

Impact Report 3

1st May 2026 – 30th September 2026

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THE UNIVERSITY
of EDINBURGH



University
of Glasgow

Edinburgh Napier
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University of
Strathclyde
Glasgow

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Built
Environment
—
Smarter
Transformation

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Overview

The Centre for Net Zero High Density Buildings (CeNZ-HighDB) is a leading research centre dedicated to advancing innovative and practical solutions for achieving Net Zero in high-density buildings and urban streetscapes. Funded by UK Research and Innovation (UKRI), the Centre brings together academic researchers, industry partners and communities, and other stakeholders to address some of the most complex challenges facing the built environment.

As the Centre for Net Zero High Density Buildings enters the next stage of its journey, Impact Report 3 provides an opportunity to reflect on the progress we have made and more importantly the growing impact of our research beyond the Centre itself.

Since beginning, CeNZ-HighDB has approved more than 55 projects, each focused on addressing key challenges in the transition to Net Zero urban living. This third Impact Report focuses specifically on projects successfully completed between May 2026 and September 2026.

We would like to extend our sincere thanks to everyone who has contributed to these projects.

Professor Sean Smith – Centre Director
Serena Lambley – Centre Manager





Housing & Net Zero Acceleration Hub

Enabled by the UK Local Growth Fund

HOUSING &
NETZERO
ACCELERATOR HUB

COMING IN 27/28

BORDERS
COLLEGE

west lothian
college

Fife College

CeNZ-HighDB is pleased to have played a key role in a project that resulted in a £25M award for five new skills training centres across south east Scotland. Pictured is the Secretary of State with the four Principals of the regional colleges involved in the project (Edinburgh, Fife, West Lothian and Scottish Borders) at the site of the planned hub at West Lothian College

Thematic Working Group I

Building Fabric and Performance



Underpinning investment in new green product materials manufacturing

June 2025 – May 2026

The project involved external review and advisory reports on the potential markets and capabilities of the new VASO panel system, using recycled glass waste. The analysis and reviews were undertaken in two stages.

Stage (1) involved the early market opportunities, technical and building performance aspects of the material versus alternative construction product systems. Stage (2) involved a wider portfolio review of future markets and products and scalability opportunities beyond construction products for housing, looking at the wider panel based market opportunities.

Main outcomes

- The use of the recycled glass materials provides a ready-source of circular economy principles and applications for such waste materials. This bodes well for the future planned Circular Economy (CE) Materials Index Framework and supporting future clients to report on embodied carbon and CE outcomes.
- The panel has a number of unique technical performance characteristics involving a range of building performance factors, providing competitive advantage and performance outcomes.
- Applications of the panel product extend beyond housing construction and could underpin a strong portfolio and de-risk factor to support the manufacturing output over diverse product sectors.
- The conformity of panel sizing and dimensions also provides a number of similar panel based (ingredient aspects) solutions, supporting manufacturing productivity and optimisation.
- The two stage reports provided analysis and evidence which assisted in underpinning external investment into the company.
- This study facilitated the combination of a £5M investment towards the company and establishing new manufacturing facilities in Dumfries.

(Image: Opening of the new VASO manufacturing facility in Dumfries, September 2026)

Next steps

- VASO has commenced manufacturing of their product systems
- CeNZ-HighDB is participating in the technical reviews for the future prototype home incorporating VASO panel systems
- The Centre is also undertaking a parallel project on the application of the panels to a number of different sectors.

The Centre wishes to acknowledge the staff at VASO for the continuous engagement and innovation partnership.

Thematic Working Group I

Building Fabric and Performance



Masonry Cavity Wall
Construction

Semi-detached /
End-terrace House

Archetype Code: XX/XX/XX/XX

A Retrofit Guide for
Home Owners and Landlords



THE UNIVERSITY OF EDINBURGH
School of Engineering

Regional Energy
Masterplan

COLLECTIVE
ARCHITECTURE

RETROFIT
PATTERN BOOK

Regional Energy Masterplan: Archetype Phase 2

1st November 2025 – 30th June 2026

The project built on the housing archetype methodology developed during REMP Phase 1 by expanding and refining wall-based archetypes for non-traditional and traditional housing types. Through literature review, site visits, and the analysis and integration of local authority data with Home Analytics Scotland datasets, the project strengthened and expanded the Wall Method of Construction (W-MoC) archetype methodology. A total of 33 non-traditional archetypes were identified, coded, and documented during this phase, alongside eight traditional archetype classifications.

The validated datasets were used to develop a user-friendly digital Archetype Dashboard for each participating local authority. The dashboard enables users to explore, visualise, and manage their housing stock archetypes, including associated energy performance and spatial distribution, providing a practical decision-support tool for retrofit planning. The project also produced archetype pattern books designed for homeowners, providing accessible guidance to support retrofit decision-making at the household level. Overall, these outputs provide an accessible framework for planning domestic retrofit programmes and support wider adoption of the archetype methodology across REMP member authorities and beyond.

Main outcomes

- REMP Phase 2 established a validated and scalable framework for housing archetype classification and retrofit planning, leading to the continued development and validation of the wall method of construction (W-MoC) archetype framework to support retrofit decision-making.
- The data has been integrated into Building Stock Archetype Dashboard tool, enabling users to explore archetype distribution, assess energy performance, and identify retrofit priorities through an interactive interface, and creating complex datasets into an accessible decision-support tool for local authorities, with strong potential for wider regional and national adoption.
- The development of pattern books and case studies has provided practical, replicable retrofit solutions grounded in validated archetypes. Together with the ongoing development of the advance Archetype Dashboard tool which focus to district level data, these outputs support the translation of analytical findings into implementable retrofit strategies.

