Llywodraeth Cymru
Welsh Government

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Research commissioned by Welsh Government

The Welsh culture sector and the climate and nature emergencies

An evidence base of the culture sector's attitudes and approaches to the climate and nature emergencies, with recommendations for next steps.

This research was produced for the Welsh Government by Regen, Energy Saving Trust and Carbon Trust.

Regen

Regen provides independent, evidence-led insight and advice in support of our mission to transform the UK's energy system for a net zero future. We focus on analysing the systemic challenges of decarbonising power, heat and transport. We know that a transformation of this scale will require engaging the whole of society in a just transition.

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The Carbon Trust

The Carbon Trust is a global climate consultancy driven by the mission to accelerate the move to a decarbonised future. The Carbon Trust partners with businesses, governments and financial institutions to drive positive climate action.

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Front cover image:
Dragon Queen Belrenin sculpture. Now on display at TimeScape Rhayader/Amserwedd Rhaeadr Gwy
Image credit: Ruth Rees Photography, artist: Richard Taylor

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Executive summary

The Welsh Government's declaration of a climate emergency in April 2019 acknowledged the need to urgently address climate change and signalled a direction of travel for Wales. Whilst tangible progress towards targets has been made, there remains a pressing need to accelerate action and to ensure everyone is brought along on this journey.

The Welsh culture sector has emerged as a focal point for public engagement with the climate and nature crisis, possessing the power to inspire, educate and mobilise communities towards environmental stewardship and sustainability.

The research findings reinforce the messaging of the Climate Action Wales: Public engagement strategy 2023 to 2026[1], which suggests culture has a specific role to play in leading by example and can "inspire others to act by exemplifying green behaviours... acting with openness, honesty and integrity".

The culture sector in Wales recognises its dual responsibility: to mitigate its own carbon emissions and adapt to climate change whilst also leveraging its unique capacity to engage wider society in climate and nature action. However, most organisations are still in the early stages of this journey, facing challenges in aligning significant activity with limited budgets and resources.

This commission gathered evidence from December 2023 to April 2024 on culture sector organisations' internal capabilities and external contributions to addressing the climate and nature emergencies. A separate commission by the Welsh Government – the Review of the Culture Sector Evidence Base in Wales - found that "the availability of data ... concerning the environmental impact of organisations in the five culture subsectors[2] and their commitment to decarbonisation is extremely limited".

Primary data collection methods for this report included steering group consultations, a survey, online focus groups and interviews for case studies. In addition, stakeholder and buildings databases were compiled and our research partner, Energy Savings Trust, used available energy performance certificates to estimate indicative emissions and future-proofing costs. The Carbon Trust provided research oversight.

Through stakeholder engagement and the synthesis of research, this report aims to catalyse momentum towards a net zero Wales. It acknowledges that climate and nature actions encompass a wide range of activities, including climate adaptation, biodiversity conservation, circular economy practices and just transition initiatives. It provides evidence-based recommendations on how the culture sector in Wales could play a meaningful role in addressing the climate and nature emergencies, contributing to broader societal efforts.

[1] Climate Action Wales: Public engagement strategy 2023 to 2026 "sets out a framework for the Welsh Government and its partners to work together to support and engage the people and communities of Wales in action on the climate and nature emergencies. In presenting the evidence, it conveys the importance of ensuring that fairness is embedded in the approach for the people of Wales and future generations."
[2] Organisations as defined in section 1.3.1, including museums, archives, arts, libraries, and historic and heritage sites.

Summary of findings and recommendations:

(See also 5.2 Recommendations and action plan, p. 45)

Recommendation 1: The Welsh Government and culture sector stakeholders should foster an autonomous sectoral peer network to focus on climate and nature in the culture sector in Wales.

- Resources to drive action on climate and nature in the culture sector are limited. Intrinsic motivations currently drive action, and the passion and dedication of the workforce and volunteers are a clear strength for future capability. However, over-reliance on individuals could lead to inconsistency and/or burnout.
- There are some tools and initiatives in the UK to support sector collaboration, but they lack coordination and centralisation, with a need for a dedicated resource in Wales and better Welsh language provision.
- A formal structure would enhance innovation, improve knowledge sharing, and empower less advanced organisations to take action by connecting them to a broader community focused on climate and nature goals.

Recommendation 2: The Welsh Government should develop its understanding of the culture sector infrastructure in Wales and work with sector stakeholders to ensure assets in the sector are both resilient to climate change impacts and able to lessen their impact on the climate.

- Future-proofing culture sector buildings poses a significant challenge, with most relying on fossil fuels. Moreover, a lack of good building data across the sector is hindering informed action. Only 15% of buildings within scope have an energy performance certificate.
- Retrofitting will require a whole-building approach. There is a need for comprehensive assessments and to empower decision-makers to find the right balance between mitigation and adaptation whilst minimising impact on the significance of buildings. Sector-wide, illustrative retrofit costs are estimated at £100 million. Note this estimate relies on broad brush assumptions and extrapolates based on limited available data.[3]
- The culture sector should consider investing in, and building a sustainable, robust digital infrastructure alongside the physical infrastructure, and strengthening the foundations of our digital services, in line with the ambitions of the Digital Strategy for Wales.

Recommendation 3: Culture sector organisations are supported to develop environmental policies and climate action plans[4]. The Welsh Government and sector stakeholders should work together to consolidate action across the culture sector and achieve improved momentum.

- Whilst culture sector stakeholders feel the urgency of the climate and nature emergencies and consider action as an ongoing priority, few organisations have comprehensive policies in place. Common areas of current focus include employee transport and waste management, and there is growing interest in concepts such as just transition[5] and climate adaptation[6].

[3] See appendix A which provides the detail on the buildings stock analysis.
[4] "Environmental policy is a statement of values, principles and commitment to positive environmental change" and an "action plan lays out how you will put these into practice… outlin[ing] the roadmap for making tangible change(s)." [25]
[5] Globally the world is decarbonising from a from a fossil fuelled economy. Delivering a just transition will mean, as we move to a cleaner, stronger, fairer Wales, no one is left behind or penalised.
[6] The process of adjusting to both the current and expected impacts of climate change to reduce harm to people and the environment, including biodiversity.

- Strategic approaches to enhance resources and skills on climate and nature are limited, with dedicated staff resources uncommon. Many stakeholders have set net-zero targets for 2030, but there is no culture-specific framework/guidance for tracking emissions.

Recommendation 4: The culture sector should continue to embrace its role as a 'cultural changemaker' and strengthen it further. Collaborative and cohesive approaches are needed to strengthen messaging and facilitate meaningful climate and nature conversations.

- Stakeholders have a deep understanding of their responsibility and power to meaningfully engage the wider public, recognising their ability to meet communities 'where they are', especially in rural communities.
- Engagement efforts already extend beyond green choices to address issues such as eco-anxiety. Culture sector practitioners are already leveraging creative methods to inspire and engage the public.

Recommendation 5: The Welsh Government should ensure the culture sector is represented within climate and nature policy-making.

- Those working in the culture sector have expressed a clear aspiration to embrace collective principles and goals, drawing inspiration from the framework outlined in the Well-being of Future Generations Act (2015). This legislation emphasises the importance of holistic engagement, mandating that listed public bodies work towards achieving all specified goals.
- Despite this imperative, those in the culture sector feel under-represented in policy discussions, limiting their ability to influence policy formulation effectively. There is a need for greater inclusion of cultural perspectives to ensure policies are comprehensive, inclusive and aligned with the sector's unique needs and challenges.

The evidence gathered highlights the culture sector is already playing a pivotal role in shaping societal attitudes towards environmental challenges. In particular, the sector is in a prime place to grapple with the present and local nature of climate change issues and facilitate much-needed experiential engagement.

Glossary

Term	Definition
Biodiversity	Biodiversity is the variety of plant and animal life in the world or in a particular habitat, a high level of which is usually considered to be important and desirable.
Carbon offsetting	Compensating for carbon dioxide emissions, by participating in schemes designed to make equivalent reductions of carbon dioxide in the atmosphere.
Culture sector	The culture sector in Wales comprises a diverse range of individuals and institutions. To facilitate meaningful analysis, this work focused on specific organisations chosen because they represent key stakeholders who work closely with the Welsh Government on the delivery of relevant policy. See 1.3.1 Stakeholder scope, p.7.
Circular economy	A circular economy aims to maintain the value of products, materials and resources for as long as possible by returning them to the production cycle at the end of their use while minimising the generation of waste.
Climate adaptation	The process of adjusting to both the current and expected impacts of climate change to reduce harm to people and the environment, including biodiversity. This also includes changing people's behaviour towards a greener way of living and working.
Climate and nature emergencies	The climate emergency refers to the urgent action required to reduce or halt climate change and avoid irreversible environmental damage resulting from it. Nature emergency refers to the urgent action required to reduce or halt biodiversity loss caused by humans. The climate and nature emergencies are inextricably linked, meaning that they are so closely connected that one cannot be addressed without considering the other.
Climate resilience	Climate resilience is the ability to anticipate, prepare for, and respond to events, trends, or disturbances related to climate change. Resilience includes adaptation and mitigation.
Decarbonisation/ climate mitigation	Decarbonisation, also known as climate mitigation, is about reducing CO2eq emissions resulting from human activity, with the eventual goal of eliminating them to avert climate change.
Green choices	Green choices are the choices we can make in our everyday lives to tackle climate change from our home energy, to transport, food and consumption behaviours.
Just transition and climate justice	Globally, the world is decarbonising from a fossil-fuelled economy. Delivering a just transition will mean, as we move to a cleaner, stronger, fairer Wales, no one is left behind or penalised.

Marginalised groups	Those excluded from mainstream social, economic, cultural, or political life due to factors such as race, religion, political or cultural group, age, gender, or financial status.
Net zero	The IPCC defines net zero as: When anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period.
Net zero Wales	The Environment (Wales) Act 2016 requires the Welsh Government to reduce emissions of greenhouse gases in Wales to net zero by the year 2050.
Procedural justice	Justice in how engagement occurs, policies are designed, and decisions are made. It is about who is involved and the way they are involved.
Scope 1, 2, and 3 emissions	A framework for categorising organisational emissions by source type, defined as: Scope 1 – Direct emissions from owned or controlled sources (e.g. company-owned vehicles, natural gas boilers). Scope 2 – Indirect emissions from the generation of purchased electricity, steam, heating and cooling consumed by the reporting entity. Scope 3 – All other indirect emissions that occur in an organisation's value chain (e.g. purchased goods and services, travel using vehicles not owned by the organisation and waste).

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Section 1

Setting the scene

1.1. Section introduction

The Welsh Government's declaration of a climate emergency in April 2019 acknowledged the need to urgently address climate change and signalled a direction of travel for Wales. Tangible progress towards targets has been made, but there remains a pressing need to accelerate action [1] – and it is imperative everyone is brought along on this journey.

