ekosgen

European Union
European Regional
Development Fund

ENERGY HOUSE 2.0

Final Summative Assessment of the Energy House 2.0 ERDF Project

Final report prepared for the University of Salford

March 2023

Report completed/submitted by:	Kirsten Powell, Esther Cordingley and Amarilis Herrera
Proof check completed by:	Lee Williamson
Date:	3rd April 2023
Report reviewed by:	Kirsten Powell
Date:	31st March 2023
Amendments made:	6th and 12th April 2023

Contents

1 Introduction and Final Assessment Scope

Introduction

This report sets out the findings of the final Summative Assessment of the University of Salford's Energy House 2.0 project, a £16.5m (£8.25m ERDF) Priority 4f[1] capital and revenue project that launched in early 2019 and will reach financial and practical completion in June 2023. It has been prepared by ekosgen – a specialist economic development consultancy with a long track record of working in Structural Funds – in line with ERDF Summative Assessment guidelines.

Building on the Interim Summative Assessment

The interim Summative Assessment report ran to 36 pages and provided detail of the project's scope, context and achievements up to Summer 2021. This final assessment report has therefore been prepared so not to repeat content that remains unchanged but instead focuses on:

- How the project's delivery has progressed since the interim assessment was prepared.
- Continued strategic alignment and relevance of the project.
- The latest performance against targets and forecasts to project closure, at the time of reporting.
- The effectiveness of recent project delivery arrangements, including any changes made since the time of the interim assessment.
- Capturing an updated picture of wider project benefits and value for money, as far as this is possible ahead of the project closing down and realising the lag that often exists between the delivery of activity and realisation of benefits on innovation projects.

This approach ensures that summative assessment guidelines continue to be satisfied while focusing on pertinent findings for this point in the project's lifetime.

Assessment Approach

The final Summative Assessment has drawn on qualitative and quantitative insights to understand the project's latest performance, experience from both a delivery team and beneficiary perspective and lessons arising. Evidence has been gathered through:

- Review of project documents, including the latest claims data available at the time of preparing the assessment (covering the period to the end of December 2022) and associated project progress reports.
- Consideration of the changing context in which the project has been delivered, recognising ongoing changes in the policy context and general operating environment.
- Consultations with members of the project delivery team, including those with responsibility for development of the new facility and the delivery of SME support services, and stakeholders.
- A survey of project beneficiaries capturing evidence from both businesses that have engaged with the project since the interim summative assessment was completed and returning to those engaging prior to this point.

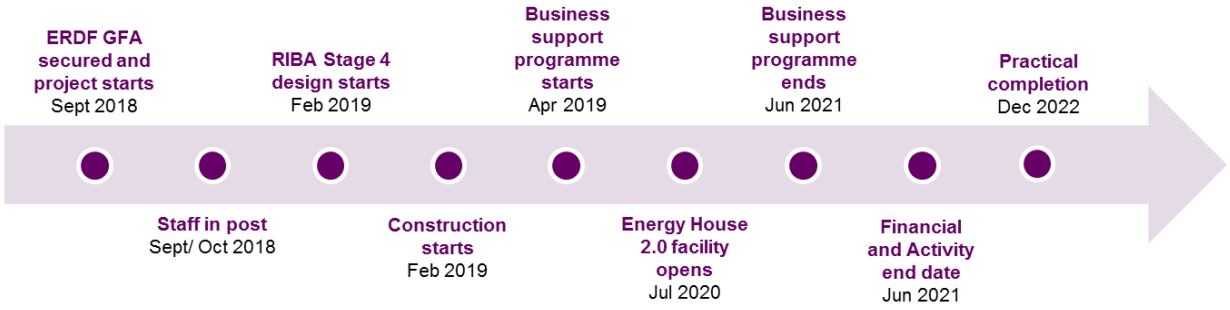
The final assessment research was completed between February and March 2023.

[1] Priority 4f: Promote R&I in low carbon technologies.

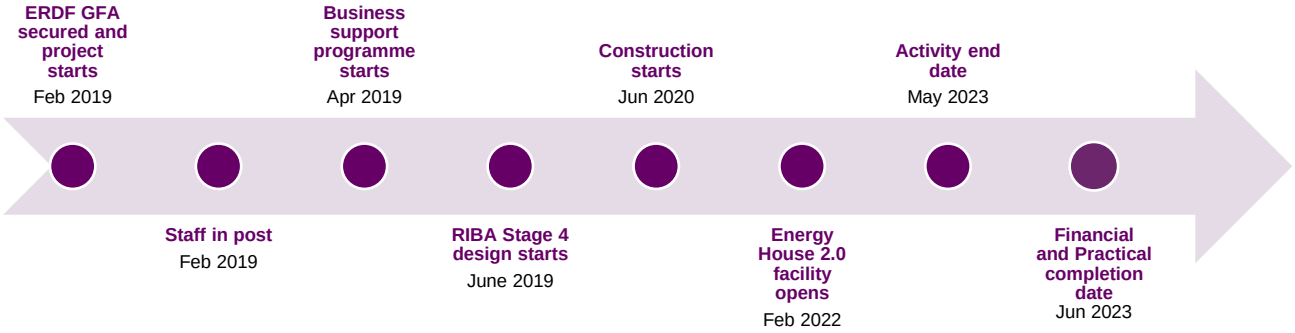
2 Project Progress

Overarching Project Programme

At the time of the project's approval, key project milestones were anticipated as follows:



A series of changes have occurred to project milestones and the latest programme – as reported in the December 2022 claim and clarified with the client team – is as follows:



The primary reasons for changes across the project's lifetime have been:

- A delayed project start due to later than anticipated signing of the Grant Funding Agreement.
- A requirement for extensive value engineering between RIBA stage 3 and stage 4, resulting in a later than anticipated start on site.
- COVID-19 impacting on delivery of the business support programme, with many project staff furloughed, access to facilities restricted and an inability to visit clients face-to-face requiring changes to the business support model and resulting in slower than anticipated progress.
- A later than anticipated completion of the Energy House 2.0 laboratory (one month behind the programme anticipated at the time of the interim assessment and 17 months behind the original programme) and re-profiling of the business support programme to ensure activity could be delivered from the facility.

Managing Competing Pressures

As was already apparent at the interim summative assessment stage, the team has been required to manage competing pressures during the project's lifetime. Key examples include:

- Value engineering within the capital scheme to ensure deliverability within the available project budget (with additions made to the budget by the University of Salford – see Section 4 for further details) while protecting the technical capabilities of the building.
- Delivering a programme of business support that was practical at each point in the project's journey and while ensuring the additionality of the capital facility could be demonstrated.
- Due to project delays, delivering a considerable programme of activity with a reduced staff team during the latter part of the project.
- Managing strong interest in the facility from a range of sources with the need to continue to focus on the delivery of ERDF targets and objectives.

Each of these points are considered in later sections of the report.

Milestone Dates

Strong delivery progress has continued to be made since the interim summative assessment was prepared. Key milestones achieved since Summer 2021 include:

Milestone Achievement	Date Achieved
Fifth workshop programme delivered	September 2021
SME supplier day hosted	November 2021
Practical completion and handover of Energy House 2.0	February 2022
House construction started	June 2022
Final business support workshop completed	December 2022
House construction completed	January 2023
Launch event held	12th and 13th January 2023

On-site research and testing are also now underway with early results anticipated to be available from June 2023 onwards.

3 Project Context

Continued Strategic Alignment

The interim summative assessment highlighted the strong strategic alignment Energy House 2.0 offered, both at the time the ERDF application was prepared and as the project's delivery had progressed. This position remains unchanged at the time of preparing the final summative assessment with the drive to support energy efficiency and low carbon growth continuing to gain pace at the local, sub-regional and national level.

Key policy announcements made since the interim assessment was undertaken in June 2021 are:

Policy	Project alignment
HM Government Heat and Buildings Strategy, October 2021 – sets out the actions required to reduce emissions from buildings to near zero by 2050, including improving energy efficiency in existing and new houses. HM Government – Heat and Buildings Strategy (publishing.service.gov.uk)	• Confirms the need for reduced emissions to be considered by the sector, prompting a drive for change and the need for appropriate research and testing facilities, such as those provided by Energy House 2.0. • Supporting companies in developing low carbon/energy efficient technologies and products for houses. • Enabling key changes to the UK housing market by introducing more energy efficient solutions.
Net Zero Strategy: Build Back Greener, October 2021 – sets out policies and proposals for decarbonising all sectors of the UK economy to meet the net zero target by 2050, including investing in the innovation of heating appliances in homes. Net zero strategy BEIS (publishing.service.gov.uk)	• Increasing awareness amongst SMEs of the need to start to consider energy efficiency and low carbon opportunities. • Supporting companies in developing low carbon/energy efficient technologies and products for the future heating of houses.
Transitioning to a net zero energy system: smart systems and flexibility plan 2021, July 2021 – sets out policies to drive the transition to a smarter and more flexible energy system. This includes the incorporation of smart heating technologies that optimise the consumption of electricity in buildings. Transitioning to a net zero energy system: Smart Systems and Flexibility Plan 2021 (publishing.service.gov.uk)	• Improving SME awareness of smart and connected homes and energy systems and opportunities for innovation. • Providing testing facilities that can assess the use and effectiveness of smart technologies where businesses can develop energy efficient technologies.
UK Innovation Strategy, July 2021 – sets out a long-term plan for delivering innovation-led-growth, with the primary objective of boosting private sector investment, creating the right conditions for businesses to innovate with confidence. It outlines areas of strength and opportunity, including energy technologies. UK innovation strategy (publishing.service.gov.uk)	• Providing testing and research facilities where businesses can innovate and test new energy saving products. • Bringing together academia and SME business to support innovation. • Growing confidence in the SME base to continue to innovate.
Greater Manchester Strategy 2021–2031 – outlines plans for recovery and renewal following the pandemic, outlining a desire to become greener, fairer, more prosperous and opportunity driven. It identifies clean growth as one of GM's greatest strengths, with an opportunity to support related businesses to grow and promote innovation. It also sets GM's commitment to create greener homes in line with its carbon neutral target. GMCA Greater Manchester Strategy 2021–2031 (aboutgreatermanchester.com)	• Creating a facility and support package that will contribute towards the low carbon transition in GM. • Boosting GM's green offer and improving GM's ability to deliver enhanced levels of productivity. • Supporting entrepreneurship, business growth and clean growth.