Next steps

- Work on standardising data collection protocols should be continued to improve consistency and interoperability across datasets.
- The site validation approach demonstrated in this study could be applied across a wider range of locations and archetypes to strengthen the robustness and transferability of the framework.
- Incorporating internal surveys, building monitoring, or additional datasets could improve understanding of fabric performance and retrofit conditions in traditional buildings.
- Further development of the REMP Building Stock Archetype Dashboard could be supported through additional funding to enhance its functionality and extend its application, including the integration of low-carbon technology options and user-oriented tools to support retrofit decision-making. This has been successfully funded through 2-UOE-047 project.
- Ongoing development and periodic updating of the archetype framework, dashboard, and Climate Action Map are recommended to ensure continued relevance and accuracy.

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THE PLACE OF USEFUL LEARNING

University of Strathclyde Engineering

PUTTING PEOPLE AT THE CENTRE OF RETROFIT

Occupant needs, behaviours and lived experience and what this means for how retrofit is designed and delivered

Lori McElroy
 Department of Architecture
 Faculty of Engineering, University of Strathclyde

CeNZ-HighDB

CENTRE for NET ZERO HIGH DENSITY BUILDINGS

CeNZ-HighDB



58 Partners

Industry: SMEs, Major Contractors, Utility Companies, Product Manufacturers, Innovators and Industry Organisations
Public Sector: Local Authorities, City Region Deals, Government Agencies (Enterprise, Housing, Heritage, Building Standards)
Skills / Training: Colleges (FE Sector), Training Academies & Upskilling
Networks: Industry, Housing, Net Zero, Retrofit, University Estates, Energy Efficiency, District Heating, Battery Technologies and Housing Associations

Logos: THE UNIVERSITY of EDINBURGH, University of Glasgow, University of Strathclyde Glasgow, Edinburgh Napier UNIVERSITY, BE-ST Built Environment Smarter Transformation, UWS



WEB SITE
<https://cenz-highdb.ac.uk/>

Prof Lori McElroy and Dr Julio Bros-Williamson at BE-ST Fest East
 2nd September 2026, Royal College of Physicians

Thematic Working Group II

Heating-Cooling and Energy Storage within Buildings



Edinburgh College's Renewable Heating Journey

8th September 2025 – 30th June 2026

This project has delivered an evidence-based case study documenting the transformation of Edinburgh College's Midlothian Campus from a legacy gas heating system to a combined Air Source Heat Pump (ASHP) and Water Source Heat Pump (WSHP) solution. Delivered through collaboration between Edinburgh College, Vital Energi, CeNZ-HighDB and the University of the West of Scotland.

The resulting case study provides a valuable resource for the further and higher education sectors, supporting knowledge exchange and encouraging wider adoption of low-carbon heating solutions.

Main outcomes

- The collaboration between Edinburgh College, Vital Energi and UWS has strengthened knowledge exchange between academia and industry, providing valuable operational insights into the transition from legacy gas heating to a combined Air Source Heat Pump (ASHP) and Water Source Heat Pump (WSHP) system.
- The case study offers a practical resource for the further and higher education sectors, local authorities and estate managers considering similar decarbonisation programmes, supporting wider adoption of renewable heating technologies.
- The project contributes to the dissemination of best practice through publication and knowledge-sharing activities, enabling lessons learned to inform future Net Zero projects.
- The completed case study and supporting materials provide a valuable sector resource, demonstrating the practical delivery of Net Zero heating solutions within an educational setting and public building.

Next steps

- The project outcomes will be used to inform future discussions with colleges, universities and public-sector organisations exploring pathways to Net Zero, providing practical evidence on the opportunities and challenges associated with renewable heating system implementation.

Thematic Working Group II

Heating-Cooling and Energy Storage within Buildings



UWS Campus & Residences Decarbonisation and Cost-Reduction Programme

2nd March 2026 – 4th July 2026

The University of the West of Scotland (UWS), in partnership with the Centre for Net Zero High Density Buildings (CeNZ-HighDB), has completed a project to assess the pathway towards a low-carbon, energy-efficient and future-ready estate. The project has evaluated opportunities for decarbonising priority campus buildings and student residences through low-carbon heating solutions, energy efficiency measures and building fabric improvements.

Through detailed surveys, energy assessments, modelling and technical feasibility studies, the project has developed an evidence-based retrofit roadmap to support future investment decisions and phased implementation. The outcomes provide UWS with a clearer understanding of the technical challenges, opportunities and priorities associated with decarbonising a diverse estate, including pre-1919 and hard-to-treat, hard-to-heat buildings.

The project has strengthened collaboration between UWS, CeNZ-HighDB, consultants and technology partners, creating a foundation for future pilot projects, monitoring and knowledge sharing. The next phase will focus on demonstrating and evaluating suitable retrofit approaches within the UWS building portfolio

This work supports UWS's Strategy 2030 ambitions and commitment to achieving net-zero operations by 2040, while contributing to wider learning on the decarbonisation of public sector estates.

Main outcomes

- The project has met its intended objectives by providing UWS with a comprehensive evidence base to inform the decarbonisation of priority campus buildings and student residences. The completed feasibility studies, building surveys and energy assessments have identified technically viable and financially appropriate low-carbon heating options, energy efficiency measures and fabric improvements.
- The project has delivered a prioritised and costed roadmap to support phased retrofit delivery, enabling UWS to make informed investment decisions and pursue future funding opportunities with greater confidence. The findings have strengthened the University's strategic planning for estate decarbonisation and provided a clear pathway towards achieving its net-zero operations target by 2040.

Next steps

- The next steps for the project are to use the outputs from the feasibility studies, energy assessments and retrofit roadmap to inform future investment planning and implementation decisions across the UWS estate.
- CeNZ-HighDB will continue to support the development of the project through pilot activities and monitoring, particularly focused on UWS building stock that presents greater challenges for decarbonisation, including pre-1919 and hard-to-treat, hard-to-heat properties. These pilots will provide valuable insight into the performance of retrofit solutions in complex existing buildings and help refine approaches for wider deployment.