Culture, and access to it, shapes societal relationships with nature and people. In Wales, the culture sector has emerged as a focal point for public engagement with the climate and nature crisis, possessing the power to inspire, educate and mobilise communities towards environmental stewardship and sustainability. Cultural organisations, from large institutions to grassroots initiatives, are increasingly embracing sustainability actions.

The foundation of sustainable development in Wales, as defined by the Well-being of Future Generations Act (2015), encapsulates the holistic improvement of economic, social, environmental and cultural wellbeing. This legislation acknowledges the interconnection of culture and climate, positing they bear a mutual responsibility towards one another.

This report draws together insights from across the culture sector in Wales to explore levels of awareness, ambition and action around the climate and nature emergencies. It recognises climate and nature action as a broad umbrella term, which covers mitigation, adaptation, biodiversity and nature, circular economy, and just transition challenges. It also considers the diversity of the sector, which may influence how different organisations currently engage. This includes being mindful of multiple subsectors with different funding and governance structures and of the diverse composition of organisations in terms of employees, freelancers and volunteers.

Through the research conducted, including stakeholder engagement, this report aims to build momentum for progress towards a net zero Wales and develop evidence and recommendations for how the culture sector could support action on the climate and nature emergencies.

1.2. The policy context

The Welsh Government Review of the Culture Sector Evidence Base in Wales Phase 1 report (2023) found that "the availability of data within the sources reviewed concerning the environmental impact of organisations in the five culture subsectors and their commitment to decarbonisation is extremely limited". [2]

The Climate Action Wales – Public Engagement Strategy 2023 to 2026 states that "the social transformation towards a greener way of living will need cultural transformation. The creative, arts and culture sectors will play an important role". Our research findings reinforce the messaging of this strategy, outlining that culture has a specific role in leading by example to "inspire others to act by exemplifying green behaviours... acting with openness, honesty and integrity".

Additionally, recognising the breadth of activity encompassed by climate and nature action, this research sits against a backdrop of other key policies, plans and strategies, including:

- Net Zero Wales
- Net Zero Skills Action Plan
- Beyond Recycling
- Transport Strategy
- Heat Strategy for Wales
- Just Transition Framework
- Climate Resilience Strategy

1.2.1. Policy driving decarbonisation

The journey to Net Zero Wales by 2050 is delineated by a series of legislated five-yearly carbon budgets and decadal interim targets. Wales has so far achieved its First Carbon Budget target and interim 2020 target. These emissions reductions came largely from power and industry, most notably from the closure of Aberthaw coal power station in 2019. However, the Climate Change Committee has instructed that stronger policy is needed to meet targets for the latter half of this decade and beyond.

The ongoing decarbonisation of electricity is laying the foundation for the rest of the Welsh economy to decarbonise. The Welsh Government has set a target for Wales to meet the equivalent of 70% of its annual electricity consumption from Welsh renewable electricity generation by 2030, [3] and the UK Government has a clean power by 2030 mission - double onshore wind, triple solar power, and quadruple offshore wind. [4] The devolved and UK Governments need to work together to deliver strong policies to achieve this, such as planning and consents for new renewable generation.

Whilst this task is by no means complete, there is now increasing pressure to focus on the electrification of heat and transport. One policy priority of particular note to the culture sector's activities is the need for "long-term plans to decarbonise public buildings". [1]

Recent policy commitments which directly impact parts of the culture sector in Wales have come from the Net Zero Strategic Plan (2022) and the Heat Strategy for Wales (2024). These include:

- Optimising operational performance across the heritage estate
- Embracing collaboration with other heritage and partner associations
- Establishing Cadw as a heritage low-carbon leader and drive wider change
- Using Net Zero reporting to track public sector building performance
- Communicating success and sharing learning across public bodies and to wider sectors
- Collaborating to drive decarbonisation regionally and locally through Regional and Local Area Energy Planning – public bodies will be central to driving change in Wales

- Build local supply chains, grow skills and realise social value through the public sector transition to low carbon heat – through implementing public sector procurement policy.

Whilst these policies set an important context for delivering net zero and climate and nature action in Wales, there is limited understanding of how the policy framework is currently translating into sector-specific challenges and opportunities.

1.3. Objectives and approach

The aim of this commission was to gather evidence on the Welsh culture sector's awareness, attitudes, behaviours and existing approach to tackling the climate and nature emergencies, and to provide suggested pathways for tackling the climate and nature emergencies in the culture sector in Wales.

This research had two overarching focus areas. Firstly, it looked at the culture sector's current impact and resilience to climate change, gathering evidence on its capability to take direct action. It then looked at the sector's role in supporting the wider societal transformation to net zero.

1.3.1. Stakeholder scope

The culture sector in Wales comprises a diverse range of individuals and institutions. To facilitate meaningful analysis, this research engaged a representative sample of the following 645 organisations. This scope was to represent key stakeholders who work closely with the Welsh Government on the delivery of relevant policy:

- Museums – specifically, those who are already accredited or those who are working towards accreditation (107)
- Archives – specifically, formally constituted archive services and members of the Archives and Records Council Wales (23)
- Arts – multi-year funded organisations (81)
- Libraries - Public Library Services and community and independent libraries (249)
- Historic and heritage sites, including properties in Cadw's care (131) and National Trust properties (54).

1.3.2. Data collection

Both primary and secondary data was collected from representatives across these organisations. This enabled the research to deliver both breadth and depth of analysis and support triangulation of findings.

Primary evidence collection and analysis included (see Appendix B):

1. Consultation with the steering group (8 members)
2. A survey aimed at cultural organisations (61 respondents)
3. Two online focus groups (51 attendees)
4. Interviews for case studies (8 interviews)

Secondary evidence collection and analysis included:

5. Collating a stakeholder database consisting of 619 organisations
6. Collating a buildings database of available energy performance certificates, identifying 536 buildings, of which 220 had certificates
7. Data analysis of buildings database, delivered by our research partner Energy Savings Trust.

1.3.3. Limitations and risks

There are four main limitations to consider when reviewing findings and recommendations from this work.

Sector scope: It is crucial to recognise that the culture sector in Wales extends beyond the defined group of stakeholders considered in this research, which does not reflect the true size and diversity of the culture sector. Whilst this work focused on organisational action, a significant proportion of the sector is represented by freelancers, particularly across the arts. Some of the insights and recommendations presented in this report may be valuable to those beyond the defined group.

Stakeholder representation: The stakeholder engagement relied heavily on the steering group contacts, and some sectors were more challenging to access and engage. See Appendix B.

Breadth of climate and nature actions: Climate and nature is a large umbrella term and many terms and practices are still emerging. There is therefore a risk that some important activities may have been omitted.

Data availability: Culture sector buildings, within the defined scope, are *not all* required to have an Energy Performance Certificate and 'listed or officially protected' buildings have exceptions to requirements. There are also widely acknowledged issues with the accuracy of the certificate framework. Analysis of emissions and retrofit costs are therefore indicative, and further work is needed to conduct and collate retrofit assessments of culture sector buildings.[7]

[7] Retrofit assessments, as defined by PAS2035, are "an appraisal of the dwelling's heritage, architectural features, structure, construction and condition, and the installed building services (ventilation, heating, hot water and lighting), *in sufficient* detail to establish the suitability of the dwelling for improvement".

1.4. Attitudes across the sector

There is broad consensus from the stakeholders engaged in this work that the climate and nature emergencies should be an ongoing priority for the sector.[8] However, this is in the context of several other critical priorities, most notably financial stability and more inclusive cultural activities.

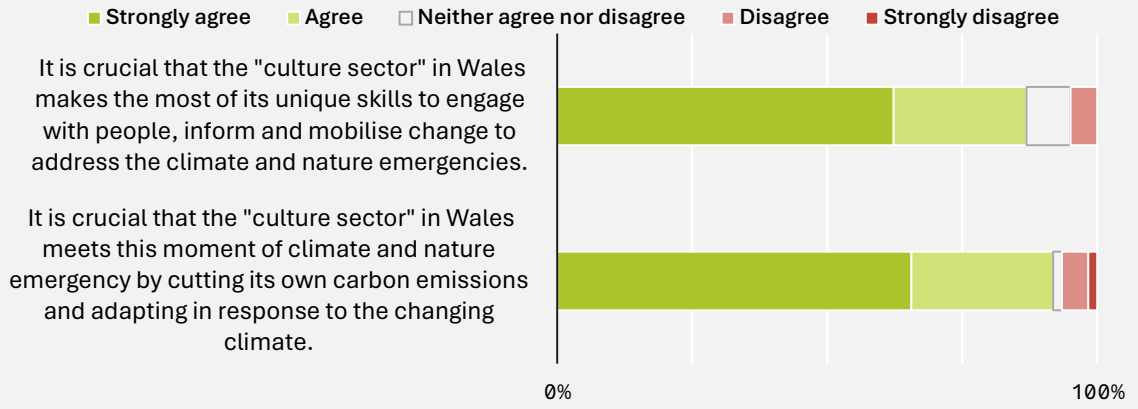
Whilst many organisations are committed to addressing the climate and nature emergencies, evidence suggests most of the sector is at the beginning of this journey.[9] Fitting in significant activity with constrained budgets and resources, combined with an absence of clear guidance on 'what good looks like', means that most organisations are still at a stage of identifying ambitions.

Currently, the primary motivations of those wanting to take action are intrinsic, coming from strong leadership and passionate teams.[10] External factors such as funding and legal requirements also play a role for those groups who need to adhere to them, such as those who receive funding from the Arts Council of Wales or which are accredited museums. The general attitude in the sector is that, while addressing the climate and nature emergencies opens the door to new and exciting creative opportunities, for many there is not yet a clear enough or strong enough business case to support action.

There is also broad consensus across the stakeholders engaged in this research that it is crucial the culture sector in Wales both (1) decreases its own carbon emissions and adapts to the changing climate, and (2) leverages its unique skills to engage wider society in climate and nature action (see Figure 1).

Figure 1

Sector actors agree that the culture sector has a collective responsibility to mobilise change internally and with wider society.



Notes: Respondents were asked, "To what extent do you agree with the following statements?"
Survey conducted by Regen in 2024; 61 respondents.

Consequently, this report is structured to explore both areas of action. Section 2 outlines the practical steps culture sector organisations in Wales are already taking to address their impact on

[8] Survey results – When asked, "How much of a priority do you think the climate and nature emergencies currently are for the Welsh culture sector?" half of respondents answered "one of a number of priorities" and a further third answered "emerging as a priority".
[9] Survey results – When asked, "How far along do you feel your organisation is in terms of taking action on climate and nature?" 43% answered "making initial progress". A further 34% also answered "well on the way".
[10] Survey results – When asked, "Which of the following factors influence your organisation's action with regards to climate and nature goals?", over half of respondents selected "Desire to do the right thing" and/or "Staff or team concern and demand for action".

climate change and how they are adapting to increase climate resilience. It also includes a specific focus on culture sector buildings, which are key to maintaining the condition of cultural collections via a stable environment.

