgow Colleges through the Colleges Partnership West
	Carbon literacy CPD and training for a wide audience	
	Consider enhancing provision so a wider range of qualifications are available	SFC/GCRB

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Governance and Next Steps

These agreed action areas are the outputs from the CESAP Pathfinder WP2 and represent initial work to better support the decarbonisation of heat in buildings in the Glasgow City Region. This has been developed from a structured end-to-end approach to identifying investment, reviewing the operating context, assessing demand for skills and skills provision, identifying gaps and issues, and working with both national and local partners to respond.

The three areas agreed for action have each identified partners to lead on next steps and implementation. As set out previously, the governance of the individual actions will be taken through existing structures in the region, but as a support to partners, and as an element of Action 7 of the CESAP WP2 Pathfinder, a high-level monitoring framework has been developed and is available to share with partners to maintain momentum on conclusion of the programme of CESAP Pathfinder work in April 2024.

Chapter 5: Conclusions and Lessons

The CESAP Pathfinder work was designed to develop and 'test' an end-to-end approach to a more dynamic skills system response to the decarbonisation of heat in domestic and commercial buildings in two regions of Scotland. The rationale for choosing this sub-sector was its status as an early investment programme being delivered as part of the SG Climate Change Plan. The two regions were selected based on desk review and engagement with stakeholders including industry, local partners, and SG policy leads.

These case studies provide the opportunity to explore the approach in two different operating contexts, although there are commonalities in terms of agreed actions which in broad terms focus around:

- A better understanding of the opportunities, in the Glasgow City Region from the perspective of building on existing heat decarbonisation activities, and in Shetland from the perspective of enhancing the perceptions of the industry as a career choice.
- Meaningful industry engagement to share insight, better understand demand, and as a contributor to refining a response.
- Promotion and enhancement of curriculum across college provision and Modern Apprenticeships.

Caution should always be applied to **both direct comparison, and extrapolation based on two cases**. However, the exploratory CESAP Pathfinder WP2 has highlighted a number of key areas which, **when taken together,** support the effective development of an evidence based co-designed response in a chosen sub-sector at a regional level. Table 3 sets these out as a series of underpinning principles each with a rationale, supported by the lessons learned from the Pathfinder and evidenced through the work.

Chapter 5: Conclusions and Lessons

Table 3 - Underpinning Principles to support a More Dynamic Regional Response in a (Sub) Sector

Principle	Rationale	Lessons Learned from Pathfinder WP2	Evidenced By
1. Using clearly identified national / regional priorities as a means for driving focused collaborative action.	To address identified skills issues in a (sub) sector of importance to the Scottish and/or regional economy. To provide a focal point for collaboration.	• It is in areas where there is strategic clarity that action is required that there is a greater chance of stakeholder engagement and traction in terms of the development of a response.	Climate Change Update Heat and Buildings Strategy Regional Economic Strategies
2. Develop a clearly articulated plan.	To provide a route map for delivery. To provide a reference point for progress.	• Development and sharing of a plan provided clarity on objectives and helped to keep the process on track. • Value in the inclusion of a Gateway Review that allowed time to review the approach in terms of its 'doabilty, plausibility and testabilty'.	Project Initiation Document Programme of Work Gateway Review
3. Identify and apply appropriate dedicated resource.	To develop a legitimate programme of action and ensure it is effectively implemented, recognising that skills planning is time and resource intensive.	• An expert, experienced team, with clarity on roles and responsibilities is required to ensure momentum. Senior resource in terms of SDS Head of Regions, the Regional Skills Planning Leads in the case study areas and the Skills Planning manager for Construction, supported by Skills Planning Executives drove the design and development of the approach. • The required skill set includes specialist knowledge across skills and economic development, strong partnership and networking skills, facilitation capabilities and the ability to see focused project work in the wider operating context. • Input from SFC and SG colleagues provided support and constructive challenge to enhance the approach throughout.	Commitment of senior and supporting SDS resource Commitment of resource from SFC, SG and wider partners

Table 3 - Underpinning Principles to support a More Dynamic Regional Response in a (Sub) Sector

Principle	Rationale	Lessons Learned from Pathfinder WP2	Evidenced By
4. Ensure effective governance of overall approach.	To ensure collective understanding of progress against objectives. To provide a forum to identify and address challenges and offer support.. To ensure ownership of individual actions	• The application of a structured and well documented approach helped to maintain momentum. • Brought together relevant colleagues across SDS, SFC and SG to draw on expertise, discuss and resolve issues and provide support and challenge.	Project Status Reports through SOAG Work Package 2 Delivery Group
5. Seek clarity on current and planned investment in the sub-sector and/or region.	To build a better understanding of the likely demand for skills which flow from economic opportunities.	• Uncertainties around progression and timelines make it very challenging to identify scale and timing of job opportunities and specific skills demands. • Need to invest time and resource in gathering as much detail on scale, certainty, timelines, location and lead partners. • Whilst there will always be data gaps, the development of a response can be justified on the back of enough significant investment.	Mapping of investment at national level and in Glasgow City Region and Shetland Islands
6. Undertake early and meaningful engagement with key regional, policy and industry stakeholders.	To provide in depth understanding of regional operating context likely to impact on any approach. To build a firm foundation for subsequent co-design with partners.	• Engagement with key stakeholders is critical at all stages of the process, from initial scoping, through a more intensive design phase through to proposed implementation.	Consultations and workshops with regional, policy and industry partners