Policy	Project alignment
Building the future economy: Plan for action for UK business innovation 2021-2025, November 2021 – outlines Innovate UK's ambitions to help businesses grow through the development and commercialisation of new products, processes, and services, supported by an outstanding innovation ecosystem that is agile, inclusive and easy to navigate. IUK Plan For Action for UK Business Innovation (ukri.org)	• Cultivating innovation within SMEs, leading to the commercialisation of new products. • Working with new start businesses, giving them access to knowledge, equipment and facilities that can allow them to take their ideas forward. • Bringing products and services to market faster and more effectively than would be possible if SMEs continued to work in isolation.
Energy-related products policy framework, November 2021 – sets out the UK's plan to drive products to use less energy, resources and materials to save carbon, reduce energy demand and help households and businesses reduce their energy bills. This includes incentives for innovation in smart technology use and to research and develop more efficient technologies. Energy related products policy framework (publishing.service.gov.uk)	• Providing an opportunity for businesses to test whole building energy efficiency/low carbon energy generation in a controlled environment. • Ensuring that SMEs are at the forefront of advances in energy efficiency and low carbon solutions.

A Pertinent Subject Area and Challenging Delivery Context

At the time of preparing the ERDF application, there was already a strong appreciation of the need to consider new energy solutions for homes to acknowledge opportunities to save energy, reduce emissions and make properties more comfortable to live in. Over the past year, energy efficiency has also gained public prominence due to the cost of living crisis, in part fuelled by rising energy prices. Uncertainty of energy supply, linked to the war in Ukraine, has also gained greater prominence in the public eye, prompting the consideration of alternative energy solutions.

This situation could not have been foreseen at the time of preparing the ERDF application but it has served to emphasise the importance of advancing energy efficient homes to both house builders and occupiers with awareness accelerated as a result of the crisis. Public and business interest in the project is believed to have increased as a result with strong media interest secured (see Section 7).

Coupled with the impacts of the Covid-19 pandemic and Brexit (both reported on as part of the interim summative assessment), the Energy House 2.0 project has been delivered during an unprecedented period. While many of the challenges presented by these events were already evident at the time of preparing the interim summative assessment, they have impacted throughout the project's lifetime. The team continued to shape the business support offer and construction programme to respond to the restrictions imposed at the time and effectively managed both during a challenging period. There were also several delays in the supply of materials and equipment which impacted upon construction, although this was largely managed within the overall construction programme.

An Ongoing Need to Intervene

Supporting an Important Market Segment

As highlighted at the time of preparing the interim summative assessment, the Energy House 2.0 project has responded to the needs of a prominent energy customer – domestic properties. The UK residential sector emitted 68.1 MtCO2 in 2021, accounting for 19.9% of all carbon dioxide emissions[2]. This was a rise of 5.8% between 2020 and 2021, due to a period of colder weather[3]. Although carbon dioxide emissions from the residential sector fell by 12.9% between 1990 and 2021[4], significant work remains to support a net zero future.

[2] 2021 UK Provisional Greenhouse Gas Emissions, Department for Business, Energy and Industrial Strategy

[3] ibid

[4] ibid

Responding to New Regulations

In support of the Future Homes Standard that will come into effect in England in 2025, new Building Regulations released in December 2021 confirmed minimum energy efficiency performance targets for specific products in buildings such as heating, air conditioning, ventilation, lighting, on-site electricity generation and storage, and automation and control systems. Furthermore, the new regulations include new standards to reduce energy use and carbon emissions in buildings including greater insulation requirements to limit heat loss, wastewater heat recovery, a lower maximum flow temperature for heating systems and access to charging points for electrical vehicles, among others.

As recognised at the time of the interim summative assessment, Energy House 2.0 supports the realisation of new home building standards both by:

a) increasing awareness amongst SMEs of the need to start to consider energy efficiency and low carbon opportunities as quickly as possible and how they can apply to their business; and

b) providing state-of-the-art testing and research facilities that support SMEs to innovate and test new products that otherwise would not be possible (see market failures) to reduce carbon emissions in homes ahead of the new standards being adopted in 2025.

Wider reaching publicity secured by the project over the past year will also have played a role in raising awareness of both the challenges and potential solutions across society.

Strong supplier interest (for example 22 SMEs attending the November 2021 supplier day and long waiting lists for tours of the facility) has emphasised that there is a market appetite to engage in this growing market segment, driven by interest as well as regulatory necessity.

Overcoming Market Failures

The market failures identified at the time of preparing the ERDF funding application – risk aversion, information asymmetry / lack of information, coordination failures and diseconomies of scale – have continued to be evident throughout the project's lifetime. The support provided by the project – both in the form of access to a leading research facility and support to businesses – has served as an appropriate response.

4 Progress against Targets

Overall Progress

Energy House 2.0 submitted a Project Change Request in December 2020, required primarily due to a delay in the construction programme with the reasons cited for the delay being:

- A later than anticipated start date due to a delay in receipt of a Grant Funding Agreement (GFA) - signed in mid-February 2019 rather than in September 2018 (as anticipated in the funding application);
- A cost overrun between RIBA stage 3 and stage 4 which led to a major value engineering exercise and an estimated 3-month delay to the construction schedule; and
- Revenue expenditure has also been impacted by the need to furlough staff during the pandemic and the re-categorisation of some other project identified costs.

No overall changes to the ERDF project cost or the target outputs were required as part of the PCR. The changes instead relate to the timing of activity, split of expenditure and the timing of outputs. The financial and practical completion date is the end of June 2023 with expenditure and outputs expected to be claimed through to this date. A further request to extend the activity end date to the end of May 2023 was made in August 2022 and was agreed.

The project now reports strong performance against targets, including evidence of significant progress since the interim summative assessment was completed. Table 4.1 (overleaf) shows the latest project targets, reported progress against them (based on the claim for the period to the end of December 2022) and the anticipated position at project close, when the team remain confident that targets will be satisfied.

Further detail of progress against expenditure and output targets is provided in the sub-sections that follow.

Table 4.1: Spend and output performance

Indicator	Targets		Performance at time of evaluation (end of December 2022)		Projected performance at project closure (end of June 2023)		Overall assessment
	Original	Adjusted	Number	% of target	Number	% of target	
Total revenue expenditure	£2,000,000	£1,473,665	£1,344,914	**91%**	£1,473,664	**100%**	
ERDF revenue expenditure	£1,000,000	£1,004,965	£917,163	**91%**	£1,004,965	**100%**	
Total capital expenditure	£14,488,087	£15,014,422	£14,942,817	**100%**	£15,014,422	**100%**	
ERDF capital expenditure	£7,244,044	£7,239,078	£7,204,555	**100%**	£7,239,078	**100%**	
Total project expenditure	£16,488,087	£16,488,087	£16,287,731	**99%**	16,488,086	**100%**	
Total ERDF expenditure	£8,244,044	£8,244,044	£8,143,866	**99%**	£8,244,043	**100%**	
C1 – number of enterprises receiving support	150	150	153	**102%**	153	**102%**	
C5 – number of new enterprises supported	15	15	16	**107%**	16	**107%**	
C26 – number of enterprises cooperating with research entities	30	30	19	**63%**	33	**110%**	
C29 – number of enterprises supported to introduce new to the firm products	30	30	33	**110%**	33	**110%**	
C34 – estimated GHG reductions (tons)	3,000	3,000	0	**0%**	3,828	**127%**	

Source: Project management records

	Less than 85%		***Between 85% and 95%***		***Greater than 95%***

Progress against Expenditure Targets

Expenditure to date and forecast

By the end of December 2022, the project had spent and claimed almost all (99%) of its budget. By this point, the project had claimed £14.94m of capital expenditure (99.5% of the capital budget), with around £71,605 remaining to be spent within the final two quarters of the project. This is an uplift in capital spend of £8.83m since the interim summative assessment was completed, demonstrating the scale of capital build and fit out activity completed over the 18 months or so following the interim assessment, in line with the agreed revised project profile. In terms of revenue, £1.34m has been claimed (91% of the revenue budget), with £128,751 remaining to be incurred and claimed ahead of project close.

Underspend against profile earlier on in the project was largely a result of adverse weather conditions causing a two-week delay to the construction programme. The extension granted has allowed the project to recover the early underspend and deliver the capital project in full, with the Energy House 2.0 facility completed in February 2022. An extended delivery period and small re-allocation of funds from the capital to revenue budget lines has also ensured that a small staff team could be retained to see the project through to its completion.

Looking ahead, the project team is confident that the remaining capital budget will be spent and defrayed by the end of June 2023. A few pieces of solar equipment have been ordered and are awaiting delivery, while the remainder of the budget relates to planned spend on sensors and wiring. The project team also anticipate spending the revenue budget in full by project closure, the majority of which will be accounted for by salary costs.

A changing expenditure profile

As highlighted at the interim summative assessment stage, although the overall ERDF project cost has remained unaltered, both the breakdown of spend by activity and financial year has altered during the project's lifetime. The key changes are as follows:

Reprofiled capital costs	As a result of delays in the construction schedule, largely due to a later than anticipated signing of the Grant Funding Agreement and the need for a value engineering exercise to be undertaken for the construction works (considered under the 'expenditure outside the ERDF scope' sub-section). The profile of expenditure on equipment was also revised to reflect the amended construction programme.
Increased and re-profiled salary costs	As a result of slippage in the construction phase (allowing outputs to be delivered from the new facility), and COVID-19 which led to members of the delivery team being furloughed for varying durations from March 2020 with no outputs delivered between March and September 2020. A limited number of posts have been supported through to the project's close to allow outputs to continue to be captured across the project's lifetime and the project to be managed in accordance with ERDF requirements.
A reduction in other revenue costs	At the request of the MHCLG project manager, equipment to be housed in Energy House 2.0 was re-categorised from 'other revenue' to 'capital spend on equipment', reducing the revenue funding requirement and increasing the capital requirement in tandem.
Reduced marketing costs and office costs	Anticipated costs for exhibitions, sponsorship fees, staff travel and subsistence costs have been lower than anticipated reflecting: a) MHCLG and GMCA advice that the project should have less reliance on attending trade shows; and b) the impacts of the COVID-19 pandemic.

Expenditure outside the ERDF scope

Outside the ERDF project scope, the project experienced an increase in capital costs of c£2.5m (a figure unchanged since the interim summative assessment was completed) having completed a value engineering exercise to reduce the originally identified cost increase from £5m. These additional costs have been covered in full by the University of Salford, demonstrating their strong financial commitment

to the project. The increased costs represent significant overruns between RIBA stage 3 and 4, which led to delays of around 3 months to the construction schedule to allow an extensive value engineering exercise to be undertaken to help reduce the overspend. The University of Salford's commitment to the project has been further demonstrated by its investment in the demolition of the Allerton Annex and re-provision of parking to create the Energy House 2.0 development plot, again outside the ERDF project scope.

Progress against Indicator Targets

Progress to date

Overall, the project has performed well against its output targets with significant progress made since the interim summative assessment was completed. By the end of December 2022, the project had exceeded its targets for:

- C1 assists with 153 claimed (against a target of 150 and an increase of 85 against the position at the interim assessment);
- C5 assists with 16 (against a target of 15 and a third more than the interim assessment position) and;
- C29 assists with 33 (against a target of 30 and compared to no achievements being reported at the time of the interim summative assessment).