Section 3 focuses on the role the culture sector could play in supporting wider societal engagement with climate and nature action. This recognises the unique opportunity the sector brings and identifies opportunities and challenges for supporting widespread transition.

Section 4 brings together both aspects to discuss the sector's capability for action, particularly focusing on finances and skills.

Finally, Section 5 presents five guiding principles for advancing climate and nature action across the sector, along with key recommendations and actions which set the path for activity to tackle the climate and nature emergencies in Wales.

Section 2

Climate impact and resilience within the culture sector

Section summary and key takeaways

The culture sector in Wales is motivated to address the climate and nature emergency by cutting emissions and building climate resilience. Practical areas of action include:

- **Emissions tracking and target setting:** Successful integration of climate goals into organisational strategies supports broader shifts, as seen with Amgueddfa Cymru. There is an opportunity to support more culture sector organisations in Wales to do the same, but they need clearer, specific guidance on tracking emissions and setting targets. *See recommendation 3.*
- **Environmental policies and climate action plans:** There is significant interest amongst sector stakeholders in developing climate and nature policies across topics, ranging from carbon impacts to ensuring a just transition. However, organisations have struggled to increase resources and improve skills on climate and nature; few have established comprehensive climate policies. *See recommendation 3.*
- **Circular supply chains:** Progress has been made in improving waste management and many culture sector organisations in Wales are interested in taking this a step further to better follow circular economy principles. This will require cross-organisational coordination and collaboration. *See recommendation 3.*
- **Sustainable procurement:** Culture sector organisations need greater support to build local supply chains. There is an opportunity to share learning and to seek *support from organisations such as community energy groups to address the complexities around procurement.*
- **Retrofit assessments:** There is no 'one size fits all' to future-proofing culture sector buildings in Wales. This is particularly true for listed buildings. Comprehensive retrofit assessments are needed to assess the specific requirements and recommend effective solutions. *See recommendation 2.*
- **Retrofit case studies:** Modern standards recommend a holistic approach to retrofit designs and plans. There is an opportunity for culture sector buildings to demonstrate this approach and share learning with the rest of the culture sector and beyond. *See recommendation 2.*
- **Investment to future-proof buildings:** Like many Welsh homes and businesses, most culture sector buildings in Wales rely on natural gas, a fossil fuel, for heating. Significant investment will be required to future proof the culture sector building stock. Culture sector organisations will need greater support to access available finance. *See recommendation 2.*
- **Climate risk assessments:** Many culture sector organisations in Wales are interested in developing climate risk assessments and climate adaption plans. *See recommendation 2.*

2.1. Section introduction

Overwhelmingly, the organisations we engaged in this research believed the culture sector has a major role to play in addressing the climate and nature emergency through cutting emissions and building climate resilience (see Figure 2).

In this section, we assess the practical steps culture sector organisations in Wales are currently taking, as well as those they need to consider taking, to reduce their impact on climate change and adapt so they are more resilient to it.

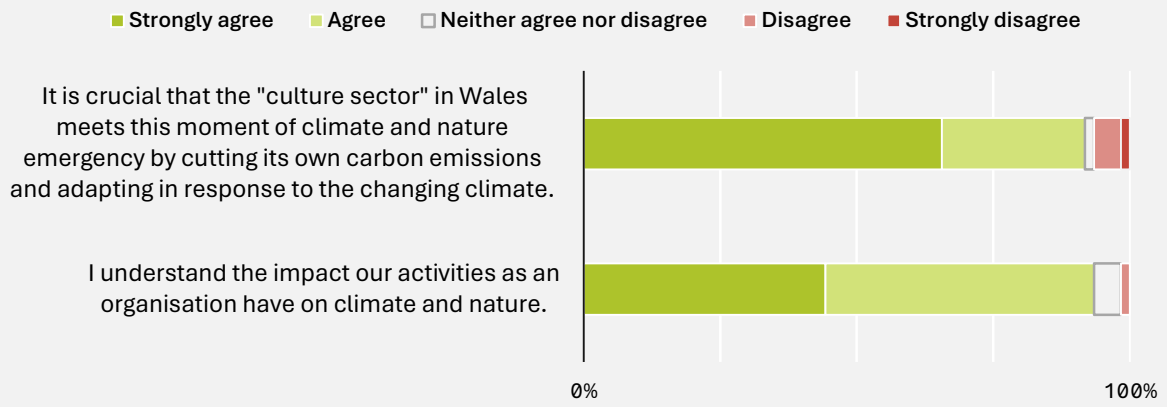
First, we set the context for where the sector is now in terms of strategic policies and operational processes. This helps us better understand the appetite for and barriers to climate and nature action.

We then focus explicitly on buildings, given their importance both in terms of maintaining stable environments for collections, but also in supporting the delivery of net zero across Wales.

Data is not available to estimate the impact of *all* activities. However, some public datasets are available for buildings, from which the current impact of culture sector building emissions and the cost to retrofit for net zero is estimated.

Figure 2

There is strong consensus on the need to address climate change impact and resilience of the culture sector.



Notes: Respondents were asked, "To what extent do you agree with the following statements?"
Survey conducted by Regen in 2024; 61 respondents.

2.2. Action under way across the culture sector in Wales

2.2.1. Net zero targets and pledges

For many organisations across the British economy, setting emissions targets has become a popular first step on the journey to emissions reductions; publicly declaring a target should, in theory, give agency to the development of more concrete plans and policies to achieve said emissions reductions.

According to our survey, those organisations in the culture sector in Wales who have already set a target believe they are at least 'making initial progress' on climate and nature action. However, there are also organisations that state they are 'leading the way' but have not publicly set a net zero target.

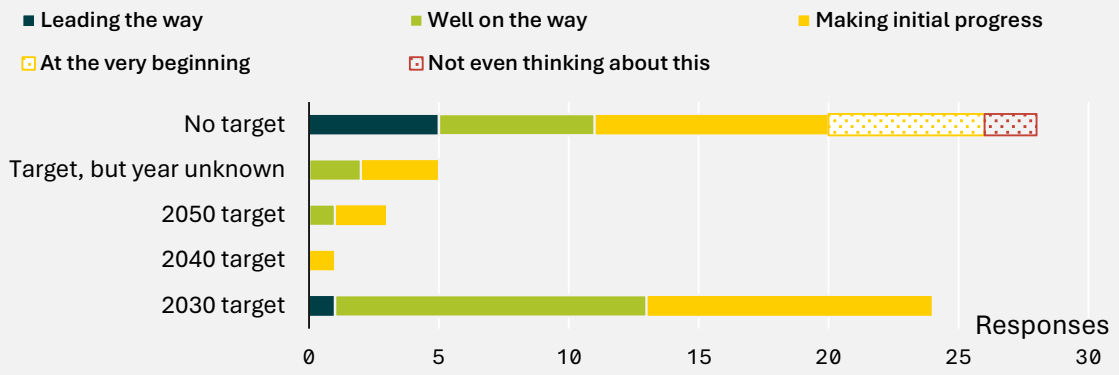
Frameworks and coalitions, such as the Science Based Targets initiative, have been emerging since the 2015 Paris Agreement. These help organisations set ambitious yet pragmatic targets and support them with the standards, tools, and guidance on emissions tracking. The culture sector in Wales needs to aspire to examples like Race to Zero, where members commit to *halving* emissions by 2030.[11] So far, coalitions specific to the culture sector lack corresponding emission targets.

Figure 3 shows that many cultural organisations in Wales have set a 2030 target for achieving net zero emissions. For some, this is set by a governing body; this is in alignment with the Welsh Government's ambition for a *collective* net zero public sector by 2030. However, for those who have set an organisational target, this is highly ambitious.[12] Only one organisation had a more pragmatic 2040 target. A handful also noted a 2050 target, in line with the UK's legally binding net zero target.

There is a need for a sector-specific framework, which would support culture sector organisations in Wales to follow a framework for emissions tracking and set ambitious but achievable targets.

Figure 3

Setting a net zero by 2030 target is a popular first set for cultural organisations starting on their emissions reduction journey.



Survey conducted by Regen in 2024; 61 respondents.

[11] As of November 2023, 36 organisations in 'creative and entertainment organisations' have joined in the UK the Race to Zero coalition in partnership with the SME Climate Hub. See the 'who's in' database.

[12] Given the pace of decarbonisation across the Welsh economy, individual organisations are likely to find achieving net zero by 2030 challenging without significant emission offsetting. See 1.2.1 Policy driving decarbonisation, p7.

2.2.2. Strategic processes and policies

Few cultural organisations in Wales have well-established policies in place across key climate and nature challenges. However, most are in the process of establishing policies or are at least interested in developing them (see Figure 4). Strategic decision-making to improve skills and increase resources regarding climate and nature action is also limited to a few organisations (see Figure 5). Note also that when comparing those with and without emissions targets, no discernible difference in policy-making progress could be found.

The most common policies in place, according to the survey, concern reducing emissions from energy use and travel. Evidence suggests that policies regarding just transition or climate adaptation are rarer. This suggests there is a gap in awareness and skills beyond carbon literacy.

Where organisations have embraced climate and nature goals into wider strategic priorities, policies, processes and staff roles, this has supported an organisation-wide shift, as has been the case with Amgueddfa Cymru (see case study on page 16).

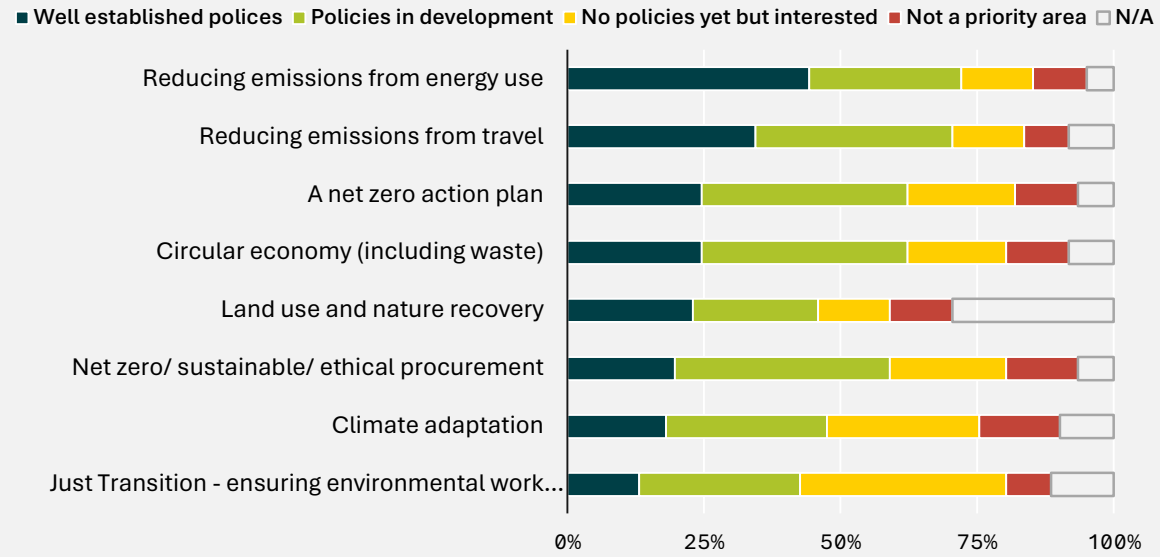
Relatively achievable policies stakeholders raised, independent of the survey, included:

- Divestment from fossil fuels via switching to sustainable investment and banking regarding accounts and pensions and/or switching to a renewable energy supplier.
- Responsible food sourcing policies.
- Travel policies and encouraging more home working. (It should however be noted that the evidence is not clear on whether increased homeworking reduces carbon emissions.)
- Full integration of climate justice in all decision-making by implementing financial and social decision-making frameworks.