UWS worked with CeNZ-HighDB and associated partners to explore a range of campus decarbonisation opportunities across IR, solar and heating technologies. The collaboration allowed us to gain useful insights and knowledge which has supported our sustainability journey whilst also linking with our institution's research objectives. We look forward to continuing to work with the Centre to realise the projects and develop the partnership.

- Luke Maclean, UWS Estates Sustainability Officer

Thematic Working Group III

District /
Community
Heating-Cooling

Ground-Source Heating for Efficient Net-Zero Retrofit:
A Glasgow Case Study

5th January 2026 – 21st August 2026

This project investigated how ground-source heating can support sustainable heating of retrofitted buildings, using a social housing development in the Cranhill area of Glasgow as a case study. Building heat demand for a single block was modelled using ESP-r, with a base case demand of 105.4 kWh/m²·year under the current climate, reducing to 84.4 kWh/m²·year by 2080 due to global warming. Retrofit measures were considered successively, with air tightness delivering the largest reduction in heat demand (11.8%), followed by cavity wall insulation (9.5%) and triple glazing, giving a combined reduction of 23.3% and a peak load of 4.5 kW.

Geological analysis of the Cranhill area identified sandstone, siltstone, mudstone, fireclay, basalt and clay, giving a harmonic mean thermal conductivity of 2.1 W/(m·K) at 200 m depth and base geothermal gradient of 22.5°C/km. Borehole heat exchanger designs were proposed per block, considering three rectangular configurations (110, 64 and 45 boreholes as 10×11, 8×8 and 9×5 arrays respectively) and varying assumptions on peak load and geothermal gradient. Minimum borehole length (Lmin) ranged from 86.6 m to 203 m depending on these assumptions, reducing with global warming and retrofit. Assuming 80% of buildings at peak load demand, Lmin was 110 m for the 10×11 configuration and 154 m for the 8×8 configuration; the 9×5 configuration was ruled out due to excessive depth requirements (>170 m). Full retrofit reduces Lmin by 20–25 m per borehole, yielding capital drilling savings up to £44,000 in drilling costs for the 110-borehole configuration. Future work should include obtaining occupant behaviour and energy use data, a thermal response test and a detailed financial analysis.

Main outcomes

- Retrofit Hierarchy: Air-tightness infiltration control delivered the largest heat demand reduction (-11.8%), followed by cavity wall insulation (-9.5%) and triple glazing (-3.5%), highlighting the critical importance of air tightness relative to glazing upgrades.
- Spatial & Geometric Variance: Post-retrofit heat demand dropped most on middle floors (31%) versus top/bottom floors (20%). Southeast-facing 2-bed units had the highest baseline demand (≈110.9 kWh/m²·year), whereas West-facing 1-bed units had the lowest (≈99.3 kWh/m²·year).
- Climate Interaction: Climate change independently reduces heating demand by ≈20% by 2080. Combined with full retrofit, heat demand drops by 40.2% compared to the un-retrofitted baseline.
- Subsurface Characterisation: Lithology comprises interbedded sedimentary and igneous units, yielding a harmonic mean thermal conductivity of 2.1 W/(m·K) at 200 m depth. Reported local geothermal gradients range from 22.5°C/km to 40°C/km, with nearby historical mine workings requiring verification before drilling.
- Ground Loop Sizing: Lmin varied from 86.6 m (40°C/km, PL40, 110 boreholes) to 203 m (22.5°C/km, PL100, 45 boreholes), decreasing with higher thermal conductivity, higher geothermal gradient, and greater borehole density.
- Economic Value: Full building retrofit reduces required borehole length by 20–25 m per hole. At £20–£30/m drilling costs, this yields direct capital savings of £25,600 (64-borehole array) to £44,000 (110-borehole array).

Next steps

- In addition to the technical feasibility considered here, a detailed financial analysis is required to understand the cost of ground-source heating in comparison with other conventional options. This is also important as this is a social housing development.
- As pointed out earlier, the building model assumes a certain behaviour of the occupants. Their energy use and behaviour should be fed into the models to improve accuracy and validate the model. Moreover, there are three buildings, and the same behaviour is assumed for all; some data on occupants and their behaviours would improve the accuracy of the building demand results.
- A thermal response test is required before drilling to ascertain thermal ground properties. This would also give more accurate input to the design model.
- Finally, since there are mine workings next to the building, their location and depth need to be ascertained. Relevant documents from the Coal Authority could help in this. This would determine the feasibility of drilling. Additionally, contamination has been identified within the area by Wheatley Group. The extent and impact of this contamination on drilling is also required through geo-chemical analysis.

Table: Minimum borehole depth required (L_{min}) assuming 80% of buildings at peak load (PL80) using the current building fabric in 2030 and improved building fabric for different geothermal gradients. Results are shown for 10×11 and 8×8 packing of boreholes for one block. Current year has been added for reference.

Case	Annual Heat Demand	L _{min} using 8 m spacing and 10*11 = 110 boreholes [m]				L _{min} using 10 m spacing and 8*8 = 64 boreholes [m]			
		Geothermal gradient [°C/km]				Geothermal gradient [°C/km]			
		22.5	25	30	40	22.5	25	30	40
PL80 @current with base fabric	721.2 MWh/year	110	109	107	103	154	152	148	141
PL80 @2030 with base fabric	651.5 MWh/year	101	100	98.2	94.8	143	142	138	132
PL80 @2030 with improved fabric	481 MWh/year	79	78.3	77	74.3	118	117	115	111