As of December 2022, the project had also claimed 19 C26 assists, 63% of the target, up from 11 at the time of the interim assessment with a pipeline of further activity underway.

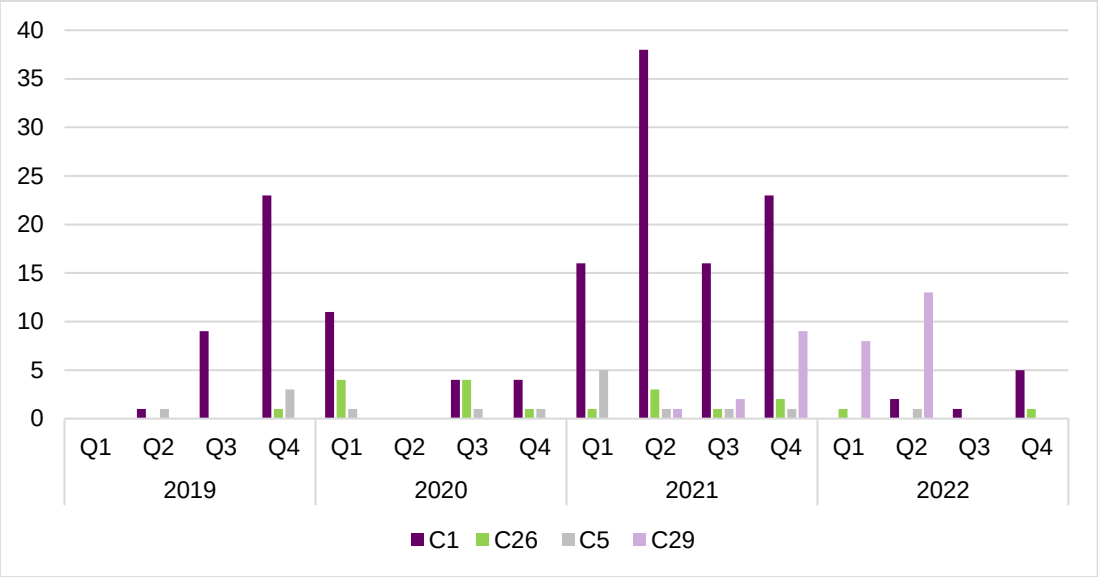
Profile of achievements

The quarterly profile of achievements is set out in the chart below. The timing of outputs has required amendment since the original funding application was made. The lack of outputs claimed during 2020 illustrates the impacts of Covid-19 on project delivery, with several project staff furloughed, an inability to conduct face-to-face meetings and access to facilities restricted. These factors all limited business engagement activity and the ability to offer testing services. As restrictions began to ease in 2021 there was a strong uplift in activity and considerable progress against targets has been made since the interim summative assessment reported.

The delays in the capital programme also impacted upon the ability to capture C26 and C29 outputs. The intention was always to ensure businesses could use the newly created facility to advance their plans with delays to the construction programme inevitably impacting the outputs profile to allow this ambition to be realised.

From Q2 2021, C29 (number of enterprises supported to introduce new to the firm products) outputs started to be claimed with relatively high number of C29 outputs achieved between Q4 2021 and Q2 2022 (between 8 and 13 per quarter). As considered below, further outputs remain to be claimed against these indicators, now the houses have been constructed in Chamber 1 to provide a testing environment.

Figure 3.1: Quarterly output profile



Source: Client team client tracker

Given the challenges encountered as a result of Covid-19 and delays to the capital programme, the completion of outputs, with three output targets already exceeded, is an important achievement.

Future forecasts

The outputs remaining to be claimed within the project's final six months (relative to the claim used to produce this section of the report), are C26 and C34 achievements.

Although performance to the end of December 2022 suggests that there is a little way to go, the team are confident they will achieve the C26 target, with a number currently being delivered through the projects in the Energy House 2.0 chambers. This was always the project's intention and necessitated outputs to be achieved late in the programme. Since the latest claim period (to the end of December 2022) the project has completed a project with one business which will be claimed as a C26 in Q1 of 2023. There are a further 15 collaborative research projects underway and the team expect the majority of these projects will be claimed as C26 outputs by June 2023, subject to securing the required paperwork and sign-offs in time. An element of prudence has therefore been factored into their latest estimate. The major ongoing C26 assists are being delivered by Bellway Homes (Future Home) and Barratt Developments and Saint Gobain (eHome2), both by the developers themselves and the SMEs completing tests within the homes. The project team are alert to the need to secure completed paperwork as quickly as possible, as activities conclude.

In regard to C34 (estimated GHG reductions), the team have collated evidence from three initial beneficiaries in order to claim annual GHG reductions (C34) of 3,828 tons in Q1 2023, exceeding their C34 target of 3,000 tons. In addition, the team suggest there is evidence of accelerated installation of heat pumps in new builds by Bellway Homes and Barratt Developments, which would support annual carbon savings. However, at the time of conducting this evaluation, there was uncertainty whether this would be captured within ERDF timescales.

Therefore, by project closure the team anticipate that all outputs will be met or exceeded, albeit final figures are subject to change. It is also anticipated that a further one-month extension of the activity end date may be required, to the end of June 2023, to allow all project activities to be completed.

Contribution to ERDF Horizontal Principles

The nature of the project means it has made an important contribution to the sustainable development horizontal principle. Energy House 2.0 has raised awareness of energy efficiency and low carbon potential and has directly built capacity within the SME base to take forward and develop innovative energy solutions. As new products continue to progress to market and application within properties, they will support the UK's transition towards a low carbon economy, aligning with sustainable development objectives. The recently launched Friends of Energy House charitable programme – considered further in Section 6 – also presents an opportunity to generate wider change under this principle.

Although formal targets for equality are not believed to have been set, steps have been taken to ensure that the project is open to all. This includes through the recruitment of project staff and the engagement of beneficiaries, in line with the university's policies and project specific ways of working. A transition to virtual delivery for part of the project's lifetime will, to an extent, have supported the scope for wider engagement and minimised the burden placed on people's time, making the project more inclusive. In this way, the project has supported the equal opportunities and non-discrimination and the equality between men and women horizontal principles. Where beneficiary characteristics have been captured, project records suggest that the project has predominantly worked with men and people aged 40+.

5 The Effectiveness of Project Delivery and Management Arrangements

Project Delivery and Governance Arrangements

The ERDF funded project team

As noted at the time of the interim summative assessment, delays to the project's start date and the impact of COVID-19 have required staffing arrangements to be flexed over time. This allowed the team to adapt resourcing to meet project needs and save funds at a time when furlough was necessary.

When reporting in Summer 2021, it was recognised that a series of ERDF supported posts were ending at a time when the project still had a significant programme of activity to deliver over an extended timescale. At the time of preparing the final summative assessment, 5.05 full time equivalent (FTE) posts[5] continue to be supported with ERDF resource, down from 9.4 FTE at the time of the interim assessment.

The progress against targets reported in Section 4 shows that the team has been able to deliver the programme of activity required by ERDF, in part by drawing on wider capacity within the university. The ability to continue to draw on the technical expertise of academic staff (who had also developed the ERDF application) and technicians has remained important to securing the rigs needed within the facility, managing its operations, supporting publicity activities and having a commitment to the asset beyond ERDF funding.

Consultees have been extremely positive about how the project has been managed with comments including:

"Management [of the project] *has been absolutely fantastic*…[the team has] *identified issues and reacted quickly…the team has done exactly what it needs to do"*

"Charlotte and Joe have made it doable. We would have been knackered without that team"

Access to wider expertise

The project's success has required the input of a wider range of non-ERDF funded posts to support delivery and has continued to successfully draw on these from within the University of Salford. This has included an important network of expertise from the procurement, estates, marketing and monitoring and compliance teams providing valuable guidance, particularly at times when delivery challenges were encountered on the capital project.

Externally commissioned services include the construction works, associated professional services and the supply of specialist equipment. The university and construction team worked effectively together to ensure timely delivery, the satisfaction of technical specifications and the incorporation of sensor equipment. This allowed any potential issues to be addressed early and the university team to be fully familiar with the facility ahead of its completion.

The project team – comprising both ERDF funded and wider positions – has worked effectively to manage the project during a challenging delivery period and ensure that a growing pool of businesses have been able to benefit from the facility and support services offered.

[5] Comprising the project manager – 0.8 FTE; project administrator – 1 FTE; technician – 1 FTE; research associate/ architect solutions) – 1 FTE; research assistant – 1 FTE; and a second technician – 0.25 FTE.

Meeting cycles

A scheduled programme of meetings and agreed reporting dates supported information sharing and regular progress checks across the team during the project's core delivery phase. As examples:

- Fortnightly meetings were held between the main contractor and consultant project manager
- The university's project manager attended site most weeks
- A capital contracts progress meeting was held monthly
- Valuations occurred monthly
- The risk register is updated monthly
- An information pack including an update on the construction programme, spend and risk was prepared for each Board meeting.

As would be expected, meeting cycles were scaled back as the construction programme concluded and the programme of revenue activity has started to draw to a close.

Governance arrangements

As recognised at the time of the interim summative assessment, the project's governance arrangements were clearly articulated from the outset with a Project Board established to maintain strategic oversight of the project and ensure its delivery to agreed timescales, budgets and designs, as well as ensuring any risks were managed. The Board met monthly during the core project delivery period – a week following the contracts progress meeting – and brought together the perspectives of:

- The project sponsor
- Key members of the ERDF supported project team – the project management, programme administrator and the two academic leads
- Head of estates
- Head of procurement
- The finance officer for capital delivery
- The construction project manager
- AECOM – the construction project manager.

The group has reviewed progress on both the capital and revenue elements of the project, allowing any issues to be quickly addressed. All meetings were minuted to ensure a record of decisions is maintained. Project specific governance and links into the university's wider governance arrangements proved particularly effective when decisions were required during the first half of the project when costs escalated.

Although the overall governance arrangements have been appropriate, strategic leadership was limited by the project sponsor being on long term sick leave – an unfortunate situation which the project team could not have foreseen. Alternative approaches ensured that informal updates have been escalated within the university, however, the originally intended arrangements were likely to have proved more effective. The project continues to report to the Strategic Projects Innovation Group which includes members of the Vice-Chancellor's Executive Team.

Project Systems

The interim Summative Assessment found that the team had worked hard to ensure that effective project systems and processes were in place to meet ERDF requirements. The experience of other ERDF projects had been built upon and approaches had been effectively adapted as COVID-19 restrictions came into force.