Table 3 - Underpinning Principles to support a More Dynamic Regional Response in a (Sub) Sector

Principle	Rationale	Lessons Learned from Pathfinder WP2	Evidenced By
7. Build and utilise a strong evidence base of data and insight on demand and provision.	To ensure the approach is underpinned by relevant and up-to-date insight and data.	• Whilst there are data gaps, particularly in relation to smaller geographies regarding demand and outcomes, in terms of college provision, imperfect data should not be a block on starting to shape up a response. • The learning on strengthening data gaps in relation to strategic evidence, demand and provision from CESAP Pathfinder WP1 sets this out in detail[97]. • Numeric data whilst important provides only part of the picture.	CESAP Pathfinder WP2 Demand assessment CESAP Pathfinder WP2 Assessment of Provision CESAP Pathfinder WP2 Analysis of Gaps and Skills Issues
8. Validate evidence base with partners.	To ensure that evidence and insight relevant to region and sub-sector is shared and understood. To ensure evidence and insight relevant to region and sub-sector can be challenged and enhanced . To provide an agreed baseline from which to develop a response.	• Partners with a potential role to play either in identifying the skills gaps and issues or in the delivery of actions need the opportunity to hear and reflect on the evidence on skills demand, provision, gaps, and skills issues.	Facilitated workshop with key partners One to one conversations with stakeholders

97 CESAP Pathfinder WP1 underpins this principle, see Skills Development Scotland (2023) . CESAP Pathfinder: A Dynamic Skills Response to Supporting the Transition to Net Zero.

Table 3 - Underpinning Principles to support a More Dynamic Regional Response in a (Sub) Sector

Principle	Rationale	Lessons Learned from Pathfinder WP2	Evidenced By
9. Develop a facilitated and well-structured approach to co-design of skills response.	To provide an authentic mechanism to support the development of an approach co-designed by partners. To build ownership of the actions to be taken forward. To ensure individuals and/ or organisations are clear on their roles and responsibilities throughout development and delivery.	• Having the right people round the table focused on addressing specific issues allowed for new ideas to be explored and refined, links and enhancements made to existing activity and actions taken forward to implementation by partners. • Clarity on who is taking responsibility for different elements of the work increases the chances of delivery.	Suite of co-design workshops and wider consultations CESAP WP2 Delivery Group
10. Develop an approach to monitoring and evaluation.	To review progress against the work programme. To provide opportunities for learning, enhancement, and review.	• The blend of formative evaluation that allowed for improvements to be made throughout and an end of project review to support the work into the implementation phase maximises the value of lessons learned.	Should read CESAP Pathfinder Monitoring, Evaluation and Lessons Learned Report

Chapter 5: Conclusions and Lessons

Next Steps

Building on the significant body of work undertaken through the course of the CESAP Pathfinder, the next steps for this work are threefold:

1. **Delivery of change.** Implementation of the agreed areas for action align with the work of partners in the Glasgow City Region and Shetland. Whilst there are differences across the two regions, both in terms of the nature of the actions and their governance routes, an outline approach to monitoring progress has been developed as part of this work and will be shared with partners. Having the right partners engaged to progress and deliver the work in both regions will be critically important. This should include SDS and the SFC, but consideration should also be given to maintaining strong links to employers and the bodies that will be involved in the letting of contracts to deliver heat decarbonisation.

2. **Opportunity for further testing in other sectors and/or regions.** Whilst a continuous improvement approach should always be taken to design and implementation, CESAP Pathfinder WP2 provides a strong basis for further testing in other (sub) sectors and/or regions.

3. **Strengthening Skills Planning.** As one of the seven projects within the programme of work under the SOAG, CESAP Pathfinder WP2[98] has provided a number of useful lessons learned in terms of the gathering, analysis and application of data and partner insight, engagement with industry partners and the co-design of a skills response that involves regional and skills partners, alongside SG and agencies. This will also be a useful source of learning in the current context of Post-school education and skills reform, both in terms of effectively engaging with industry and stakeholders and in strengthening elements of regional skills planning.

98 Skills Development Scotland (2024). CESAP Pathfinder: Monitoring, Evaluation, and Lessons Learned Report (unpublished)

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