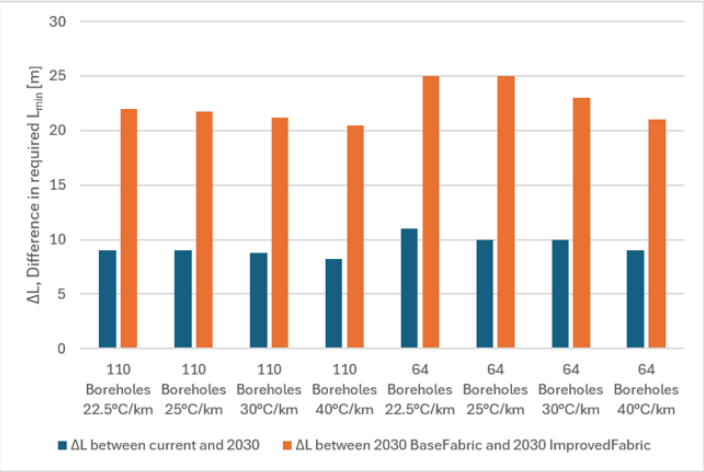
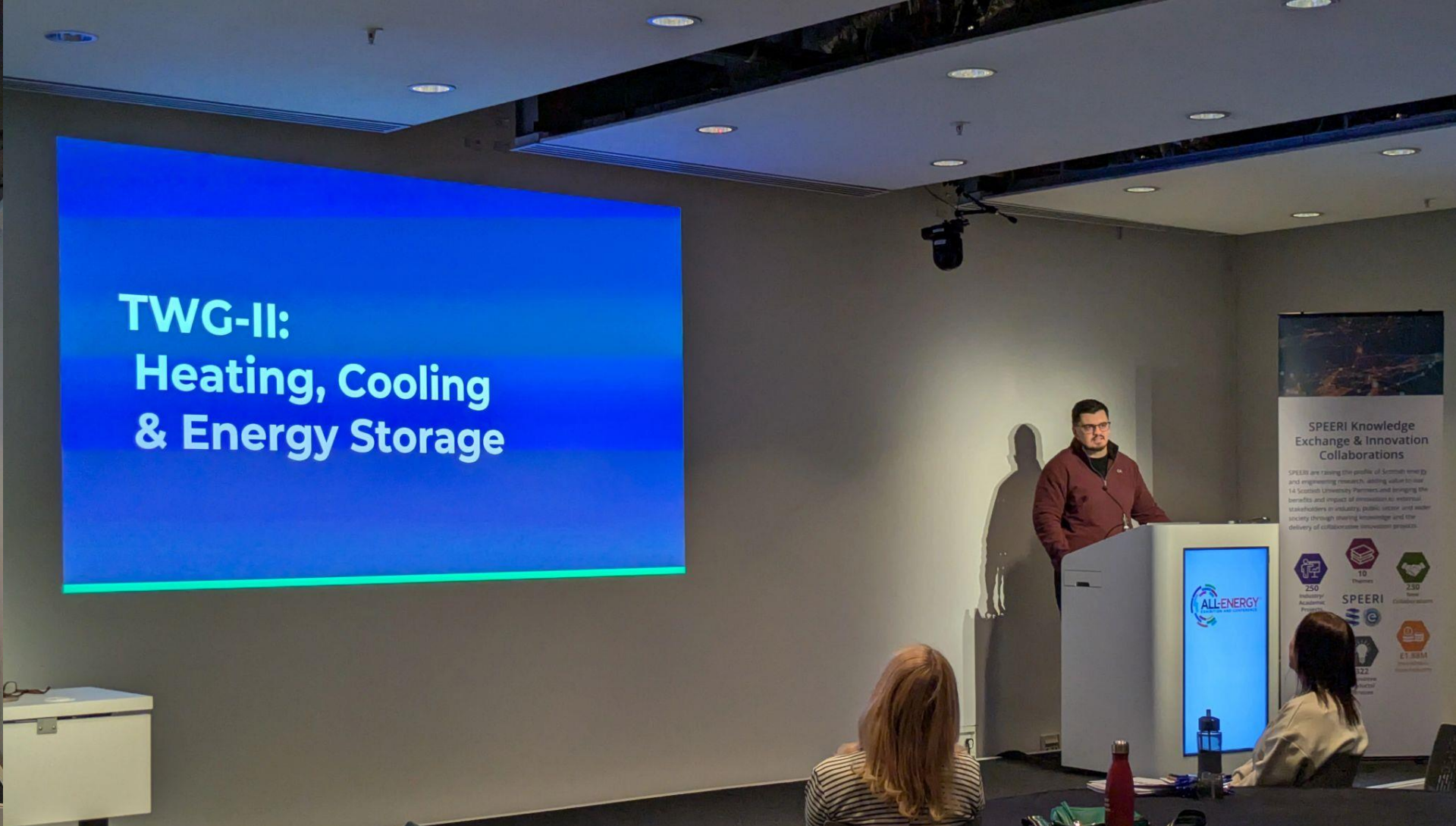


Figure: Difference in minimum required borehole length (ΔL) between current building fabric and improved fabric for 2030 and between the reference year and 2030. Results are indicated for 10×11 and 8×8 borehole configurations assuming different geothermal gradients; PL80 – 80% of buildings are assumed to be at peak load.



Professor Nick Kelly, Dr Sam Ahmadzadeh, Dr Ashwini Konanahalli, and Professor Gioia Falcone speak at the All-Energy Conference, Glasgow, in May 2026

Thematic Working Group IV

Modelling and Data Analysis



Developing of a Layered Testing Framework (DeLTeFrame) for Building Performance Simulation – Validating the ZUOS Home Energy Model

3rd November 2025 – 30th June 2026

The DeLTeFrame project developed a comprehensive test and validation framework for Scene Connect's ZUoS home energy modelling software. The framework combines three complementary validation approaches: inter-model comparison against recognised benchmark archetypes (BESTEST), empirical validation using high-resolution test house measurements, and validation against large-scale, low-resolution energy datasets. By progressing from controlled experiments to representative real-world data, the framework provides increasing confidence in the reliability of ZUoS predictions. The principal outcomes from the project were an improved ZUOS model and the modelling framework and its integration into future ZUoS releases, enabling automated replication of validation tests and continuous quality assurance as the software evolves. This ensures that model accuracy, transparency, and stakeholder trust (householders, utilities, lenders and policy makers) are maintained over time. A further important outcome from the project was upskilling of Scene Connect staff in the methods and data requirements for appropriate validation of energy modelling software.