Although effective overall, a series of areas of improvement were identified at the interim assessment stage. The project team has responded as follows:

Area for Improvement	Response
Ensure that address entries confirm when beneficiaries are located in Greater Manchester	Records suggest that entries have been reviewed and changes made where necessary.
If support is being accessed by businesses based outside Greater Manchester (for example by joining virtual workshops) consider if this information could more effectively be captured elsewhere	The team have consciously targeted Greater Manchester based businesses to benefit from the project since the interim assessment was completed ensuring this is less of a potential issue than may otherwise have been the case.
Where such activity continues to be captured, the team need to recognise the risk that this carries, both in terms of outputs (from early project activity) that may be at risk and the scope for the use of ERDF resources to be challenged	Records suggest that no businesses based outside Greater Manchester have been supported since the interim summative assessment was prepared. Audit visits and claims have also raised no issues for the project team to be concerned about.
Identify common formatting and categories of response (e.g. to confirm the status of beneficiaries within a support journey (e.g. completed and claimed, ongoing, concluded prematurely), identifying a single most appropriate SIC code per beneficiary and how they found out about available support) to support effective tracking and analysis over time	Common categories of response do not appear to have been used within the client tracker on a consistent basis. A 'did not progress' category has, however, been applied with a reason given in some instances. From Q1 of 2022, single SIC codes have been applied to beneficiaries.
In the C1 tab, capturing information that shows the progress made towards / the components of a 12-hour assist, for example which workshops within a programme have been attended. This will support claims and allow the team to identify if there are beneficiaries requiring any 'top up' support to allow an assist to be concluded and an output to be claimed	The client tracker suggests that this recommendation has not been acted upon. Discussions with the project team do however suggest that they have been alert to the level of support beneficiaries have received and have developed solutions to allow assists to be completed, as appropriate.
Introduce an innovation tracker to allow beneficiary progress to be demonstrated as a result of their engagement in the project	An innovation tracker developed by the summative assessment contractor was introduced in September 2021. However, documentation seen by the summative assessment team suggests that an innovation score has only been recorded at the start of support. The absence of a comparator score at the end of an assist means that the direction of travel cannot be assessed as had been anticipated.

No significant changes to project systems have been identified as part of the final assessment, aside from the points outlined above. It is understood that no issues have been raised through the project's audit visits.

Publicity Approaches

The project has continued to adapt its publicity approaches to first establish its profile – both as a capital facility and innovation support provider – and then manage demand. Examples of approaches taken across the project's lifetime include:

- **Establishing an Energy House 2.0 website** – hosting a web cam that showed progress on the capital build and information about the available SME support offer. Presentations from previous workshops can also be accessed[6] along with the Energy House Labs[7] quarterly newsletters.
- **Hosting an Energy House 2.0 launch event** – held virtually, due to COVID-19 restrictions, during November 2020 to mark the start of the building's construction. The session attracted 350 participants as well as having Ministerial and Mayoral support and the Octopus Energy founder and CEO as a speaker. It provided an opportunity to introduce the facility's capabilities

[6] Although the routing didn't appear to be working at the time the final summative assessment was prepared

[7] Covering activity at Energy House 2.0 as well as Salford Energy House, the Smart Meters>Smart Homes Laboratory and Thermal Measurement Laboratory

as well as how a selection of businesses has already benefited from the University's expertise. This session led to 20 leads for the project.

- **Maintaining social media accounts** – the project's social media profile has continued to grow. LinkedIn is the project's primary account with approximately 500 followers. The project is also publicised through the accounts of team members with the lead academic having 3,000 followers and securing 6,000 impressions on some posts.
- **Circulating an Energy House Laboratories newsletter** – a quarterly newsletter provided updates on construction progress along with upcoming events and details of activity being delivered from the facility in the latter project stages to a database of contacts, helping to build and maintain awareness of the project.
- **Distributing post cards** – sent to target businesses such as architectural businesses that were the target audience for the early smart homes workshop session. Contacts were identified through data harvesting of details from Companies House, using relevant SIC codes, to generate interest in the workshop programme.
- **Hosting tours of the completed Energy House 2.0 facility** – it is estimated that approximately 1,200 people toured the facility over a six-week period. This includes:
    - over 225 visitors touring the facility during 14-18 February 2022;
    - approximately 400 people attending open tours during 2023; and
    - a series of additional tours being completed by partners during 2023.

  A waiting list of over 150 people who are interested in attending future tours is also in place with activity currently paused to allow for a focus on research and testing.

- **Holding a meet the buyer event** – providing the opportunity for SMEs to pitch their ideas and, in successful cases, become part of the supply chain to work with the large house builders.

Unfortunately, project records do not capture a complete record of how beneficiaries have been made aware of the project to allow the most effective engagement routes to be identified. Consultations have however suggested that during the early stages of the project the post cards proved effective to secure early workshop attendees while media coverage during the latter stage of the project has helped to raise wider awareness.

Project records show that approaches have been effective to secure both the scale and, particularly in the latter stages of the project, the quality of beneficiaries needed to realise ERDF targets and support the achievement of wider project objectives.

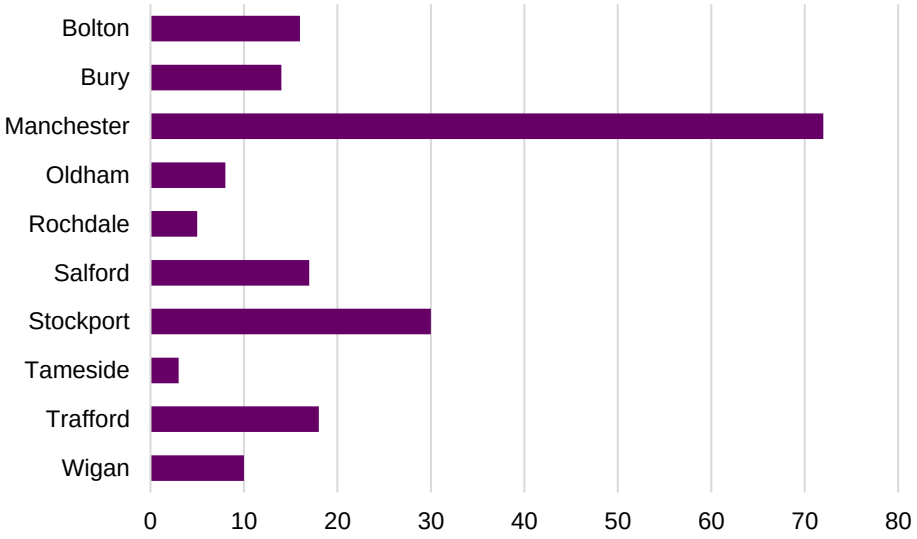
Beneficiary Profile

Project records suggest that a wide beneficiary base has been engaged by the project. The client tracker (as of December 2022) shows that:

- In total, 226 businesses have engaged with the project – up from 145 at the time of the interim summative assessment.
- Of these, 193 businesses are based in Greater Manchester[8]. Businesses have been engaged from across the ten local authority areas, although 37% are identified to be based in Manchester (see overleaf).

[8] The majority of businesses registered outside Greater Manchester were recorded in 2019, ahead of clarification of the required geographic focus being confirmed with the team. Since Summer 2021 there have only been five new engagements registered outside Greater Manchester, none of which have gone on to receive an assist.

Figure 5.1: Geographic Coverage of Greater Manchester Beneficiaries



Source: Client tracker, December 2022, N=193

- Beneficiaries have typically been established businesses that have been trading for three or more years, although examples of new start businesses being supported are also known (as reflected in over-achievement of the C5 target).
- Businesses have been supported from across more than 90 Standard Industrial Classification (SIC) codes.

Consultations with members of the project team suggest that the project has effectively engaged a significant number of new business contacts for the university. In addition, existing working relationships (often established through wider elements of the Energy House Laboratories offer) have been built upon, allowing research and testing activity to be advanced and new product ideas to secure the evidence required to progress towards market (where appropriate).

Activities Delivered

Capital activities

Since the interim Summative Assessment was prepared:

- Construction of the Energy House 2.0 facility has been completed and testing undertaken ahead of its launch.
- The in-house construction of weather simulation and sensor rigs has concluded and installation within the facility completed.
- Equipment purchases have progressed, allowing the facility to accommodate the latest available technologies.
- Two house builder partners – Bellway Homes and Saint-Gobain in partnership with Barratt Developments – have been appointed and each constructed a three-bedroom detached property within Chamber 1[9].

[9] Although there had been plans for properties to also be constructed in Chamber 2 these plans did not materialise. The Chamber 1 structures have provided sufficient capacity for a range of research activities to be progressed and Chamber 2 has retained the flexibility to accommodate wider research activities, as needs have arisen.

Development of Future Home (by Bellway Homes) and eHome2 (by Barratt Developments and Saint Gobain) have been an important achievement for the project. It has provided initial housing prototypes in a timely manner that provide a realistic test environment and have secured significant media attention for the project (see Section 7 for further details). Incorporating a range of technologies, (including air source heat pumps, mechanical ventilation and heat recovery (MVHR), centralised mechanical ventilation systems, 'smart' control systems, PV panels and battery storage, heated skirting boards and infra-red panel heating, convection radiators and underfloor heating), this element of the project has provided a testing facility that has been particularly important to engage SMEs and support them to apply their products in a controlled environment.

Revenue activities

As outlined in the interim Summative Assessment report, a series of adjustments have been made to the revenue programme since the ERDF application was submitted recognising feedback provided by the Managing Authority and changes to the delivery context. Key changes include:

- Removing plans for attendance at exhibitions and trade shows to form part of some C1 assists (as had been the case under the original Energy House project).
- Moving to a virtual delivery model, as the implications of the COVID-19 pandemic became clear.
- Delivering a programme of six themed workshops, as follows:

Table 5.1: Workshop Programme

Topic	Date	Format
Retrofit	November 2019	Two days, in person
Smart meters	March 2020	Two days, in person
Smart homes	March 2021	4 x 3 hour sessions, online
Domestic retrofit	April – May 2021	5 x 1-3 hour sessions, online
Electric vehicles	September 2021	Two days, in person
Retrofit for architects	December 2022	Full tour of university facilities plus online workshops

Source: Client team records

Further adjustments to the support offer have continued to be applied post-Summer 2021 to reflect completion of the facility and a strong desire to allow SMEs to benefit directly from it. Examples include:

- Hosting a Meet the Buyer day to allow the two house builders to establish a network of local SMEs to work with. In total, 22 companies presented their ideas, including EV charging, heat recovery and low carbon heating solutions, many of which have since been incorporated into the properties in Chamber 1.
- Establishing research collaborations to allow products to be tested within the Energy House 2.0 chambers and, over time, data to be assembled to determine their effectiveness.
- Offering full tours of Energy House 2.0 and other university facilities for groups of SMEs plus the delivery of two further themed workshops (detailed in the table above).

The changes made have demonstrated the project team's responsiveness to a changing delivery context, feedback from businesses and the practicalities of delivery. Feedback from beneficiaries suggests that the model has proved popular and has satisfied support requirements.