While the activities listed above were described as ‘somewhat achievable’ by some participants, for others it is possible these may still be challenging given resource pressures.

Figure 4

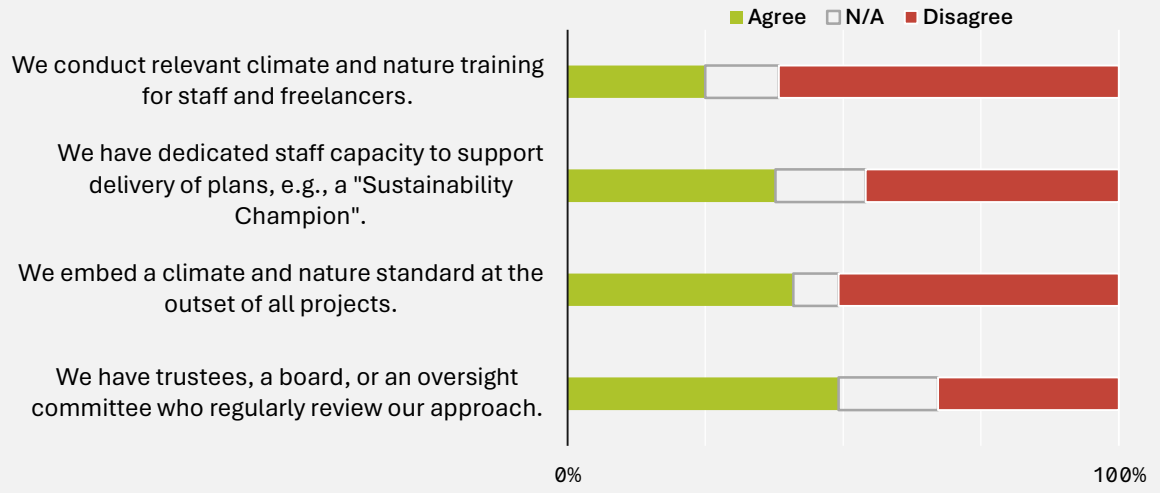
Many organisations have set internal policies across climate and nature challenges. There is an opportunity to support those who have not yet done so.



Survey conducted by Regen in 2024; 61 respondents.

Figure 5

Some organisations are taking strategic action to increase resource and improve skills on climate and nature, but they are in the minority.



Notes: Respondents were asked, “To what extent do you agree with the following statements?”
Survey conducted by Regen in 2024; 61 respondents.

Case study summary: Amgueddfa Cymru

Amgueddfa Cymru is a collection of seven museums across Wales, maintaining collections and partnering with venues and institutions around Wales. Carbon has been factored into strategic decision making since Amgueddfa Cymru declared a climate emergency in 2019.

Bringing climate and nature into wider strategic priorities for Amgueddfa Cymru has supported a cultural shift; sustainability now forms part of the organisation's DNA. This is evidenced through the diversity of actions on building retrofit, renewable energy generation, land management and nature, biodiversity audits, staff and volunteer engagement, environmental monitoring, pension investments, business travel, procurement, waste management, digital decarbonisation and recruitment.

Amgueddfa Cymru has made significant investment at several of its sites. The recent replacement of gas boilers with air source heat pumps at the National Waterfront Museum in Swansea resulted in a capital expenditure £400,000 higher than for a like-for-like gas boiler replacement. However, given the alignment with organisational priorities and carbon reduction targets, being able to demonstrate the carbon impact of this decision helped justify the additional expenditure.

There is also substantial work under way to build a strong network of engagement throughout their body of staff. This includes carbon literacy training, workshops, craft activities, climate communication training, and symposiums and talks. The engagement work Amgueddfa Cymru has delivered is driven by a belief you need to have spaces to create connections between people and with the climate and nature emergency. Showing staff their role is directly relevant to climate change can help motivate them, make them feel like they are part of a wider community and empower them to act.

Image: Community garden in the central courtyard of the National Waterfront Museum in Swansea

2.2.3. Behaviours enacted

Most survey respondents reported taking some climate and nature actions, and despite limited widespread action, they showed strong interest in various initiatives. (see Figure 6 and Figure 7).

Perhaps unsurprisingly, the most common actions taken relate to waste management practices. One example of such practice comes from Ballet Cymru; 75% of their costumes and props for productions are crafted from recycled materials or reused from previous shows. Additionally, they accepted donations of 'as new' furniture from Cardiff Met University to furnish their office spaces and provide seating for events.

The actions with the greatest interest included developing a climate risk assessment and adaptation plan and exploring circular supply chains. The European Circular Economy Hotspot will be hosted by Wales in 2024 and the opening ceremony is to be held by Amgueddfa Genedlaethol Caerdydd. This international event will showcase progress in Wales, as well as be an opportunity to collaborate with others and discuss next steps.

There was little interest in purchasing carbon offsets or renewable energy credits. This suggests the sector is aware of the question marks around the credibility of such actions.

About half of the surveyed organisations monitor and track emissions to some extent; 25% track all Scope 1 emissions, while 22% track some but not all. Interestingly, among those tracking all Scope 1 emissions, less than half have set a net zero target, perhaps indicating a gap in priorities. Conversely, among organisations *not* tracking Scope 1 emissions, half have set a net zero target.

Monitoring and tracking energy consumption is more common, with 62% of respondents doing so, including those who are not actively considering climate and nature emergencies. This suggests alternative motivations, such as reducing energy costs. A notable proportion of respondents were unsure if their company tracks carbon emissions (25%) or energy consumption (11%).

This trend was similarly represented in organisations' approaches to monitoring vehicle miles travelled, providing on-site EV charging and switching their fleet to EVs. 26% of organisations currently provide on-site EV charging for their staff or fleet vehicles, and only 10% of fleets are predominantly electric. Over 50% of organisations did not have any cars or vans in their operations, with only a handful having other vehicles such as trucks, buses and coaches.

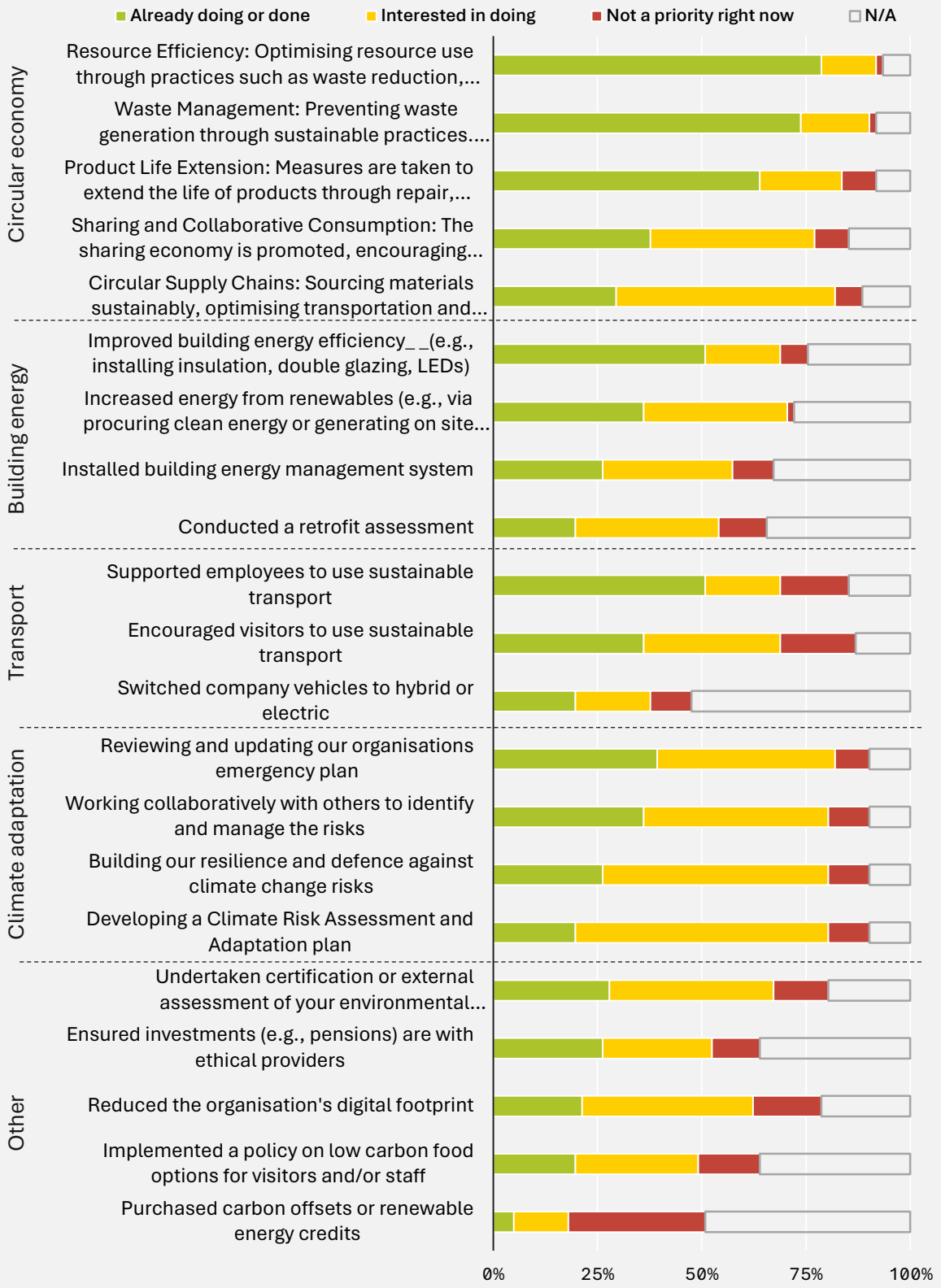
Figure 6

Frequency of types of actions taken by culture sector organisations.

At least one action taken related to the themes, where applicable.
Survey conducted by Regen in 2024; 61 respondents.

Figure 7

Indicative frequency of actions undertaken by culture sector organisations.