Main outcomes

- Improvements to the ZUOS software. ZUOS is based on EnergyPlus modelling tool and relies on an interface (wrapper) to translate data from the user into a model suitable for simulation. The project validation work resulted in significant changes to input data settings for ZUOS. Specific improvements were on default constructions used with models, how windows were represented, and exposure and shielding settings. Subsequently, the ZUOS tool now provides more reliable predictions of home energy use, compared to detailed and stock-level empirical data, and the predictions of other modelling tools.
- Testing framework: a 3-level automated test framework was completed comprising 1) selected simulated cases from BESTEST for inter-model comparison; 2) high quality empirical comparative testing using an IEA-EBC-Annex 71 real-house dataset and 3) a comparison with the National Energy Efficiency Database (NEED) for assessment of ZUOS's ability to generate data that is representative of the wider housing stock.

Next steps

- The results of the project will be published in a forthcoming paper, to be presented at the BSO-uSIM2026 conference in Glasgow in November.
- The testing framework and knowledge acquired from the project will be taken forward in the continued evolution of the ZUOS tool.

Thematic Working Group VI

EDI, Skills and Training



Sustainable Retrofitting Challenge: CPD Development based on SNRC

September 2025 – June 2026

This pioneering project has delivered significant impact by creating a new model for sustainable retrofit education, research, and industry collaboration, with the Scottish National Retrofit Centre (SNRC) established as a nationally significant living demonstrator of net-zero retrofit innovation. By bringing together academia, industry, government, and international partners, the project has successfully transformed research knowledge into practical solutions that support the decarbonisation of the built environment.

The project has developed impactful educational and professional resources, including the Sustainable Retrofitting Toolkit for Educators and the Retrofitting Future CPD programme, equipping the next generation of professionals and industry practitioners with the skills required to deliver sustainable retrofit at scale. Through applied learning, industry engagement, technical workshops, site-based activities, and international collaboration, the project has enabled learners to explore real-world challenges in whole-life carbon assessment, circular economy, digital innovation, and net-zero delivery.

Beyond its original objectives, the project has created a lasting legacy through strengthened academia industry partnerships, international knowledge exchange, research publications, and follow-on innovation opportunities in AI-enabled decarbonisation and digital twins. The SNRC case study has demonstrated how living laboratories can accelerate knowledge transfer, inspire innovation, and bridge the gap between research and practice.

This project provides a transferable blueprint for sustainable retrofit education and professional development, supporting Scotland's net-zero ambitions and contributing to global efforts to create resilient, low-carbon, future-ready buildings.

Main outcomes

- Delivered an integrated programme of education, research, and knowledge exchange, centred on the Scottish National Retrofit Centre (SNRC)
- Sustainable Retrofitting Toolkit, incorporating Environmental Impact Assessment (EIA), Life Cycle Assessment (LCA), and sustainability assessment methodologies
- Directly engaged 30 MSc Environmental Sustainability students through challenge-based learning, site visits, industry workshops, and applied case studies.
- Collaboration with BE-ST, Wholus, Okana, the City of Edinburgh Council, and the Centre for Future Infrastructure strengthened academia-industry partnerships through expert-led lectures, technical site visits, and knowledge exchange on embodied carbon, net-zero retrofit, AI-enabled decision-making, and sustainable housing delivery.

Next steps

- The next phase will focus on scaling impact through continued partnership development, resource dissemination, skills delivery, and applied research.
- The Sustainable Retrofitting Toolkit will be further refined through stakeholder feedback, finalised as a practical industry and education resource, and progressed for publication through the BE-ST Skills Learning Hub. The accompanying research paper on embodied carbon hotspots and net-zero retrofit will also be finalised and disseminated, providing evidence-based insights to support future retrofit decision-making.
- The next stage will include delivering and evaluating CPD programmes using the toolkit approach, with structured feedback collected from participants and industry users to assess learning impact, usability, and wider adoption potential.

Thematic Working Group VI

EDI, Skills and Training



CeNZ-HighDB-Powering Futures-School Challenge Programme 2025/26 – Challenge Setter

1st July 2025 – 1st June 2026

CeNZ-HighDB collaborated with Powering Futures, HCI Skills Gateway, Vital Energi and a wider network of industry partners to support the delivery of the "Hot Stuff" challenge as part of the Powering Futures SCQF Level 6 qualification programme. The challenge engaged 2,303 S5 and S6 learners from over 100 secondary schools across Scotland, encouraging them to explore solutions for low-carbon heating, sustainable housing and future communities.

Learners developed over 100 team-based proposals, demonstrating innovative thinking around district heating, renewable energy, energy efficiency, affordability and community wellbeing. The challenge provided participants with insight into the opportunities and challenges associated with delivering a net-zero built environment while raising awareness of related career pathways.

The project strengthened links between education, industry and research organisations and contributed to ongoing discussions around future-ready skills for the transition to a low-carbon economy. The outputs generated through the programme highlight the value of challenge-led learning in engaging young people with sustainability issues and inspiring the next generation of talent for the built environment sector.

Main outcomes

- Raising awareness of net-zero, sustainability and built environment career pathways through participation in the Powering Futures "Hot Stuff" challenge.
- Strengthened collaboration between education, industry and research partners
- Generated evidence relevant to the development of the CeNZ-HighDB Future-Ready Skills Framework.
- Learner outputs highlighted innovative thinking around district heating, energy efficiency, renewable energy integration, affordability and sustainable community design, demonstrating the value of challenge-led learning in developing awareness of net-zero built environment careers and future workforce skills.
- Over 100 team-based solutions generated through the challenge, providing valuable insights into how young people perceive and respond to net-zero built environment challenges.
- Engagement with teachers through a Continuing Professional Development (CPD) session providing additional insight into the opportunities and challenges associated with embedding sustainability and built environment topics within secondary education.