Identifying C26 beneficiaries

Initially, all C26 beneficiaries had completed a C1 assist first, allowing their commitment to the project to be tested and the value of undertaking collaborative research to be determined. To be considered, SMEs needed to demonstrate that they had a low carbon innovation proposal with potential and that will generate carbon savings – appropriate criteria for Priority 4 support. As the project has progressed, some businesses (for example Bellway and Barratt) will have been engaged purely to deliver a C26 output, recognising the opportunities they presented to the project.

The development of a research plan at the start of the C26 assist helps to ensure that a robust proposition has been identified to test and the beneficiary is alert to the support they will (and won't) receive through the project. Consultations suggest that beneficiaries are typically at a close to or early market stage to benefit from a research collaboration with another team member suggesting a Technology Readiness Level of 4-6 as a minimum, which is considered appropriate for the project.

While earlier stages of the project drew on the facilities available across the Energy House Laboratories offer, the focus has now shifted to delivering C26 assists from the Energy House 2.0 facility. All remaining C26 outputs will be claimed on site. The development of the housing prototypes and resulting collaborative research agreements reached to allow SMEs to work with the house builders have been an important step to achieve this. The approach has also ensured that C26 assists have focused on quality, supporting both SMEs and the house builders to benefit from the arrangement. A series of products are expected to progress towards market, over time, as a result.

Value of support

The value of both C1 and C26 assists has been estimated at the start of an assist and re-calculated on completion to ensure compliance with de minimis limits, which is self-certified by beneficiaries. Analysis shows that the value of C1 assists has remained under £3,000 in all instances and the actual value of claimed C26 assists has ranged from £1,883 to £23,726, showing that a one size fits all approach has not been taken by the project. The breakdown of values is as follows:

Table 5.2: Value of Project Support

De Minimis Value – C1	Number	%
Less than £1,000	89	58%
£1,000-£1,499	30	20%
£1,500-£1,999	28	18%
£2,000-£2,499	4	3%
£2,500-£2,999	1	1%
£3,000 and above	1	1%

Source: Project management records

De Minimis Value – C26	Number	%
Less than £5,000	8	42%
£5,000-£9,999	4	21%
£10,000-£19,999	6	32%
£20,000 and above	1	5%

Source: Project management records

In most of the C26 assists, the actual reported de minimis value of support has exceeded the estimate provided at the outset, in some cases by more than double the initial estimate.

Beneficiary Perspectives

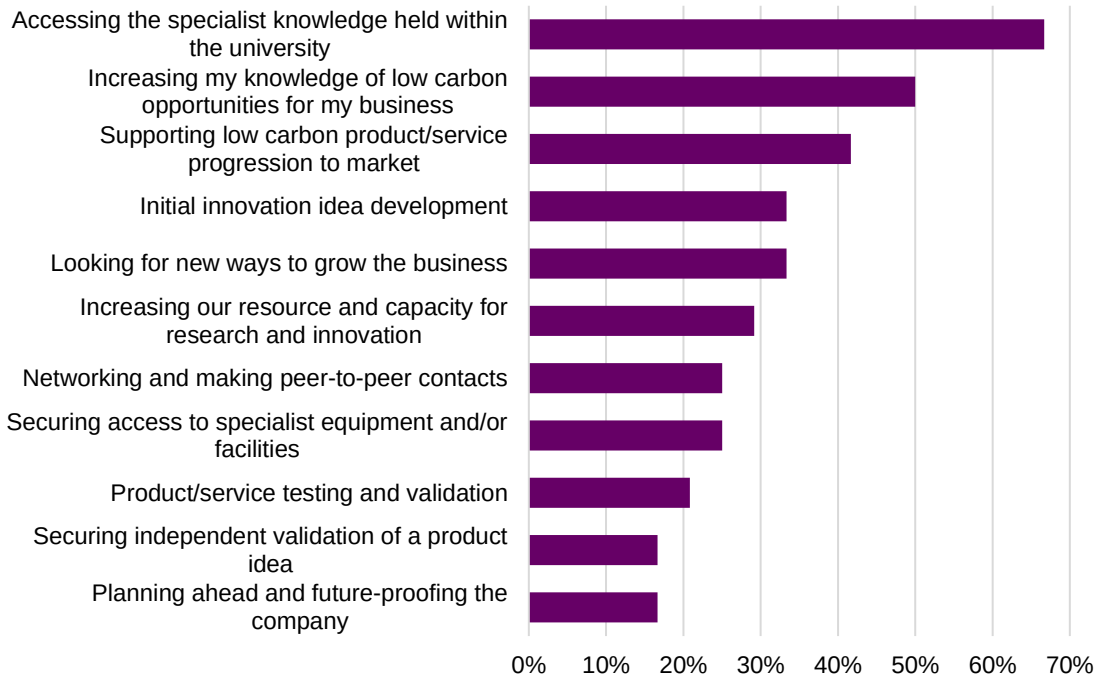
Reasons for engaging

Bringing together survey results from research conducted at both the interim and final assessment stages, the five most common reasons businesses engaged with the project were:

- to access the specialist knowledge held within the university, reported by 67% of respondents;

- 50% of businesses wanted to increase knowledge of low carbon opportunities for their business;
- 42% wanted support to progress a low carbon product/service to market;
- 33% engaged because they wanted help with idea development; and
- 33% were looking for ways to grow their business.

Figure 5.2: Motivations for Project Engagement



Source: ekosgen beneficiaries survey, 2021 and 2023 (N=24)

Experience of the project team

Survey results reveal beneficiaries have positive views of the project team with 91% of beneficiaries agreeing that the project team are knowledgeable and were able to meet their support needs. In addition, 89% respondents agreed or strongly agreed that the project provided a unique support offer to businesses. As noted above, the ability to access specialist knowledge within the university was a reason for many SMEs engaging.

"From start to finish of the project, the whole team guided me on every aspect. Without this guidance, I would of not bothered with my innovation, where else would I go?" – beneficiary

"EH2.0 and the team at Salford are an amazing resource which is really accelerating the analysis and data availability for infrared space heating." – beneficiary

"The biggest impact has been our business coming into contact with academics. Working with building physicists has enabled us to better understand the more complex characteristics of the homes we build." – beneficiary

In the absence of the project, survey respondents had mixed views on how they would have progressed their proposals with 41% respondents saying they would have sought support elsewhere, 23% reporting they 'don't know' what they would have done and 18% suggesting they would have sought to progress their ideas without support.

Experience of support

In general, beneficiaries reported a high level of satisfaction with the project. In terms of initial experience of engaging with the project, at least 78% of beneficiaries were happy with the process and support given, as shown in the table below, with the ease of engagement particularly highly rated.

Table 5.3: SME satisfaction with initial engagement (% rating at least 4 out of 5, 5=very satisfied)

Quality of the information about the available support	91%
Clarity of the eligibility criteria for receiving support	91%
Ease of the engagement process	96%
Length of time taken between initial inquiry to working with the project	78%

Source: ekosgen beneficiaries survey, 2021 and 2023, N=23

Regarding experience of working with the project, the majority (76%) of respondents were happy with the project overall, with more than two-thirds of those being very satisfied. The survey also found that:

- 71% of respondents agreed or strongly agreed that the project had been able to meet all their needs.
- 67% agreed or strongly agreed that the project exceeded their expectations.
- 86% agreed or strongly agreed that they would recommend the project to others businesses.

When considering satisfaction with different elements of the offer, workshops received the highest level of satisfaction, rated 4 or 5 out of 5 by 86% of respondents. Where lower proportions are reported it should be noted that the figures are based on small samples. Open responses suggest some frustrations related to an inability to access facilities (in part due to pandemic restrictions), the lack of funding to build prototypes, the need for more real examples to incorporate in their businesses, and the university not having suitable facilities for specific products. It is possible that some of these requirements may have been outside the intended project scope. In other cases, beneficiaries commented that the project had done well and appreciate the testing facilities and the team involved.

Table 5.4: SME satisfaction with support (% rating at least 4 out of 5, 5=very satisfied, in instances where support was applicable)

Workshops	86%
Developing an agreed research brief	59%
Intensive 1-2-1 support	55%
Use of testing facilities	45%
Collaborative R&D project	41%
Final research report	55%
The project overall	76%

Source: ekosgen beneficiaries survey, 2021 and 2023, N=22

"The workshops were informative and the speakers knowledgeable, I felt a learned a lot from the workshops." – beneficiary

"Good team and network of speakers for the workshops." – beneficiary

"[The greatest strength of the project is] it's scale, professionalism and profile, based on the facility itself and the quality and reputation of the team involved" – beneficiary

Delivery Challenges

The primary delivery challenges have remained consistent with those identified at the interim summative assessment stage, primarily:

Increased project costs: Faced with rising costs during the design stages, the university identified the need to secure savings but also the need to commit additional funds to the project itself to allow works to proceed and the vision for the facility to be realised. It was recognised that with a two-stage process "you are always going to be at risk" but that it continued to present the most appropriate option for the project.

The team successfully retained a focus on the functionality of the building with features such as offices and meeting rooms removed to allow funds to focus on technical requirements. As one consultee confirmed: *"we haven't lost anything as a test facility"* and this view was confirmed by others. Where potential additional costs were identified (e.g. finding contamination on site), cost effective solutions were explored to allow the project to remain within the revised budget and all budget variations were agreed through the project board, ensuring an audit trail was maintained.

The impact of COVID-19: Although the project has not been as severely impacted as many others (for example the construction team remained on site throughout), the revenue programme did have to adapt to new ways of working and the project furloughed staff to preserve funding for when activity could return.

Responding to MHCLG clarifications: Two primary clarifications have been raised:

- The need to support SMEs in Greater Manchester, a requirement that the project team had not appreciated through the application stage and that has resulted in a smaller pool of potential beneficiaries; and
- Attendance at exhibitions and trade shows could not be counted as a business assist, unlike under the original ERDF funded Energy House project.

By identifying and addressing these points early, the risk to the project was minimised.

The need to accommodate an extended delivery period: Delays to the construction programme and the absence of on-site support activity during a large part of 2020 required activity to be delivered and outputs to be captured over a longer period than originally anticipated. Resources were re-allocated to allow this to happen and the team remained committed to delivering contracted outputs.

Despite the challenges encountered, the project team has been pro-active to recognise and overcome issues as quickly as possible with a wider commitment within the university to learn lessons for the delivery of future projects.