Survey conducted by Regen in 2024; 61 respondents.

2.3. Action to improve buildings

In its 2023 progress report [1], the Climate Change Committee highlighted the lack of progress made to date on installing energy efficiency and clean heating measures in buildings. The Committee noted a large and increasing gap relating to delivering action on non-residential buildings, with a lack of building information data as one key limiting factor in both the development of policy and the delivery of measures.

2.3.1. Understanding the scale of the challenge - buildings data

To address this gap, our research drew together all publicly available data on buildings in the Welsh culture sector into a database to enable the development of evidence-based recommendations for action. An overview of the data sources are outlined below.

Energy performance certificates

For most culture sector buildings, the most comprehensive open-source data relates to Energy Performance Certificates (EPCs).

Performance certificates should, in theory, provide information on net zero readiness as well as some context around resilience; higher-performance buildings should protect better from extreme heat and cold. However, the current design of these certificates means this is not necessarily the case. The UK government has previously committed to EPC reform to enhance their effectiveness in measuring building energy performance, the wider system's functionality, and the suitability of EPCs for future roles.

The requirement to obtain a Non-domestic Energy Certificate (NDEPC) or Display Energy Certificate (DEC) does not apply to all buildings identified within the scope of this commission. In total, energy certificates were found for 230 sites, with 92 having a DEC, 77 having an NDEPC, and 61 having both. Since the DEC is based on the actual energy usage of a building, these were used for any site which had both certificates available.[13] Note also that the UK Government has set exemptions for 'listed or officially protected' buildings, which applies to 34% of National Trust sites and 62% of identified Cadw sites, although it should be noted that 35% of the Cadw sites are categorized as unroofed ruins.

The use of a shared building was determined in at least 34 organisations. One notable site, the Wales Millenium Centre in Cardiff, hosts six multi-year funded organisations. Some sites, such as the Usk Library, along with at least 14 other organisations, operate out of a community/leisure centre. This limits the ability to accurately calculate the carbon emissions associated with the individual organisation.

Cadw and National Trust building data

Whilst the availability of EPCs for Cadw sites is limited, the organisation falls within the boundary of the Welsh Government for reporting carbon footprints. No public datasets were found with the reported data – however, according to the Welsh Government Net Zero Strategic Plan, Cadw accounts for 3% of building and infrastructure (2019-2020), at approximately 375.1 tCO2e [5]. Cadw

[13] The energy certificates provide information on the building's energy use, method of heating, and the emissions associated with operating within the building. Whilst NDEPCs are *numerically modelled* energy use, the DECs are based on *actual* energy use of the building. NDEPCs area also carried out on the entire building (over 500 sqm), where as a DEC can be conducted on a part of a building, enabling shared buildings to be divided by organization when possible.

is also the lead on the national forum for the Historic Environment Group (HEG), which has a subgroup focusing on climate change.

The HEG Climate Change Subgroup is responsible for assessing and reporting to HEG on the challenges the historic environment sector should address. The HEG Climate Change Subgroup published the Historic Environment and Climate Change in Wales Sector Adaptation Plan in 2020 and publishes an interim report annually, with the full monitoring and evaluation report expected in 2024. The adaptation centres around understanding and managing the risks of climate change to the historic environment.

The National Trust is a member of HEG and is working alongside Cadw to tackle the threat of climate change on the historic environment in Wales. Along with working to understand the impacts of flooding, fires and other environmental changes caused by a changing climate on the natural environment, the National Trust has also established Fit for the Future, a network whose mission is to support member organisations to decarbonise.

Whilst our desk research was only able to find EPC data for 11% of National Trust sites, the organisation has been monitoring its energy usage for all buildings in its care. National Trust sites in Wales produced approximately 692.1 tCO2e in 2021 (financial year ending). However, this does not include negative emissions from the 11 sites with renewable energy sources, namely:

- Hydropower at Aberdulais and Craflwyn;
- Solar PV at Bodnant Garden, Craflwyn, Dinefwr, Dyffryn Gardens, Llanerchaeron, Penrhyn Castle, Plas Newydd and Powis Castle;
- Ground source heat pumps at Craflwyn, Porth Y Swnt, Powis Castle, Stackpole and Tredegar House;
- Air source heat pumps at Dyffryn Gardens and Tredegar House; and
- Water source heat pumps at Plas Newydd.

Cadw also has several renewable energy sources across its sites. For a full list, contact Chris.Wilson@gov.wales

As a result of the limited public data available and to avoid duplicating work from the HEG workstream, the building analysis conducted by EST as part of this research does not include Cadw or National Trust assets.

Flood risk data

Extreme heat and cold are just two of the weather events buildings should be prepared for. Cardiff Metropolitan University, in partnership with the Office of the Future Generations Commissioner are conducting research assessing the impact of climate change on cultural assets. This is not discussed further in this report, but should be considered once published.

2.3.2. State of building stock and emissions

Extrapolating the data from the buildings for which a certificate was identified, the total carbon footprint of culture sector buildings in Wales is estimated at 50 to 110 kt CO2e. (See Table 4 in Appendix A - Building stock analysis, p. 60.) For context, most Welsh building emissions occur from residential buildings, which is over 3,000 ktCO2e. All commercial buildings are estimated at 500 ktCO2e and all public buildings at 300 ktCO2e. [1]

Heating and renewable technologies

Like many Welsh homes and businesses, most of the culture sector buildings in Wales rely on natural gas, a fossil fuel, for heating. A small proportion also still rely on oil and LPG, which are even more carbon intensive and costly. (See p. 58 for cost and carbon estimates.) Buildings identified using oil and LPG included archives, museums and arts organisations.

The database collated for this research identified solar PV on seven buildings, a heat pump on one, and a building connected to a hydropower generator. (See Table 1 below.) However, these statistics prompt questions about the accuracy of the data sources, considering other known renewable technologies installed on buildings. For instance, the Wales Millennium Centre reportedly generates 10% of its energy requirement from on-site solar panels. Table 1 should therefore *not* be treated as exhaustive.

Table 1

Renewable energy technologies installed in culture sector buildings in Wales, according to incomplete public datasets.

Source: NDEPC and DEC databases

Organisation	Local Authority	Technology	Installation Year
St Fagans: National History Museum	Cardiff	Solar PV	2009
Chepstow Library	Monmouthshire	Solar PV	2013
Milford Haven Library	Pembrokeshire	Solar PV	2013
Big Pit: The National Mining Museum of Wales	Torfaen	Solar PV	2014
North East Wales Archives	Flintshire	Solar PV	2015
Anglesey Archives	Isle of Anglesey	Solar PV	2016
The Royal Mint Museum	Rhondda Cynon Taf	Solar PV	2017
Blaenavon Library	Torfaen	Hydropower	2016
Sarn Library*	Bridgend	Heat Pump	2013

Note: The installation year is based on the first year the technology appeared in an energy certificate.

* - heat pump installation has not been verified.

Building fabric and construction type

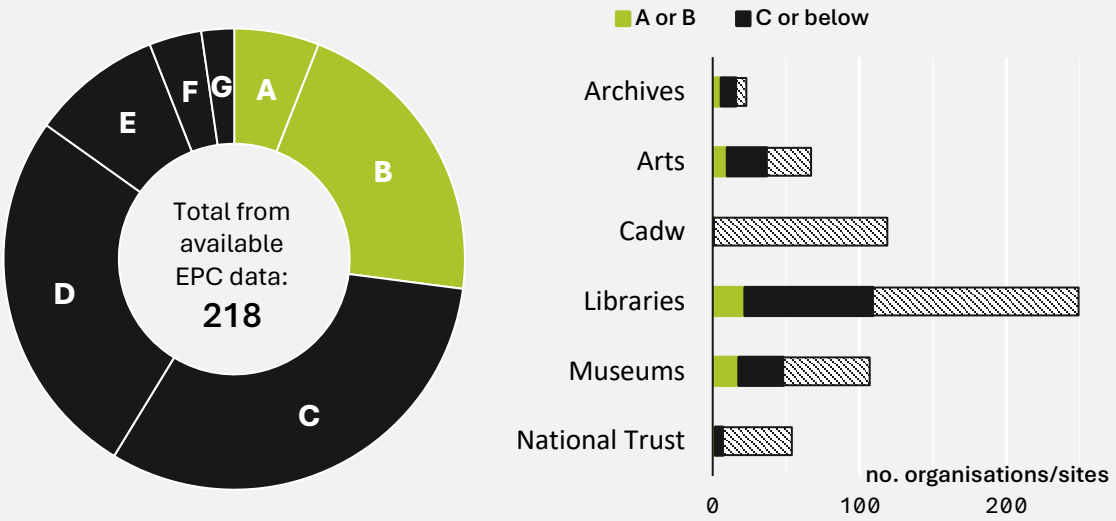
From the available public data, property age and construction type cannot be deduced. Future work should consider requesting further data to uncover further information.

However, we do know approximately a fifth of the organisations in scope are located in a listed building. Most of these are Cadw and National Trust properties, but nine museums, twenty-four libraries, four archives and three arts organisations were also found to be operating out of listed properties. Many of these cultural and heritage assets are likely to be old and therefore made from traditional construction materials.

Additionally, the DEC and NDEPC datasets contain alphabetised ratings for 'energy performance'. These are denoted from A to G, and give an indication as to their fabric efficiency, costs to heat, and carbon emissions.

Due to the mixing of these factors, it is difficult to conclusively state that a building of rank C has better fabric efficiency than a building of rank D.[14] However, when considering the national picture, the data suggests a significant gap exists in achieving net-zero compliance within culture sector buildings. See Figure 8. The prevailing aim should be to achieve a rating of B or above; the UK Government has pledged to enforce Minimum Energy Efficiency Standards (MEES) for non-domestic rented buildings by 2030.

Figure 8
Energy performance ratings of culture sector buildings in Wales, by sector.
Source: DEC and NDEPC databases



[14] Reform to EPC's is required as requested by the CCC.

2.3.3. Future-proofing culture sector buildings

It is critical that culture sector buildings in Wales are future-proofed in Wales – considering adaption and mitigation measures in tandem. [6] This requires a tailored approach; there is no universal solution for all buildings. Buildings in Wales will need a combination of technological solutions, as illustrated in Figure 9, from the Heat Strategy for Wales. In addition to this, buildings should be kept in a good state of repair and occupants should understand how to properly use and maintain the building.

For those with an EPC, it is possible to *estimate* the investment costs to instal these technologies. However, it is important to approach this with caution. Best practise is to conduct more comprehensive retrofit assessments which assess the specific requirements and provide more accurate insights into the most effective strategies for enhancing energy efficiency and sustainability.