Next steps

- No presently confirmed plans for follow-on collaborative projects arising directly from this activity.
- Key next steps internally include:
 - reviewing the engagement approach used in this project
 - identifying how earlier coordination with delivery partners could improve school and learner interaction
 - considering how insights from learner presentations and educator engagement can inform the ongoing development of the Future-Ready Skills Framework
- The outputs and case study of this activity will be one of the useful resources listed in the Skills Knowledge Hub and will signpost to the partner's website.

Challenge Setter Highlight



Photos from the Powering Futures Challenge Setter event



Thematic Working Group VI

EDI, Skills and Training

HCI Legacy: Informing an Inclusive Skills Framework for Net Zero Construction

14th July 2025 – 31st May 2026

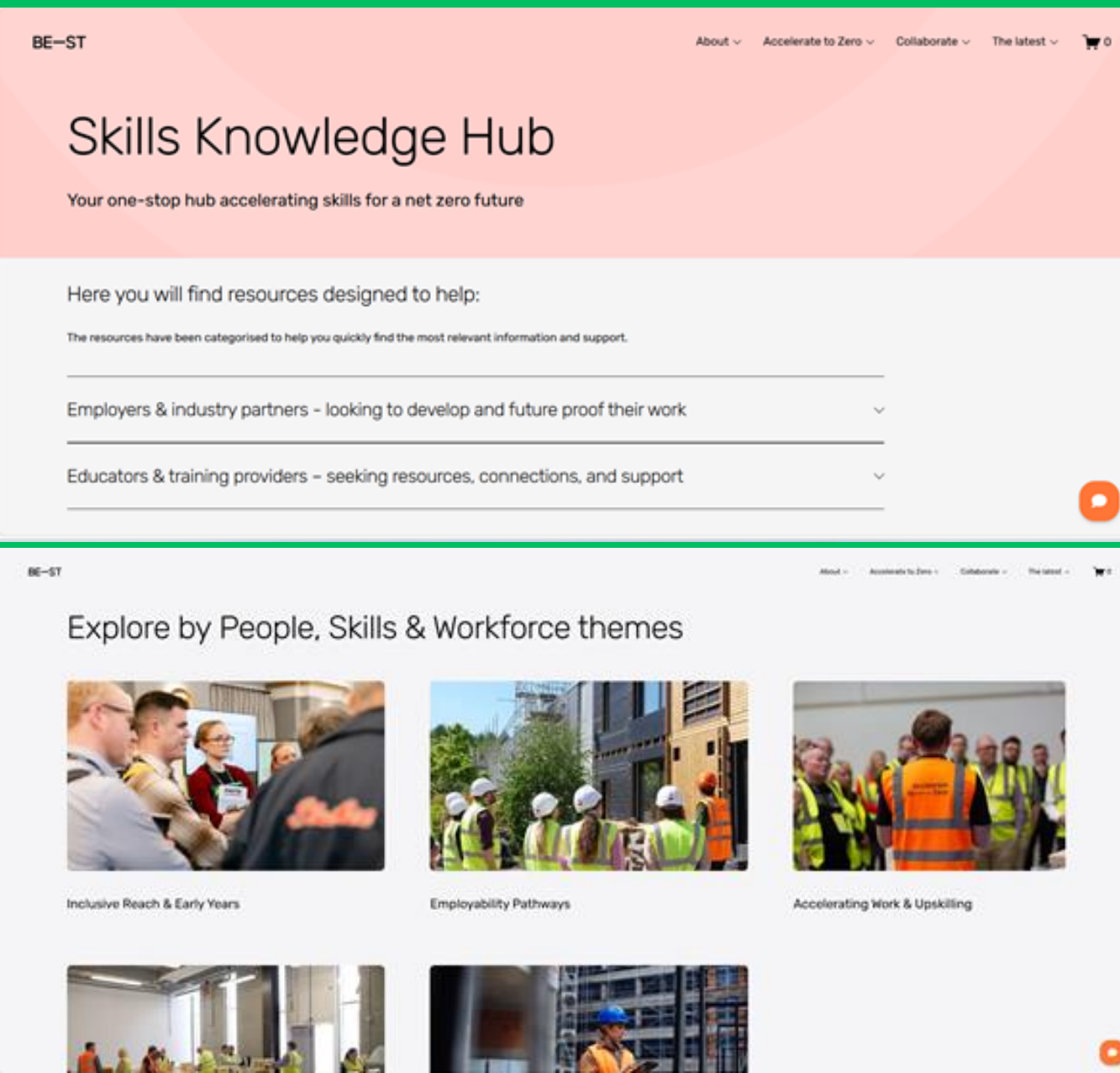
The Future-Ready Skills Framework project has established a practical foundation for supporting skills development, knowledge exchange, and collaboration across the built environment sector. The project developed a scalable Skills Knowledge Hub that brings together resources, case studies, project outputs, and learning materials in a single accessible location. It strengthened connections between industry, education, and skills stakeholders while creating a mechanism for sharing knowledge and promoting best practices. The Skills Knowledge Hub has been designed to continue evolving as new projects and resources become available, ensuring that the benefits of the project extend beyond its delivery period and continue to support future sector innovation and impact.

Main outcomes

- A major outcome was HCI-NMITE commissioned case study, and another outcome is the creation of the Skills Knowledge Hub, providing a central platform for showcasing exemplar interventions, project outputs, case studies, learning resources, and skills initiatives. The hub improves accessibility to knowledge and promotes greater collaboration between industry, education providers, training organisations, and skills stakeholders.
- The project strengthened engagement with organisations including BE-ST, CeNZ, NMITE, the Engineering Professors Council, education providers, and industry partners, creating a collaborative network to support future activity and funding opportunities.
- The resulting framework, knowledge hub, and stakeholder network provide a lasting resource to support future sector-wide skills development, knowledge exchange, and impact.