6 Response to Interim Recommendations and Planning for the Future

Response to Interim Recommendations

A series of recommendations were identified as part of the interim summative assessment to help ensure that the project delivered to its objectives and contract requirements. The recommendations have been revisited as part of the final assessment to determine how the project team responded and any achievements secured as a result. In summary:

Recommendation	Project Response
Plan for headroom in C1 and C26 achievements	The C1 target has already been exceeded and the project pipeline suggests that sufficient research collaborations have been established to meet the C26 target.
Focus on quality not quantity (to support C26, C29 and C34 achievements)	The ability to link SMEs to Bellway and Barratt, as structures have been completed in Chamber 1, has been an important step to ensure that the quality of assists has been ensured and the ability of businesses to contribute to targets has been captured. Forecasts suggest that C26, C29 and C34 targets will be satisfied.
Confirm the project's business support end date	Activity is scheduled to continue until the end of June 2023, allowing a series of assists to be completed from within the completed facility and collaborative research opportunities to be advanced with the two on-site house builders.
Manage the support pipeline to ensure value is secured from the capital facility	The team has been conscious to ensure that businesses could benefit from the new facility as part of their ERDF assist. Project records show that 8 C1 and up to 17 C26 assists have been completed since the facility opened or are forecast to complete before the project's closure.
Review the client tracking tool to ensure completeness and accuracy	A series of enhancements have been made to the way the client tracking tool has been completed since the interim summative assessment was completed, albeit not all recommendations have been acted on in full.
Ensure capacity is available to support assists late in the project's lifetime	Although staff resources have been more limited in the latter part of the project, they have been organised to ensure that the required scale of activity could be delivered.
Start to plan for the centre's sustainability beyond ERDF support	Plans are now in place to support Energy House 2.0's sustainability beyond the ERDF funding period and ensure the facility continues to be used for its intended purpose.
University of Salford to position itself as a centre of excellence for sustainability in the urban built environment (taking Energy House 2.0 together with other assets)	The university's profile has benefited from significant media interest in Energy House 2.0 (see below) which has also provided opportunities to showcase the wider facilities and research offer. Securing a series of awards for the facility has also been a benefit in this regard.

Planning for the Future

The University of Salford has always been committed to planning for the long-term future of Energy House 2.0, following completion of ERDF funded activity. Plans have been prepared to detail how the facility will operate post June 2023, both from the perspective of maintaining the capital structure and business access to it and ensuring that staff are available to service it. Plans are based on ensuring the facility can cover its costs – supporting sustainability – without generating profit.

Bellway Homes and Barratt Developments have confirmed that they are happy to leave their structures in place to support longer term research and testing opportunities. This is an important decision that

reflects the long potential lifespan of the structures and the organisations' status as formal project partners in continuation activity (see below). The continued offer of the structures will support an ongoing programme of testing and recognises that the offer of a cleared site (highlighted as an option in the ERDF funding application) is not always desirable, for example in instances where companies want to test products in a whole building setting and the cost of construction and associated timescales would prove prohibitive. This scenario can – currently – continue to be offered through Chamber 2.

The award of a £1.9m Innovate UK grant has been another important achievement that will allow some ERDF style supported activities to continue on-site. Offering research collaboration projects, the funding will provide some businesses with subsidised access to testing and research opportunities to support the advancement of their products. A collaboration with the University of Manchester will also allow research regarding the use of sustainable materials to be completed, expanding the research agenda. From a staffing perspective, a commitment has been made to retain the project management team to support the facility's ongoing operations, as part of this scheme. Recruitment is also ongoing to continue to grow the technical team that can take full advantage of the facility and take forward further research.

Friends of Energy House – a philanthropic funded initiative to accelerate efforts towards net-zero – has also been launched. The initiative will provide a route to support projects that extend the expertise and activity of the facility into the community. Three projects have been awarded funding to date with this figure to increase over time.

These developments are a positive indication that the facility will be maintained and continue to be used for the purpose anticipated in the ERDF application, as well as supporting wider advances in the net zero agenda. Strong levels of business interest and the continued relevance of the strategic context also suggest that ongoing use of the facility will remain high.

7 Project Impacts and Outcomes

Introduction

While the interim summative assessment identified a series of emerging impacts, this element of the assessment has been revisited in early 2023 to capture an updated perspective. A further round of beneficiary survey work has been completed and insights gathered from the Energy House 2.0 project team and house builders to secure wider perspectives on benefits secured.

Beneficiary Benefits

Beneficiary surveys were completed at both the interim and final assessment stages to explore the nature of benefits arising from support secured to date and anticipated in future. The combined findings are summarised below with no distinct differences evident between the two assessment stages.

Economic benefits

Beneficiaries reported having achieved, or expecting to achieve, a range of economic impacts as a direct result of the project, as shown in Table 7.1. Reflecting the early stage of product development for some beneficiaries and ongoing support journeys in other cases,[10] a higher number of beneficiaries expect to achieve benefits in the future. These findings are particularly encouraging given the period of economic uncertainty the project was operating in.

Table 7.1: Economic impacts achieved to date or expected in the future

Economic impact	Achieved to date	Expected in the future
Increased sales/turnover	3 respondents	13 respondents
Increased profit	3	12
Increased productivity/efficiency	5	11
Increased employment levels	5	10
Sustained employment levels	3	13

Source: ekosgen beneficiaries survey, 2021 and 2023, N=20

Overall, 82% of survey respondents believe that their business is in a better position as a result of working with the project while only 5% disagreed.

Wider business benefits

In addition to the core economic benefits considered above, survey respondents identified a series of wider business benefits that have both been recorded to date or are anticipated in future. These are important short-term impacts that offer scope for further benefits to materialise in future.

Table 7.2: Wider business impacts achieved to date or expected in the future

Wider business impact	Achieved to date	Expected in the future
Made the business stronger and more stable	8	9
Enhanced market awareness	12	6
Improved business networks/collaboration	10	8
Accessed new markets	8	10
Raised the business profile	7	10

[10] At the time of the survey, 19% reported that the support is still underway, and 40% have not implemented or launched their product idea yet.

Source: ekosgen beneficiaries survey, 2021 and 2023, N=20

"The project has offered a vital helping hand, to get public recognition for the energy performance of our infrared system. This is absolutely key to gaining wider acceptance for this important technology." – beneficiary

"It's exciting and useful to gain more knowledge and network connections. " – beneficiary

Environmental benefits

The survey found that almost a quarter of respondents (23%) reported that the project has supported a reduction in carbon emissions and results are already evident and a further 41% reported it has but impacts are yet to be seen. Beneficiaries also report having a greater understanding of the low carbon agenda and the role their business can play within it. Seven out of 18 businesses (39%) reported that they already have greater clarity and drive for low carbon business ambitions with the remainder expecting to achieve this position in future.

"They are making a really strategic contribution to the decarbonisation of heating homes in the UK." – beneficiary

"[The greatest strength of the project is its] ability to quantify and measure accurately the effect of individually implementing various types of sustainable technologies" – beneficiary

"An increase in knowledge regarding low carbon and the options and processes available" – beneficiary

"The project has provided the business with an awareness and thus ability to promote and specify (including specific products) within a building design that will reduce the carbon footprint or work towards achieving certain sustainability targets/criteria."

The project team's confidence that the project will achieve its reduction in greenhouse gas emissions target is further evidence that environmental benefits are starting to be realised with scope for them to increase considerably in the future. If the two major house builder partners roll out technologies tested on site, the environmental benefits could be considerable.

Innovation benefits

The survey found that a series of innovation benefits are already evident amongst beneficiaries or are expected to arise in future. As the results below show, the project has already prompted greater investment in R&D and an appetite to continue to work with the university, as well as supporting improvements to existing products, processes, or services.

Table 7.3: Innovation impacts achieved to date or expected in the future

Wider business impact	Achieved to date	Expected in the future
Increased investment in R&D activities	7	9
Improved existing business products/processes/services	7	12
Developed new products/services/processes	6	11
Secured new Intellectual Property (IP)	3	11
More likely to engage with the university on other projects	9	8

Source: ekosgen beneficiaries survey, 2021 and 2023, N=20

When asked if the project had helped to overcome any barriers to innovation, 36% stated 'very much so' and 41% said the project had supported a significant improvement in their business approach to innovation. Advances in progressing products to the launch stage were also identified, with 35% of respondents having launched their product to date compared to 10% when first engaged with the project.

A greater awareness of and appetite for innovation was also evident in the open responses provided by beneficiaries and the academic team have supported wider introductions where they can support further innovation.

"Added expertise and access to R&D" – beneficiary

"[The biggest impact of the project has been] improving the product, business and engagement with potential clients." – beneficiary

"Access to knowledge and now looking for further research opportunity with the University." – beneficiary

Evidence of longer-term benefits

As part of the final summative assessment stage, beneficiaries who had already been engaged by the project at the time of completing the interim summative assessment were invited to complete a follow up survey. The intention was to explore longer-term benefits arising from involvement in the project, recognising the lag in many benefits being realised.

According to the respondents of the follow-up survey[11], all the economic, environmental, innovation and wider benefits mentioned above remain in the long-term although with different levels of importance. Economic benefits seem to dilute over time for some beneficiaries, with only 50% of them reporting at least one economic benefit compared to 90% in the case of newer beneficiaries. As the status of innovations explored through the project is unknown, this may reflect where products still remain to reach the market.

In contrast, environmental benefits seem stronger in the long-run as all respondents confirm that the project has contributed to a reduction in carbon emissions, with 43% of them finding this impact already evident and the rest yet to be seen. A greater clarity and drive for low carbon business ambitions is also considered as a benefit of the project for all the respondents of the follow-up survey.

The support to innovation also appears to be more relevant in the long-term, with 71% of respondents reporting that the project helped to overcome barriers to innovation and half considering that their approach to innovation improved since receiving the support. Innovation benefits such as improvements to existing products, processes, or services and an appetite to continue to engage with the university are reported by all the beneficiaries as well.

"Awareness of some innovatory approaches" – beneficiary

"Endorsement of product as working with Uni of Salford adds credibility" – beneficiary

"Seeing relevant technologies implemented and operating at a domestic scale" – beneficiary

"Modern innovation" – beneficiary

A Strong Project Profile

While Energy House 2.0 was always anticipated to attract strong interest in its intended marketplace, delivery of the project has resulted in very high levels of interest across a spectrum of organisations, particularly since the facility became operational. This has materialised in a series of ways, as outlined below. While these are largely unintended benefits, they are significant and have the potential to support the project to continue to thrive in the future.

Strong media attention

Energy House 2.0 has been embraced by a series of local and national news outlets, allowing the work of the team and capabilities of the facility to be shared and general awareness of the low carbon and

[11] It should be noted that findings are based on responses from a limited sample

net zero agenda to be raised. Media coverage peaked as the facility became operational and it has been possible to demonstrate the testing conditions that it can create, with particular interest in snow. Examples include appearances on:

- BBC Breakfast – two x ten minute slots on 12th January 2023 broadcast from the facility;
- BBC News – including coverage on BBC 1, BBC News 24 and BBC World;
- Morning Live – a feature on 27th February;
- Rip off Britain – a feature on 3rd February; and
- ITV News – as part of the News at Ten on 12th January.

Articles have also featured in The Guardian, The Sunday Mirror and The Daily Mail.