Figure 9
Low-carbon heating technology options.
Source: Heat Strategy for Wales

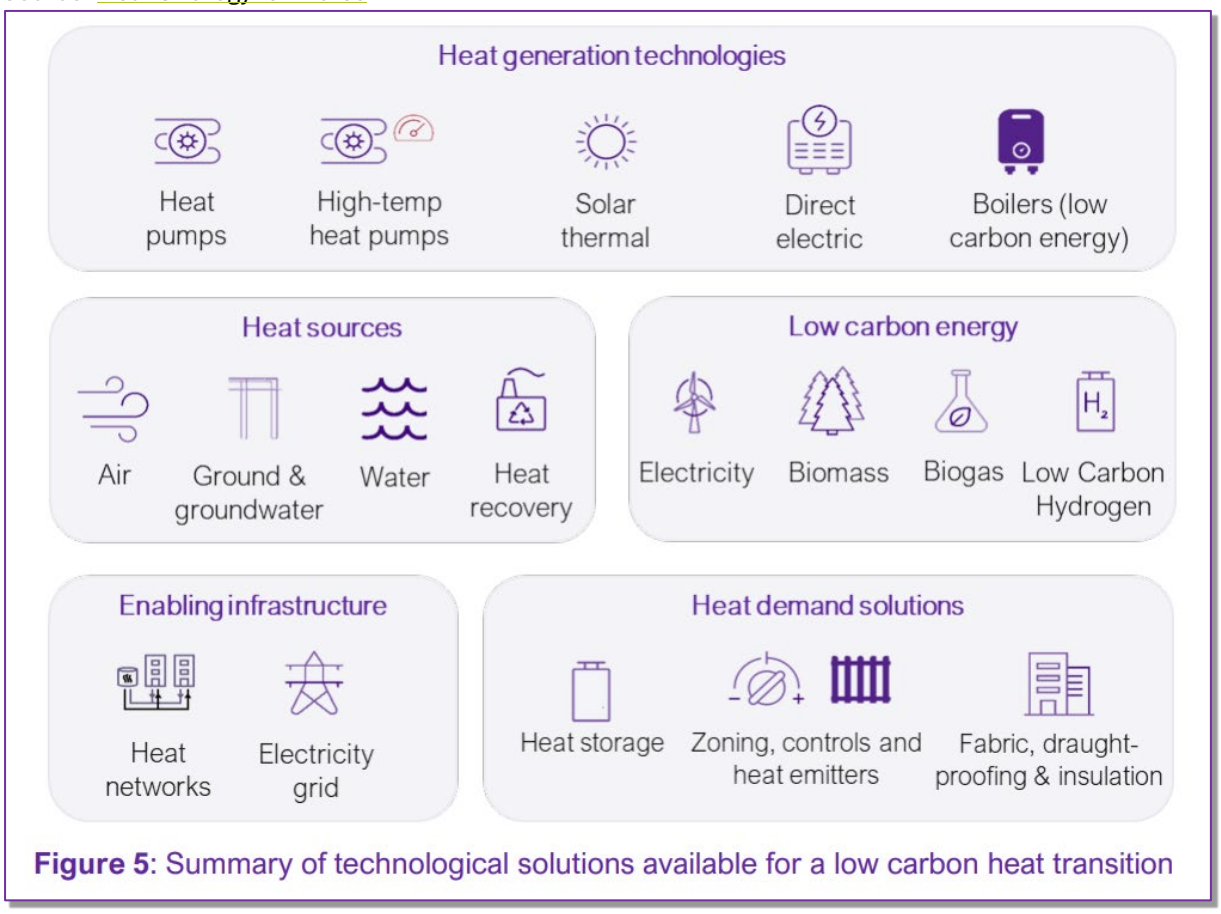


Figure 5: Summary of technological solutions available for a low carbon heat transition

Indicative net zero investment

Two technologies that stand out as crucial are heat pumps and solar panels. (This aligns with the strategy outlined in the Heat Strategy for Wales.) Despite data uncertainty and the variability across the building stock, it is safe to assume the future-proofing will require the installation of a high proportion of heat pumps and solar panels.

To indicate the high level of investment needed for net zero, analysis conducted by EST found that approximately 4 MW of solar PV could feasibly be installed on culture sector buildings' roofs, costing around £5 million, with a payback period of roughly a decade. Installing heat pumps across the building stock is estimated to cost £100 million. Note that no additional fabric changes were modelled; however, these interventions alone would immediately reduce building use carbon emissions by a third, with emissions reduction continuing as the grid decarbonises over this decade. See appendix A for further details on the building stock analysis.

This indicative assessment has significant uncertainties, which also highlight some retrofit challenges:

- **Electricity price:** The current relatively high cost of electricity (compared to the fuels it is displacing) means installing heat pumps today will not see significant enough savings on bills to justify investment. Lower-cost bills should be a motivator for any investment in heat decarbonisation, and the Heat and Buildings Strategy from the Department of Energy Security and Net Zero has committed to addressing this. In the near term, matching heat pumps with on-site low-cost renewable electricity could alleviate this challenge, but would increase costs upfront. [7]
- **Roof quality and makeup:** Roofing material and scaffolding costs can have a big impact on the total installation costs. Structural integrity of roofs will need to be assessed on a case-by-case basis.
- **Grid constraints:** Modest assumptions were made about the current limits posed by grid constraints. It is possible that significantly *more* solar panels could be installed. However, this relies on unlocking significant investment in the local grid ready for net zero. [8]
- **Fabric measures:** While the modelling did not include costs and impacts of supporting fabric measures, such as insulation and draught-proofing, in reality each building will need to make an informed decision on the trade-offs between upfront costs, payback and building comfort.
- **Impact on aesthetics and wider heritage value:** Challenges are likely to arise for buildings with significant cultural value, where retrofit risks damage to heritage value. However, there are ways around this, e.g., solar panels could be placed on accompanying modern buildings and heat pumps can be sensitively situated so as to not harm critical viewpoints. Where fabric measures are unfeasible, efficient operation should still be achievable without.[15]

[15] Useful information on this topic is available from organisations such as Historic Environment Scotland, and examples of successful heat pump installations can be found in properties managed by the National Trust, such as Blickling Hall and Plas Newydd.

Other important technologies

When evaluating suitable low-carbon heat options for a building, it is essential to adopt a whole-building approach. This holistic approach "considers the building as a system of elements (building fabric and building services), interfaces and occupants that interact, and not as a set of elements that are independent of each other or of occupants' working practices and behaviour." [9]

The whole-building approach should help ensure retrofit design and delivery is technically robust, avoiding inappropriate interventions which lead to unintended consequences [9]. For example, an inability to improve the thermal performance of a building need not necessarily impede the installation of a low-carbon heat technology.

It is important to consider demand reduction through behavioural change, fabric and/or control improvements, aiming to lower operating temperatures of heating systems. Heat pumps, for instance, operate more efficiently at lower flow temperatures. Fabric improvements like loft insulation, along with building maintenance and repair and draughtproofing, can enhance energy efficiency at a relatively low intervention level and are amongst the less risky interventions.

Retrofit assessments and designs in line with PAS2035 and PAS2038 requirements should identify and investigate potential heat sources and the feasibility of shared heating infrastructure. For example, a new marine source heat pump at the National Trust's Plas Newydd site is under construction. This type of heat pump uses the more stable water temperature (compared to air source) to achieve higher efficiencies year-round. The National Trust collaborated with coastal and marine experts and conservationists to maximise the benefits of the technology while safeguarding the environment and archaeology.

An example of larger-scale heating infrastructure is Cardiff's heat network, which aims to connect to the Wales Millenium Centre in 2024. The building is home to six cultural organisations within the scope of this research, along with several other organisations, and welcomes touring productions and performances from across the globe. The first phase of the network, currently under construction, will use waste heat from an incineration plant with back-up heat from a gas-powered energy centre. The heat network will need to transition to entirely renewable sources of heat in the future; in the short term, the heat network is expected to save 5,600 tCO2e/year across the city [10].

Large culture sector buildings may have a role to play in the viability of heat networks in urban areas in Wales. The early involvement of large public or commercial buildings in heat network plans is instrumental in offering assurance of a substantial heat load, thereby providing investment security. Additionally, buildings with significant cooling requirements, such as archives and museums, can contribute to heat networks by recycling waste heat back into the system. There are 39 cultural organisations sited within 500 m of potential heat network locations identified by the Welsh Government, 54 within 1,000 m and 69 within 1,500 m. For instance, the National Waterfront Museum in Swansea, situated within 500 m of an identified location, boasts a heating load exceeding 1 GWh, equivalent to heating approximately 100 average homes. (See Appendix A - Building stock analysis for more details.)

Case studies from Conwy Culture Centre and Tretower Court Barn illustrate key factors important in the successful delivery of new-build and retrofit consistent with a net zero future.

Case study summary: Conwy Culture Centre

The Conwy Culture Centre is a new, purpose-built site for Conwy Archives' collection of historical and cultural documents. It has an innovative, 'passive' strongroom that houses the documents underground and minimises the otherwise considerable amount of energy that would need to be used to maintain their condition.

In developing the new building, the team followed a rigorous planning process due to the location of the Culture Centre adjacent to the UNESCO World Heritage site of Conwy Castle. During this process, the team identified an opportunity to take advantage of the underground location to minimise energy requirements. With the changes of temperature underground minimal throughout the year, the need for heating and cooling to maintain the very specific temperatures for the archive could be significantly reduced. This approach was driven by advice from a trusted external consultant.

Engaging archive staff in design and ongoing operation and maintenance of the building is key, as they have specialist knowledge around the needs of the collections housed by the archives, which more traditional contractors and building management teams do not. Additionally, having trusted experts on hand to support with design and future proofing of culture sector buildings is key to unlock the innovation needed.

Image: the Conwy Culture Centre.

Case study summary: Tretower Court Barn

Tretower Court is a fortified manor house from the early 14th century in Powys, in the middle of Wales. Adjacent to the court is a 15th century designated Scheduled Monument barn. This was built as an outer building of the court, with continual expansion and alterations being made to it in the 17th to 19th centuries.

An opportunity was spotted for this barn to become a new visitor centre at Tretower Court, and renovation work started in 2020. By the time it was completed in 2022, the space had been transformed into a visitor centre and retail space on the ground floor, with a restaurant on the first floor.

Revitalising an old building to the level achieved at Tretower Court Barn is quite the achievement. It has included a comprehensive retrofit, complete with underfloor heating and an air source heat pump. The heat pump units have been installed in a separate enclosure away from the barn, with power cables and pipes between the heat pumps and the barn buried.

As Tretower Court barn was originally built as a medieval-era barn, it was not originally built with warmth in mind. During the recent renovation, alterations were made to the original building, balancing goals of conserving the original building with improvements to efficiency and warmth.

New doors and windows were installed in the occupied area of the building, and traditional methods used to seal the roof and walls, including a mix of lime and hemp. The visitor centre has received several compliments from staff on its comfort and warmth. However, the restaurant above remains cold, most likely due to cold draughts experienced from the eaves of the building, a lack of modern insulation in the roof, multiple gaps in the building fabric around the roof and doors, and high air flow velocities between open doors.