Next steps

- The next phase of development will focus on expanding the Skills Knowledge Hub with additional project outputs, case studies, resources, and learning materials from ongoing initiatives. This includes incorporating outputs from projects such as the CITB funded Timber in Construction Skills and future CeNZ and BE-ST activities.
- The future aim is to establish the hub as a recognised resource for educators, training providers, employers, and skills stakeholders while continuing to support knowledge exchange and workforce development within the net-zero built environment sector. A strategic aim of this will also develop the early communications with the Engineers Professor Council so as to build a strategic relationship with them to amplify the available content to a wider audience.
- Further to the above, the next iteration of HCI is being bid for to secure future funds. If successful, the SKH would act as a platform for this building upon the legacy of HCI and feeding into HCI 2.0 for which the scoping activity has been carried out. There is also an opportunity to into content from the other TWGs of CeNZ High DB into the SKH as the findings and outputs from the wider project emerge.



Thematic Working Group VI

EDI, Skills and Training

Some quotes from stakeholders

“We need to change the mentality of training being a quick fix. To overcome short term thinking. [We] have to invest in this process and these people to build a workforce for the future.” - Scottish employer, SME

“We’ve worked on 47 [projects] in two years...That’s amazing.” - PlanBEE graduate

“For me, the USP is the rotations... A large percentage think they want to go into architecture and then they discover all these other roles.” - PlanBEE sponsor

“If I have a graduate next to a Plan BEE person, it would be a Plan BEE person I would go with.” - PlanBEE sponsor

“Speaking from a local perspective, an awful lot of our employers are SMEs and micro businesses which obviously don’t have the same resources as bigger companies. That’s maybe why you need to have a shared apprenticeship model, because it takes away the overall responsibility.” - Scottish employer, SME

EDI Retrospective and Inclusive Adaptation Analysis for PlanBEE – Scotland Feasibility Study

1st January 2026 – 31st May 2026

This project assessed the feasibility of adapting the successful PlanBEE higher-level apprenticeship model for Scotland, with a focus on Edinburgh and South-East Scotland and potential future scaling across other regions. Through engagement with employers, colleges, training providers and strategic stakeholders, the study explored how the industry’s rotational apprenticeship model could support future inclusive workforce development within Scotland’s built environment sector.

The project has increased awareness of innovative apprenticeship delivery models, strengthened collaboration between industry and education partners, and provided an evidence base to support future pilot development as well as follow on funding routes. It has also highlighted the importance of embedding equality, diversity and inclusion considerations within future programme design. The recommendations will inform future discussions and planning activities aimed at creating more accessible, industry-led pathways into construction and the built environment while supporting Scotland’s skills and net zero ambitions.

The study produced practical outputs including learner personas, EDI recommendations and implementation guidance to support future pilot development. It has also informed the Built Environment Net Zero pathway concept which would draw upon areas of best practice including PlanBee. Funding avenues for BENZ are being sought.

Main outcomes

- Conclusion that a Scottish PlanBEE-style model is feasible in principle, with strong support from industry stakeholders.
- A robust evidence base and set of recommendations to inform future pilot development and strategic decision-making across the skills, construction and built environment sectors.
- Successful engagement of several bodies and strategic partners in discussions around workforce development, apprenticeship delivery and future skills needs within the built environment sector.
- Raised awareness of the PlanBEE model amongst Scottish stakeholders who had not previously engaged with the programme.
- Three learner personas developed to support future programme design and stakeholder engagement: Young person from a low-income household seeking an alternative pathway into higher-level construction careers; Disabled learner requiring accessible learning and workplace support; Learner from an under-represented background Without Industry Connections or Prior Exposure to the Built Environment

Next steps

- The project partners intend to use the findings of the feasibility study to explore the development of a Scottish PlanBEE pilot within the ESES region.
- The learner personas developed through the project will continue to be used as engagement and planning tools to inform discussions with employers, training providers and policymakers regarding the design of any future Scottish pilot.
- There is an opportunity to present the findings and recommendations from the PlanBEE feasibility study at the following future events Leadership Lunch event involving over 30 SME representatives from the construction and built environment sectors
- BEST FEST 2026 in Dumfries focussed on skills.
- This would provide a platform to disseminate the study findings, raise awareness of the proposed Scottish PlanBEE model, gather additional industry feedback, and support employer engagement for any future pilot activity.

Thematic Working Group VI

EDI, Skills and Training

Some quotes from stakeholders and participants

“The enthusiasm of the children and young people at the Stemovators Celebration Events is a strong reminder that the future is in very capable hands”
Professor Calum Semple OBE, Chief Scientific Adviser for Scotland

“The Construct a Crane competition has given me an engaging and valuable context to teach science and technology. The children were excited and enthusiastic throughout the project.” Pupil, Fintry Primary School, Stirling

The support in the run up to, and on the day of, the celebration event has been fantastic. The kits, both for the Climate Smarter project last year and the crane challenge this year, were excellent. They were well thought out and included everything we needed. The videos for the annual challenge were very helpful and the CPD was very thorough. As a non-specialist teacher, it gave me the confidence to deliver the lessons and provide high quality STEM learning. I also really appreciated the effort made to allow our pupils to present their learning through the medium of Gàidhlig. Mòran taing. Teacher, Bun Sgoil An-T-Sailein (Salen Primary School), Argyll & Bute

Stemovators Annual Challenge – ‘Construct a Crane’

1st September 2025 – 30th June 2026

The Construct a Crane project successfully demonstrated how practical, curriculum-linked STEM activities can inspire young people to explore construction, engineering and the skills needed to support Scotland's transition to net zero. Delivered by Stemovators in partnership with Scottish Government and co-funded by the Centre for Net Zero High Density Buildings (CeNZ-HighDB), and co-f the project connected classroom learning with real-world challenges such as high-density development, regeneration, retrofit and modern methods of construction.