In addition, international interest has been secured including from CBS, Al Jazeera, Reuters and Agence France-Presse. It is estimated that coverage has reached over one billion people worldwide with the team recording over 400 instances of the project being referenced across all sources to date and coverage being predominantly positive with other cases being neutral. As a member of the team commented: *"It has been a juggernaut…from a press and impact side I don't think it could have gone any better."*

Although not a direct requirement of the ERDF project, the publicity secured (with references made to the ERDF funding contribution and the ERDF logo showing prominently in news coverage) has served to raise the profile of the facility, university and sub-region within the research field. Retaining interest as research findings begin to emerge will present the next challenge for the team.

Although on the whole a positive, the time pressures placed on the team by media interest have been considerable and have required management to ensure the project continues to deliver to its targets and that the focus on research is retained. This has been achieved by halting further tours of the facility until the ERDF project concludes so ensure a focus on research and testing.

Political interest

The project has attracted interest from across the political spectrum with local, national and international visits including:

- Chris Skidmore MP from the All-Party Parliamentary Group for the Environment.
- A joint visit by Ed Miliband MP, Shadow Secretary of State for Climate Change and Net Zero, Rebecca Long-Bailey, MP for Salford and Eccles, Andy Burnham, Mayor of Greater Manchester, and Paul Dennett, City Mayor of Salford.
- The German Ambassador Miguel Berger, invited by Andy Burnham, as part of a wider programme to build bi-lateral relationships to boost trade and research and innovation collaborations.

Such visits show the interest in the low carbon and energy efficiency agenda and in turn would be expected to attract further interest in and knowledge of the facility and research and testing opportunities available.

Securing early awards

The innovative nature of the facility has also been recognised across a series of built environment and knowledge exchange bodies. Energy House 2.0 has already secured a series of awards, including:

- Manchester Sub-Regional Project of the Year and Project of the Year - Building at the North West Regional Construction Awards 2022;
- The Greater Manchester Chamber of Commerce Building of the Year award 2022; and
- Net Zero Project of the Year at the annual PraxisAuril Knowledge Exchange Awards.

Wider nominations include Building Project of the Year at the National Constructing Excellence Awards and three nominations at the inaugural UK Green Business Awards 2023 under the Green Building, Green Heat and Renewable Energy Project of the Year categories. While not a requirement of ERDF support, the awards acknowledge the important and distinct research and testing role that Energy House 2.0 is playing and the value that others have attached to it. As research begins to be produced from the facility, there is scope for the number and variety of awards to continue to increase.

Added Value and Evidence of Demand

A strategically aligned asset

Energy House 2.0 has been developed as part of a growing cluster of climate change and energy research assets within Salford and Greater Manchester more widely. The University of Salford is playing a key role within the sub-region, with the Energy House 2.0 facility sitting alongside:

- The original Energy House
- Smart Meters>Smart Homes Laboratory
- Thermal Measurement Laboratory
- The Barratt House of the Future
- IGNITION Living Lab

This position is supporting the project to generate added value – in its own right and by association – and is allowing Greater Manchester to build its reputation for low carbon expertise on a national and international stage at a time when this is a subject area of growing public and business interest. As consultees consulted during the interim Summative Assessment stage commented:

> *"The University of Salford has a unique opportunity to be at the forefront and in a leadership position* [to address climate change]."
>
> *"We have the opportunity to be the leading university – it* [Energy House 2.0] *is world class."*
>
> *"We have a name nationally."*
>
> *"It* [Energy House 2.0] *is globally recognised"*

Adding value to the existing facility and support offer

The ERDF application and appraisal process raised questions about how Energy House 2.0 would add value to existing infrastructure. As the facility has been completed and become operational, it has been further emphasised how it adds value to the wider facility offer and enables research to be delivered that would not be possible elsewhere. Examples include:

- The extremes of testing conditions offered that recognise the impacts of climate change as well as the global markets for products;
- The ability to test products in modern house types;

- Attracting two major house builders to work together and explore opportunities for new technologies to be tested and subsequently commonly applied in new build homes;
- Facilitating major house builders and SMEs to work collaboratively – a scenario that SMEs would find incredibly difficult to achieve unsupported and that is also generating benefits for the house builders. A number of SMEs have also secured positive press coverage for their products, generating greater awareness and business opportunities (for example DiscreteHeat who have worked with Barratt Developments to test their ThermaSkirt product, a skirting board heating system); and
- The offer of a 'cleared site' option that in future will accommodate wider housing types (e.g. Vector Homes have committed to build a bungalow in Chamber 2 to support the testing of graphene panels) and potentially infrastructure (in response to market interest) rather than solely building test conditions.

In these ways, the project has added value.

Supporting advances in the house building sector

Looking ahead, the research findings of the projects with Bellway Homes (Future Home) and Barratt Developments and Saint Gobain (eHome2), have the potential to deliver a significant impact on the house building sector and its supply chains. This includes potential to inform the design, construction and management of net zero homes that will meet (or exceed) the Future Homes standard. For example, Bellway Homes have cited plans to build around 15,000 homes to a similar standard to Future Home in Energy House 2.0 by 2026/27. Many of the technologies being tested on-site are anticipated to be in common use by 2026 with testing providing the opportunity for products to potentially be applied ahead of this date.

"There is no comparison in the field to Energy House 2.0" – beneficiary

"There will be a lot of learning around the best mix of technologies and best way of delivering in terms of the capital investment, embodied carbon, energy systems and usage delivering future savings" – beneficiary

"The findings will have an implication on regulations… the two housebuilders are key active members in future homes hub advising on delivering future sustainable housing models" – beneficiary

"The findings will influence building level thinking rather than individual technologies really driving a different way of thinking and model of construction" – beneficiary

"It has been good for the house builders and good for the SMEs as well" – project team

Delivering wider benefits

Evidence of wider benefits secured for project partners and Greater Manchester overall include:

- Creating ***new partnerships*** – during the latter part of the project the most significant achievements have been Bellway Homes and Barratt Developments working together – an unusual situation for two companies that are typically in competition – and providing opportunities for SMEs to establish relationships with major house builders to mutual benefit. As one member of the team commented: *"house builders met SMEs they wouldn't otherwise have met and they love their products".*
- The ability for Salford and Greater Manchester a whole to raise its ***profile in the low carbon and climate change fields***, both nationally and internationally to attract businesses, investment, and research opportunities to the sub-region. The publicity that Energy House 2.0 has secured locally, nationally and internationally since opening has been considerable, exceeding expectations.
- The university benefiting from:

- Continuing to ***build its profile*** in an increasingly pertinent and recognised area of expertise, locally, nationally and internationally;
- Establishing a ***growing network of SME contacts and links to major house builders*** who provide scope for ongoing research and collaboration;
- Offering potential for ***longer term research collaborations*** to form beyond the scope of the ERDF project that will allow new income streams to be accessed and expertise to build. For example, Vector Homes – a C1 beneficiary – has committed to using Chamber 2 to complete further testing;
- Identifying opportunities for the Energy House 2.0 facility to ***bring together expertise across departments*** and ***attract new staff members to the institution***, based on the strength of research assets and opportunities; and
- Providing ***lessons for the planning and delivery of future capital developments*** to reduce the level of risk.

Evidence of demand

Strong business demand has been identified for the facility and its associated support services. This is evidenced by the project exceeding its target for C1 assists, advancing research collaborations in excess of targets and high levels of interest in the facility tours. Evidence of demand for ongoing support is also building. Since the January launch, the team has received approximately 50 enquiries from businesses (within the UK and overseas) who wish to work with them and the team is engaged in 30 active conversations for support beyond the ERDF project. As awareness of the facility and the support it can offer to businesses continues to build, this figure is expected to grow.

8 Value for Money

Introduction

An assessment at this stage in the project is likely to underestimate the overall impact of the project which is expected to continue to build beyond the project's monitoring period. This reflects that testing is still underway for a number of products and for a number of those where testing has completed, products are yet to reach the market.

The ERDF output indicators and monitoring data does not capture the full scope and scale of benefits which the project is likely to deliver such as the benefits highlighted by the beneficiary survey. A full value for money assessment should also include indicators which capture economic and environmental impacts which have not required monitoring as a condition of funding.

Quantified Impacts

Carbon savings

By project closure the team expect to have claimed a reduction in GHG emissions of 3,828 tons. Using the value per tons of CO_2 of £252, as per the Green Book supplementary guidance on the valuation of energy use and greenhouse gas emissions for appraisal Central Scenario value for 2023, suggests a gross value of almost £1m.

These figures are likely to underestimate the future impacts of the project on carbon savings through the work with beneficiaries and research findings. The survey with beneficiaries suggested 6,283 tons of carbon emissions savings per annum supported across one business[12]. As set out in Section 7, most beneficiaries surveyed also suggested that in the future they expect a reduction in carbon emissions. Roll out of products within the plans of Bellway Homes and Barratt Developments could significantly increase this figure.

Wider Impacts

Although the ability to identify quantified impacts remains limited, survey work completed with beneficiaries shows that[13]:

- 15 products/processes/systems have been developed to date across ten businesses;
- 37 full time equivalent new jobs have been created across five businesses;
- 52 full time equivalent jobs have been safeguarded across five businesses; and
- Additional sales of £24.7m have been supported across four businesses[14].

These figures are expected to continue to increase, as products tested within the facility progress to market.

Although not a direct target for the ERDF project, the figures above are considerable achievements.

Additionality

Survey results show that, out of 21 respondents, four (19%) believe benefits would not have occurred at all in the absence of support and nine (43%) believe that benefits would have been realised on a smaller scale and/or over a longer timescale. This suggests a relatively high level of additionality.

Consultation with the developer Saint Gobain, who are collaborating with the project, highlight the added value of the project:

[12] It should be noted that this figure has not been verified and may not translate into an ERDF claim, once the project team has investigated the basis of the claim

[13] The figures stated have not been verified

[14] With £24m of additional sales reported by one business

"There is no comparison in the field to Energy House 2.0" – Beneficiary

"There are a number of technologies which can't be tested on an active site" – Beneficiary

"Without Energy House 2.0 any research is hugely elongated. In the nine months in the chamber we will be covering three times amount of research a three year project in the field would" – Beneficiary

Direct jobs supported

Across the duration of the project, a series of jobs have been funded by ERDF (in full or part) to deliver the Energy House 2.0 project. Considering the duration of the ERDF funded posts, from the project inception up until project closure at the end of June 2023, 21.3 FTE job years will have been directly supported.