Despite some of the challenges associated with retrofitting a grade II-listed building and scheduled monument, the project marks a success story around practical approaches to retrofit including the use of traditional methods and materials.

Image: Tretower Court Barn post-retrofit. © Crown copyright (2024), Cadw

2.3.4. Historic buildings and traditional construction

A prominent challenge with historic buildings is finding the right balance between mitigation and adaptation whilst minimising harm to the cultural heritage of the building.

Cadw produced comprehensive guidance on this in 2022, stating "getting the balance right (and avoiding unintended consequences) is best done with a holistic approach that uses an understanding of a building, its context, its significance, and all the factors affecting energy use as the starting point for devising an energy efficiency strategy." [11] Therefore, measures should be considered on a case-by-case basis. However, the guidance does outline which fabric improvement measures are low risk and should be considered in every building. Cadw also has further guidance on Installing Micro-Generation Systems.

Historic buildings offer valuable learning opportunities; traditional construction methods often utilise locally sourced, low-carbon building materials such as stone, timber or earth for walls and slate or stone tiles for roofs. By collaborating with specialists, retrofit work can better integrate with the unique characteristics of traditional buildings whilst preserving their inherent benefits – simultaneously honouring the past whilst safeguarding the future.

Moreover, the remarkable advantages of traditional construction and Wales' rich construction history should be celebrated. One example of this is Swansea-based social enterprise Down to Earth. Down to Earth promotes sustainable and traditional construction techniques through inclusive workshops with community groups; construction specialists work alongside vulnerable and disadvantaged individuals on practical new build projects. Backed by clinical healthcare research, their approach emphasizes the mental health benefits of outdoor, hands-on engagement. [12]

Section 3

Combating the wider climate and nature emergencies through culture

Section summary and key takeaways

Sector stakeholders recognise the culture sector in Wales has an influential role in driving change and engaging diverse audiences on climate and nature issues. By harnessing creative mediums and storytelling, cultural organisations play a crucial role in developing understanding and cultivating optimism within communities. These initiatives effectively engage groups who may feel disenfranchised by the idea of transition. They can also support individuals who are debilitated by eco-anxiety or feel apathetic due to the perceived insignificance of their actions. The key takeaways include:

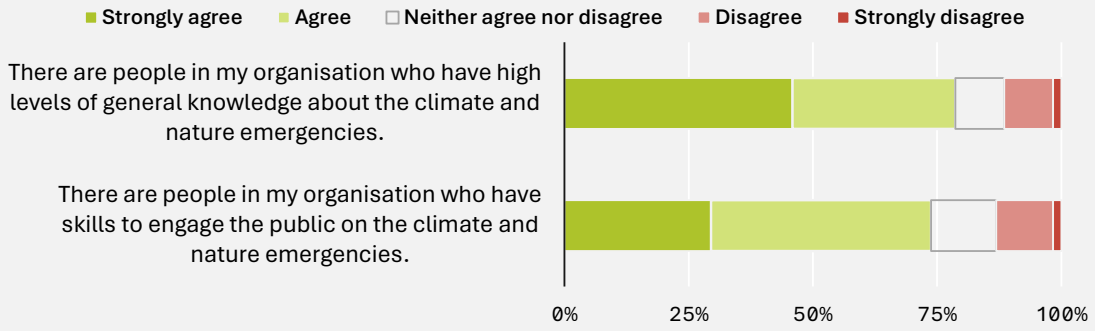
- **Public engagement expertise:** Stakeholders acknowledge their expertise in effectively communicating with the public. Many are already experienced in engaging on a variety of issues *beyond* green choices and sustainable lifestyles. *See recommendation 4.*
- **Meaningful engagement and storytelling:** Stakeholders understand that for engagement to lead to action, it must be meaningful – people need to be engaged through emotive storytelling, rather than simply sharing the facts. The culture sector is well placed to do this, by leveraging cultural activities beyond digital media. *See recommendation 4.*
- **Diverse cultural activities to involve and engage diverse audiences:** A broad range of tailored creative cultural activities have been used so far to engage on climate and nature. There is an opportunity to leverage the expertise and credibility of these organisations to support place-based climate and nature action across Wales. Culture sector organisations have established strong relationships with local people and understand the specific needs and issues facing communities. *See recommendations 4 and 5.*
- **Bringing people together on shared issues in a local area:** Culture sector organisations have the opportunity and space to hold a collective conversation. For example, CARAD leveraged arts-based activities to bring together wildlife groups, farmers, and local people. Creating meaningful connections to local issues can empower people to engage in collective action. *See recommendation 4.*
- **Engaging with policy-making:** Engaging citizens in climate and nature conversation, action and policy-making can be challenging. Overcoming these challenges requires thoughtful and creative approaches, which the culture sector is ideally positioned to deliver. *See recommendation 5.*

"We are the most effective sector to get across ideas, aspirations, practical advice and inspiration for change - across all sections of society. Facts don't change opinion [...] the culture sector has a really vital role to play." **Catherine Allan, Co-Director CARAD**

3.1. Section introduction

Across the culture sector in Wales, stakeholders have a deep understanding of their responsibility and power to mobilise change and to engage meaningfully with a wide audience. They also believe they have sufficiently high levels of knowledge about the climate and nature emergencies, and the skills to engage the public (see Figure 10).

Figure 10
Skills and knowledge of culture sector staff.



Survey conducted by Regen in 2024; 61 respondents.

The public are now largely aware of the climate and nature crises, but many people have low levels of climate literacy [13], preventing them from understanding the actions they can take. [14] Others suffer from response efficacy, believing that their actions won't have a significant impact. [15]

To address these issues, it is important to emphasise the present and local nature of climate change and to facilitate more effective and experiential engagement. [16] The culture sector is in a prime place to support both these outcomes. Creative forms of engagement, such as through music, art, performance, craft, exhibitions and stories can inspire, motivate, and spark optimism and action.

Culture sector actors, groups and organisations tend to be deeply rooted in their communities, having established connections and developed an understanding of the needs and concerns of people over time. They can therefore *meaningfully* engage [17] with and access excluded or marginalised groups. [18]

The Climate Action Wales: Public engagement strategy 2023 to 2026 developed the 5 Es framework. This framework ensures that people are engaged at different stages of their journey. Influencing first and foremost by building legitimacy and trust, then building awareness, providing the opportunities to change behaviours and finally by catalysing social norms. Exemplify: lead by example; Enable: make it easier; Evaluate: share the impact of actions; Engage: get people involved; and Encourage: give the right signals.

Through this research, we heard from stakeholders about the importance of meeting community members 'where they are' and engaging them without alienating anyone. Discussions also revolved around the importance of reaching diverse audience groups through tailored cultural activities and acknowledging intersectionality. Language accessibility and the avoidance of jargon are essential for effective communication. Whilst several organisations are already engaged in this work, there was a consensus on the need for increased funding to scale up initiatives and for more sector-wide development of expertise in this area.

3.2. Topics addressed through engagement

Most survey respondents have engaged both their workforce (staff, freelancers and/or volunteers) and their audience or visitors on the climate change and nature emergencies. Figure 11 shows the diversity of engagement topics.

Figure 11

Stakeholders have engaged audiences and visitors across a broad range of climate and nature issues. Results were similar for engagement with the workforce.

[Left, popularity of engagement topics, by broad categorisation. Right, word cloud from full responses.]

Applying broad categorisations based on distinctions made in the public engagement strategy shows an encouragingly even spread of activity; cultural organisations are engaging on issues beyond green choices and sustainable lifestyles. For example, “sustainable historic building practices”, “land rights”, “learning from our ancestors”, “critical minerals”, “ethical issues with collections”, “sustainable careers”, “warmth and wellbeing”, and “invasive species”.

Through our research we uncovered a variety of ways in which the culture sector in Wales is delivering climate and nature engagement. This spanned activities such as sewing, print making, poetry, film, music, pottery, photography, painting, weaving, nature-friendly farm visits, exhibitions, installations, and performances. These activities help people explore challenging issues around the climate and nature emergencies through creative approaches.

For example, an exhibition at Tŷ Pawb (see Figure 12) explored community and alternative food growing in response to the societal challenges of climate change, social isolation, loneliness and food poverty. By emphasising the wellbeing benefits of nature, the exhibition also served as a lush and vibrant green escape for visitors, stimulating forms of interaction and emotion more effectively than simply explaining the issues.

Figure 12
Exhibition on community and alternative growing

Image: Horizon Garden, Exhibition at Tŷ Pawb 2023.

Another example of powerful engagement related to eco-anxiety. A range of surveys conducted in the UK revealed that approximately 60% of the population experiences elements of eco-anxiety. The culture sector is well placed to address this, and work by Amgueddfa Cymru has explored how a variety of different activities can empower people to channel their eco-anxiety into learning, behavioural change, and wider cultural shifts. This includes workshops, craft activities, climate communication training, symposiums and talks, working groups around solutions, and opportunities to engage with nature and develop a well-being-focused mindset.

Activities which help address eco-anxiety need not be innovative; culture sector organisations already possess the skills to deliver these activities. They are the bread and butter of community engagement.

3.3. Engagement to support a just transition

The Welsh Government has outlined its commitment to a just transition, stating that as we move to a cleaner, stronger, fairer Wales, it will leave no-one behind. The Just Transition Framework sets out the Welsh Government's strategic approach to achieving a just transition, underpinned by the Well-being of Future Generations Act.

"Achieving a just transition means thinking about climate change as a way to deliver our commitment to social and economic justice, consistent with our commitment to fair work and Social Partnership. It recognises the technological, social and economic challenges of tackling climate change and works to identify ways in which we can redress existing inequalities across communities and the Welsh workforce and prevent new ones from forming. An effective and fair transition needs to be planned and coordinated in a coherent way. We know that meeting Wales' climate change targets will require transformation across all sectors of our economy and society."

Securing a just transition necessitates not only achieving just outcomes but also ensuring fairness in decision-making processes and implementation. This entails considering who participates in shaping new policies and projects, who determines the rules of engagement, and the level of accountability in these processes. Termed as 'procedural justice' in research, it encompasses justice in *how* engagement occurs, policies are designed, and decisions are made. It is about who is involved and the manner in which they are involved.

A focus on just transition also recognises that current 'systems' are unjust, but that transition to net zero brings an opportunity for countries to recreate their economies in ways that are more equitable instead of replicating unjust policies and processes.

A just transition is "really about ensuring that all elements of our society and economy are transitioned away from one that is fundamentally extractive to one that is generative in all ways." It means that "the most marginalised and vulnerable people in this system are actually centred as we move forward in the creation of policy, so they then become the architects and the drivers of the new system." [19]

This approach to a just transition aligns with the views expressed by some of the stakeholders in this research, who noted that climate and social justice should be embedded and aligned with decolonising and indigenising sectors, shifting the approach to one of working with and for communities. One example raised was the impacts of digital engagement - how can the sector reach the most people, particularly those who feel the impacts of climate change?