During the project, 151 Construct a Crane kits were distributed to schools across Scotland, with participation from 28 local authorities and an estimated 3,000 pupils. Through CeNZ-HighDB support, the project expanded into the Edinburgh and South East Scotland City Region, reaching up to 25 schools and around 600 pupils, while the wider programme extended engagement to schools across Scotland.

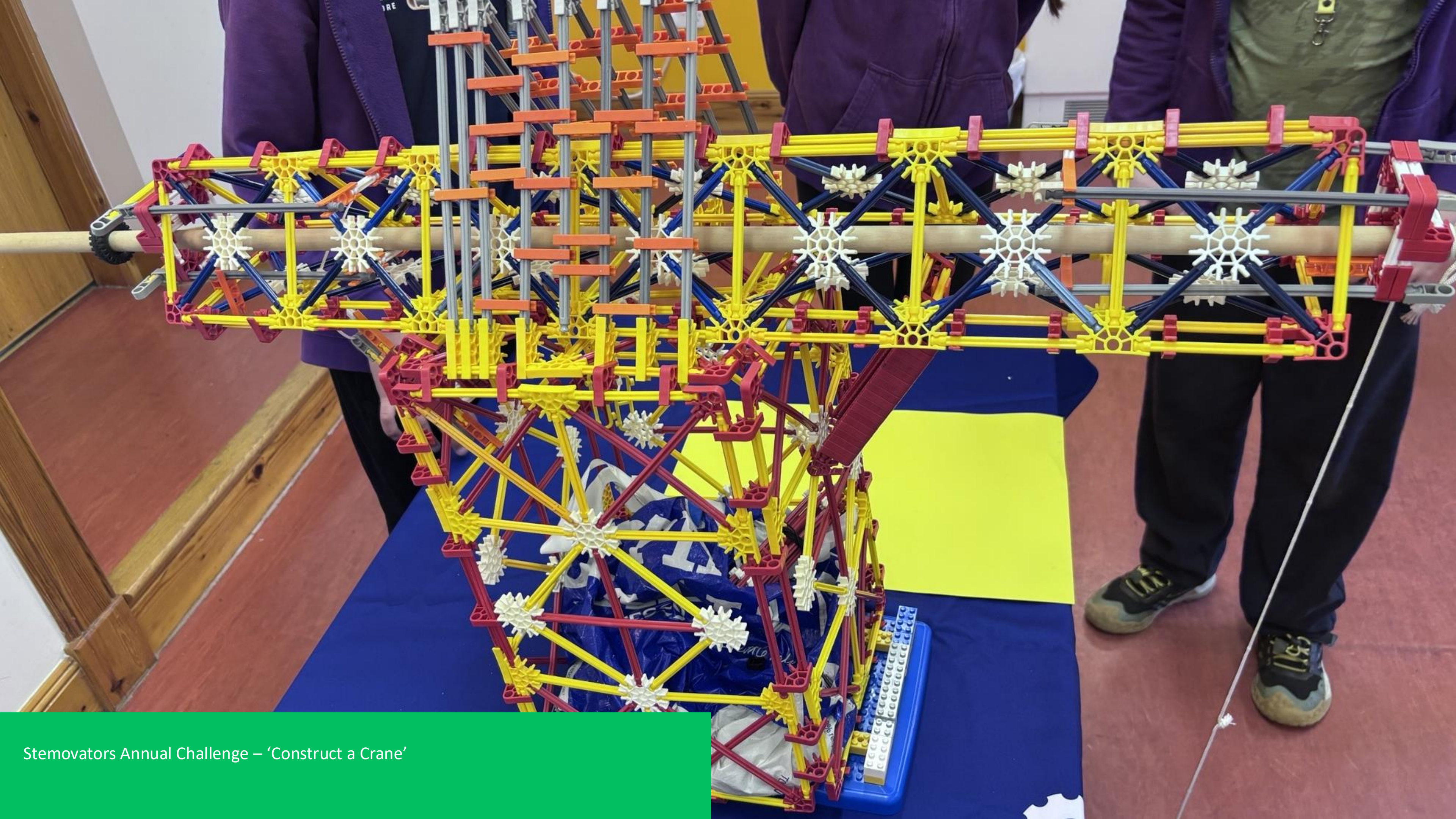
The partnership embedded net zero construction and careers messaging throughout classroom resources, teacher CPD and programme activities, helping pupils understand the important role the construction sector plays in delivering a more sustainable future. The project also strengthened collaboration between education, research and industry through regional STEM events and stakeholder engagement, creating a scalable model for developing future skills and broadening participation in engineering and the built environment.

Main outcomes

- Young people developed engineering design, teamwork and problem-solving skills, while gaining greater awareness of careers within construction and related STEM disciplines.
- Attendance and invited participation at the Orkney Celebration of STEM event and a Fife College event helped strengthen connections between schools, industry and higher education.
- Resources and learning that will continue to be used through the wider Stemovators network.
- The Construct a Crane resources and supporting case study will continue to be shared through the wider Stemovators programme and the Skills Knowledge Hub, enabling employers, skills providers and schools to adopt similar approaches to inspire the next generation of engineers and construction professionals.
- Increased visibility of CeNZ-HighDB, supported knowledge exchange, and created a scalable model for engaging young people with future skills in sustainable construction and the built environment.

Next steps

- Further opportunities will be explored to expand industry engagement, strengthen links between schools and the construction sector, and continue promoting inclusive pathways into engineering and built environment careers. The resources, networks and evaluation evidence developed through this project will support ongoing impact delivery beyond the initial funding period.
- The Construct a Crane case study will be a useful asset added to the Skills Knowledge Hub, a platform that shares resources like case studies, animations, learner journeys and other examples of good practice. The case study resource will provide a practical example of how curriculum-linked STEM activities can be used to engage young people with construction, engineering and net zero themes. It will serve as a resource for employers, skills providers and schools wishing to develop or deliver similar hands-on learning experiences within their own programmes or curriculum.



Stemovators Annual Challenge – ‘Construct a Crane’