The gross and net impacts of the Energy House 2.0 project in terms of the direct funded project posts are as follows:

Table 8.1: Gross and net additional impact of Energy House 2.0

		Impact Area: Greater Manchester	
		Measure	**Adjustment**
Impact Indicator: Employment Unit = Full time equivalent posts	Gross impact	21.3[15]	n/a – number of direct FTE years funded by the project
	Deadweight/reference case	16.0	25% - given the posts are directly funded by the project a low level of deadweight has been applied
	Displacement/substitution	12.9	19.5% - an element of the Energy House 2.0 funding may have been committed to other support
	Leakage	10.1	21.1% - based on the project staff who are based outside the GM area
	Net additional	**10.1**	
Impact Indicator: GVA Unit = £m	Gross impact	1.6	n/a – per annum contribution, applying the GVA per FTE for the whole economy £75,000 in GM
	Deadweight/reference case	1.2	See above
	Displacement/substitution	1.0	See above
	Leakage	0.8	See above
	Net additional	**0.8**	

Source: ekosgen analysis based on Project Management Information

Costs per Output

By project closure in June 2023, the project's total revenue (ERDF and match funding) unit cost per assist (based on C1 achievements) is expected to be £9,632 per enterprise receiving support. This is lower than the typical cost per assist benchmarks ekosgen has identified through recent summative assessments of other ERDF funded innovation support schemes elsewhere in the North West of England.

[15] This figure is the number full time equivalent (FTE) job years directly funded by the project, using project management information which details the precise dates when each staff member was funded by the project and what proportion of an FTE post was supported. For example, a full time post supported for 2 years would be 2 FTE years or a 0.75 FTE post funded for 2 years would be 1.5 FTE years.

Value for Money

The project continues to be delivered within the ERDF allocation identified at its outset. The team also remain confident that contracted output and outcome targets will be satisfied or exceeded suggesting that Energy House 2.0 will deliver value for money in line with or above expectations at the project's outset.

True value for money will become more evident as impacts start to emerge from Energy House 2.0's activities. It remains too early to assess this – recognising the widely acknowledged lag between innovation activities being delivered and impacts being realised – but the early indications acknowledged in this report are positive and the University of Salford's commitment to continue to use Energy House 2.0 in line with the purpose outlined in the ERDF funding agreement will allow benefits to continue to grow over time as more businesses secure access to the facility and on-site expertise.

9 Conclusions and Lessons Learnt

Conclusions

A strategically important project

Energy House 2.0 was well-aligned with strategic drivers at the time of its development. Changes in the delivery context and the continued evolution of strategy have continued to strengthen its relevance over time. Over the past year, concerns around the certainty of energy supply, costs and ongoing climate change have risen in public opinion because of world events. Energy efficiency and the ability to reduce emissions is now a pertinent subject area with strong prominence within the business community and amongst households, providing a marketplace for testing and the implementation of new products.

The final facility is unique and has an important role to play in driving forward low carbon and net zero advances. It has secured the interest of major house builders and SMEs (as well as media and academia) and presents a distinct opportunity to accelerate the advancement of new products towards market and into properties on scale, potentially ahead of Future Homes Standard requirements.

A dedicated team delivering strong results

The core academic project team had a clear vision for the facility from the start and have been hands-on during the delivery of the project and now in its operation. This has played a central role in ensuring that the vision has been realised and how the facility will continue to operate post-ERDF funding.

The project has not been without its challenges but the team has effectively adapted to ensure it has been delivered in line with the ERDF approval, in terms of the facility developed, ensuring businesses have been engaged and targets have been satisfied. With all indicator targets forecast to be satisfied or exceeded, the project has performed well, particularly given wider circumstances.

An effective delivery model

The team has been flexible to respond to changing delivery circumstances. Changes to the capital specification were effectively managed with no apparent implications for the function of the building as a research and testing facility. The support offer has also evolved over time, meeting a range of support requirements. Although not all recommendations identified through the interim summative assessment have been applied in full, the project team has effectively managed activity.

Although the facility completed relatively late in the project's lifetime (reflecting the restrictions presented by ERDF funding), a series of activities have been completed on-site that would not otherwise have been possible. The engagement of two major house builders has been a significant development to engage SME supply chains and understand how products may progress into mainstream applications. Impacts are already evident – including economic, environmental and organisational – and are anticipated to continue to be realised over years to come. Added value has been generated.

A well-received offer

Energy House 2.0 has been well-received by businesses accessing support throughout the project's lifetime. Strong demand has been evident and a range of support offers have proved popular, responding to varied business needs. Satisfaction with the project team has been very high and the majority of businesses recognise the unique support offer provided by the project. Survey results show that business benefits are already evident and are expected to grow over time.

Boosting a specialism

The University of Salford already had a strong portfolio of facilities and research expertise in the field of energy and low carbon research at the time the Energy House 2.0 project launched. The project has undoubtedly added to the specialism, providing a unique research and testing facility that can accommodate diverse requirements that previous facilities – both within the university and beyond – could not. The considerable financial contribution made by the university (both within and outside the ERDF project scope) demonstrates the importance they have placed on the development.

Strong media interest has also played a role in ensuring that the University of Salford is recognised as a leading centre for energy research with local, national and international interest secured as a result that offers potential for wider benefits to be unlocked in the future. Establishing a clear plan (supported by Innovate UK funding) to continue operation of the facility and business engagement beyond ERDF has been an important achievement since the interim assessment was completed.

Achievements against objectives

A series of objectives were established for the project at its outset, as outlined below. Many reflect longer term ambitions for the site that will continue to build over time with use of the building still in its relative infancy. The summative assessment team's view of the position at present is summarised against each project objectives below with strong progress evident.

Project Objective	Status
Develop a world-leading new site which provides facilities to test building performance issues, such as energy, acoustics, data analysis, smart homes, materials and wellbeing.	***Achieved*** – unique testing facility completed in line with the intended technical specification. Early work underway to explore a range of building performance issues and international interest secured.
Build on the success of Energy House, allow multiple building types to be tested, enhancing capabilities for whole building testing and increasing the research questions which can be answered at the site.	***Achieved*** – new building types introduced and testing underway to answer diverse research questions. Commitment in place for a further housing type to be introduced on site and clear fit within the wider Energy House Laboratories portfolio of facilities established.
Contribute to house and building performance in the UK and internationally through greater understanding of building and material performance and whole building systems.	***Underway*** – testing now underway to achieve this objective with a longer period required to allow for achievement in full. Engagement of two major house builders suggests that building performance will alter as a result.
Generate environmental and economic benefits by supporting the advancement of new products and services to market within the building performance sector.	***Underway*** – evidence of early benefits emerging with a longer timescale required to allow the objective to be achieved in full.
Form part of the University of Salford's Industrial Collaboration Zone (ICZ), contributing to the ICZ aim of providing space for industry and academia to collaborate through enterprise, and research.	***Achieved*** – facility being used to support collaboration between industry and academia with a longer-term programme of activity now confirmed to allow this to continue beyond ERDF funding.
Contribute to university priorities around sustainability, in particular the university's Sustainability Strategy and supporting the decarbonisation of the campus.	***Future potential*** – Energy House 2.0 itself is not zero carbon, due to its energy demands. Research to be conducted within the facility does however present potential for lessons to be applied across the campus in the longer term.
Help to maintain the UK's competitive advantage in the field of whole building performance testing and respond to the increasing demand for these services.	***Achieved*** – completion of the unique whole building performance facility and its successful launch has maintained the UK's competitive position with evidence of strong demand to use the facility already in place and expected to continue to grow.
Contribute to local and national agendas, including supporting the growth and competitiveness of the UK economy as set out in the recent 'Industrial Strategy' and GMCA's ambitions to place Greater Manchester at the leading edge of science and technology, support business growth and improve international competitiveness.	***Underway*** – strong strategic fit evident and work underway to allow practical steps to be taken to meet this objective. Longer assessment period required to capture the achievement. Outside the direct project scope, academics are also informing the Retrofit Taskforce and net zero groups for new build development at the Greater Manchester level.

Lessons Learnt

Lessons for the University of Salford and others developing similar projects

The primary lessons arising for the university and other project sponsors are:

Strong project ownership is key: Energy House 2.0 has benefited from strong academic support from its outset and throughout, ensuring that emerging plans were supported and compatible with wider ambitions and activities. This has been important to the project's delivery and ongoing operations, as well as securing internal support to fund cost over-runs.

Projects need to retain flexibility to respond to the delivery context: The last four years have provided an unprecedented delivery context but have demonstrated the importance of retaining flexibility. Although the project has not been delivered exactly as anticipated in the ERDF application form, the team has ensured that new approaches have been applied that continue to deliver against the project's objectives and were appropriate to the circumstances facing them and businesses at that time.

A range of business engagement approaches are often required: Project teams need to recognise where engagement approaches are proving effective or not and whether they are securing the nature of interest anticipated. Adapting approaches, or adding to the approaches being taken, is often necessary, learning from experience as projects progress.

Business needs are diverse: A one size fits all support offer is rarely appropriate and there is a need to identify what will be most effective in each case – both to meet business needs and project objectives. Finding a way to identify and prioritise those beneficiaries that have the recognised potential to deliver wider benefits ensures that resources can be effectively targeted (in the case of ERDF to progress from a C1 to C26 assist and offer the potential to unlock C29 and C34 benefits).

Having a clear vision from the outset reaps benefits: Having a widely agreed scope for the delivery of activity and what it is intended to achieve brings benefits. When the project has had to adapt to budget pressures and an evolving delivery context, clarity has remained regarding the project's priorities, ensuring that delivery remained on track.

Succession planning requires attention from a relatively early stage: Funded project timescales are relatively short and where capital facilities are created it is particularly important to have a succession plan. Early consideration needs to be given to this, to establish support within the project sponsor organisation and, where necessary, explore the scope to secure further external resources. The University of Salford team has worked effectively in this respect.

Lessons for policy makers

The main lessons arising for policy makers are:

Project timescales should recognise capital innovation facility build programmes: Delivering capital and revenue activities in tandem undoubtedly generates benefits to ensure that facilities are used for their intended purposes and businesses (including SMEs) secure access to facilities and expertise that would not otherwise be available. The tight project timescales imposed by ERDF presented a barrier in this respect with value to be gained from successor programmes exploring support periods that are appropriate for different project types.

Flexibility is needed when unprecedented situations arise: Some issues are outside applicants' control and require a flexible programme management approach to ensure that projects are not penalised when unprecedented situations arise.

Successor programmes are needed to build on the success of ERDF: Demand for projects such as Energy House 2.0 remains high with many SMEs continuing to face multiple barriers to innovating if left unsupported.

The ability to support a cross-section of businesses can be beneficial: The ERDF programme required projects to focus on supporting businesses within their target geography and SMEs. The ability to broaden the beneficiary pool could generate benefits, particularly in innovative fields such as those applicable to Energy House 2.0, to secure the full value from projects.

A wider set of indicators would allow many projects' achievements to be captured more effectively: ERDF indicators have provided a consistent approach to capturing achievements across a variety of project types with limited flex to adapt them to satisfy the objectives of individual projects. A wider suite of indicators (including to allow for the capture of economic, environmental and social considerations) would allow a more accurate assessment of project outputs, outcomes and impacts to be captured under future funding streams. Consideration of distance travelled would also be worthy of consideration where there is an anticipated lag between the completion of supported activities and ultimate benefits.