Engaging citizens in climate and nature conversations, actions and policy making can be challenging. This is particularly true for marginalised or excluded groups who face additional barriers such as lack of knowledge, time, resources, language barriers, or trust issues. Overcoming these challenges requires thoughtful and creative strategies.

Young people are another group who can often be excluded from climate conversations and decisions. Amgueddfa Cymru's Youth Forums, established in 2021 across all their museums, serve as platforms for young people aged 14-25 to actively participate in decision-making processes and organise activities within the museum settings, exploring their perspectives and addressing issues they deem significant. Although the forums are not explicitly centred on climate-related topics, they have at times chosen to prioritise climate and nature concerns, including a focus on activities such as recycled art and sustainable fashion. [20]

Public Service Boards (PSBs) were established in 2015 to bring together local public service leaders to assess and address the well-being needs of their areas, in response to the Well-being of Future Generations (Wales) Act 2015.

The Act originally established a Board for each of the 22 Local Authorities in Wales, but PSBs can now work together across Local Authorities and merge. The PSBs are demonstrating a greater understanding of the climate and nature emergencies and recognise the need to increase their ambition. The culture sector in Wales could help further improve PSBs' understanding and coverage of cultural well-being and their insights into the impact of climate on culture.

3.4. Place-based climate and nature action

Cultural organisations, deeply embedded within their communities, have established strong relationships and understand the specific needs and issues facing community members. There is an opportunity to leverage the expertise and credibility of these organisations to support place-based climate and nature action across Wales.

Around 83% of the land in Wales is used for agriculture (67%), common land (10%), forestry or amenity woodland (6%). Agriculture, land use and climate change are deeply interconnected and have an impact on culture. This means engaging with rural and farming communities is particularly important.

CARAD (see case study below) is an organisation whose focus is on landscape and farming. They are located in a rural area in mid-Wales, so they are very aware of landscape changes and degradation, and are motivated to do what they can to make a difference for their community. A key challenge they encounter when conducting engagement and outreach work with local communities is the lack of collective conversation and action. Wildlife groups, farmers, and grant funders all have important roles to play in addressing the climate and nature emergency locally. CARAD creates a space for them to come together.

Engagement activities led by culture sector organisations have the opportunity to create connections in ways which spark engagement without alienating. During CARAD's Rhos Pastures project, an activity led by their Artist in Residence, they engaged the farming community as well as more traditional wildlife volunteers. The project saw the County Chairman of the Brecon and Radnor National Farmers Union and the head of the Radnorshire Wildlife Trust meet and talk for the first time ever.

Another example of note is the Peak Peers programme, which ran in 2023. It exemplified the fusion of place, nature, and creativity. This six-day programme, set amidst the scenic Black Mountains, engaged young people aged 18 to 30 from the Abergavenny region. Through creative workshops, walks, and talks with local experts, participants explored themes such as climate change, land rights, biodiversity, and creativity. The programme, hosted by Peak Cymru, encouraged dialogue and learning, fostering a sense of community stewardship and environmental responsibility. By offering bursaries to cover travel expenses, Peak Peers ensured inclusivity and accessibility.

A further example is the Carneddau Landscape Partnership Scheme, led by Eryri National Park. The partnership was established to consider and address threats posed to the landscape, biodiversity and traditional knowledge, place names, cultural stories, oral traditions and intangible cultural heritage. Key objectives included the promotion of sustainable land use practices to safeguard rare habitats, species, and archaeological sites, as well as the documentation of place names and local memories. The project is grant-funded by the National Heritage Lottery Fund for 2020-2025.

Landscapes and land are also profoundly connected to language. The culture sector plays a crucial role in supporting this connection, facilitating initiatives that celebrate the land through the language. This interconnection is acknowledged through the combined goal of "a Wales of vibrant culture and thriving Welsh language" under the Well-being of Future Generations Act.

Case study summary: Community Arts Rhayader And District

Community Arts Rhayader and District (CARAD) are an independent charity promoting participation in the arts and heritage activities in Mid Wales. The organisation focuses on taking people on a journey to net zero and beyond, tackling the big, uncomfortable changes that will need to happen if the climate crisis is to be addressed.

CARAD aim to give people the understanding of how things are changing, the action that needs to be taken and the tools to do so, with the belief that the greater the consensus for change, the more successful the net zero transition will be.

CARAD has consistently found creative methods of facilitating change the most effective way to reach people. Up until now, the standard approach to the climate crisis has been to deal in facts, and these have not achieved widespread behavioural change as needed. CARAD fundamentally believe that facts need to be embedded in stories, and people need to be made to feel agency and hope, not just despair.

This has translated into their work, which includes activities like nature talks coupled with drawing; craft, natural world, or wellbeing activities at festivals, exhibitions and events; an online Dragon Club for children, themed activities and ideas for real world nature or heritage visits, information and craft activities; and a gardening for life project with outdoor space for growing food.

Image: The Community Quilt hanging in Llandrindod Wells library, with Jane Titley (far left), the artist who helped inspire the makers. Part of the Rhos Pasture Restoration project.

Section 4

Capability for further action

Section summary and key takeaways

A key strength lies in the passion and dedication of individuals within the sector, particularly in smaller organisations where personal commitment often drives sustainability efforts. However, there is an over-reliance on individuals, and this could lead to inconsistent action and burnout.

When it comes to taking direct action on climate and nature, there is a resource and skills gap across the sector, which is limiting. Funding cuts present a significant challenge, hindering organisations from fully realising their sustainability goals and aspirations, including the role they can play in public engagement and policy-making.

Key challenges and opportunities regarding the culture sector's capability or further action are:

- **Collaboration:** Collaboration emerged as a cornerstone for addressing climate challenges within the sector, with widespread agreement on the necessity of establishing a cross-sector network and/or regional hubs. *See recommendation 1.*
- **Guidance and knowledge sharing:** Some sector stakeholders are making use of guidance and knowledge-sharing opportunities. However, this is not pervasive and there is a lack of Welsh language provision. Many organisations have already established internal policies across climate and nature challenges; a low-cost intervention could help share their learnings and support others across the sector to embark on their own climate and nature journey. *See recommendations 1 and 3.*
- **Partnerships:** Stakeholders emphasised the importance of partnership working in unlocking economies of scale, particularly in acquiring costly equipment for shared use. Establishing networks could play a pivotal role in fostering a circular economy marketplace for materials used in exhibitions or sets, promoting sustainability and resource efficiency. *See recommendation 3.*
- **Funding and finance:** There are significant investment costs for key technologies such as insulation and clean heating. Stakeholders feel the funding landscape is unclear and this prevents more prolific action. Where organisations had been successful in securing funding, they were able to support more extensive or widespread actions. Without long-term funding and financial support, organisations may struggle to sustain their climate and nature initiatives, or to embed these in core operating principles. *See recommendation 2.*
- **Culture sector resilience:** The CHERISH project highlighted the need for stronger alignment of decarbonisation and adaptation in policy and practise. The culture sector's resilience will be strongly impacted by local plans. For example, historic assets are at risk from the changing climate and specific challenges emerged for collections management in these buildings. *See recommendations 2 and 5.*

4.1. Section introduction

Across the range of stakeholder activities undertaken as part of this commission, it is evident that there is a huge amount of passion in the culture section in Wales to drive forward action on climate and nature.

> "We can't think currently of any greater benefit than doing what small things we can about climate change." Cath Allan, Co-Director, CARAD

> "What's really great about being part of this service is that commitment and that passion is there to do it." Owen A.M. Williams, Carmarthenshire Museum Service

Over 85% of survey respondents noted the 'desire to do the right thing' was driving action across their organisations, and 70% highlighted that action was driven by concerns and demand from their staff or team.

This passion was similarly reflected in the case studies we collected. Staff at Theatr na nÓg outlined that the passion from team members, supported by ambitions from company directors, was key to developing a formal and public climate statement to sit alongside the company's climate action plan. We also heard from Cardiff University Library Service that a set of voluntary eco-champions was critical to the delivery of climate and nature action. (See both case studies overleaf.)

Evidence collected suggests that the alignment of staff motivation with strategic policies on sustainability is key to unlocking action. Having high-level strategies in place enabled sustainability to take a higher priority in procurement and funding decisions as well as staff roles and responsibilities.

Whilst this passion is driving action in some areas, stakeholders also raised concerns that the climate and nature emergencies are yet to be considered in *all* decision-making across the sector. Stakeholders cited reasons which ranged from apathy to feeling overwhelmed, from a lack of accountability to inertia.

In this section, we discuss the capability in the culture sector in Wales for further action on the climate and nature emergencies and the barriers the sector faces to doing more. Two notable areas emerged from engagement: funding and finance (p.40) and resource and skills (p. 41)

Case study summary: Theatr na nÓg

Theatr na nÓg has been creating original theatre for over 30 years, in both Welsh and English. The organisation has always held the climate crisis as a core value. The team of staff believe there is a social responsibility in the work they do to address the climate crisis, whether through representing it in the shows they create or taking actions in their own operations.

With several staff members feeling increasingly passionate about the climate crisis, supported by the directors of the company, a formal climate statement was put out on the company's website alongside a published carbon emissions action plan. The action plan covers scope 1 direct emissions, scope 2 indirect emissions, and scope 3 indirect emissions from organisation activities.

Some of their actions have already delivered a big impact. This includes their own operations, for example staff carsharing when travelling for shows, leading to thousands of pounds saved over 3 months. Impact has also resulted through their engagement, for example, their classroom productions within schools has seen children embracing climate action in their learning.

The team at Theatr na nÓg continue to evolve their climate action plan despite challenges around funding, resources and wider infrastructure . As reflected by their General Manager Rachel Fryer "If we did everything on the action plan, well then you just come up with a new action plan."

Image: Actor Ioan Hefin in a performance of "You should ask Wallace", produced by Theatr na nÓg celebrating Welsh naturalist, Alfred Russel Wallace.

Case study summary: Cardiff University Libraries

Cardiff University Library Service looks after a significant portion of the Cardiff University's academic documents, including over 1.1 million printed books and more than 1.5 million online books, journals and resources. As part of Cardiff University, the Library Service is working to the target of 2030 set by the University for delivering net zero across Scope 1 and Scope 2 emissions.

In 2023 the Library Service undertook a strategy refresh, including adding goals around sustainability and net zero. Having these high-level strategic goals in place has supported library staff to set objectives and carve out time in their day-to-day roles to focus on delivering sustainability actions within the library service itself.

In addition, links to the wider university have been essential to help harness resources and funds and build strong relationships with people working across the university. This includes a core group of eco-champions, who have been critical to the delivery of climate and nature action.

These eco-champions have volunteered their time and effort to supporting a sustainability culture shift both within the library and the wider university. The relationship with the wider university has helped the library team build a wider awareness of sustainability and net zero, and to feel greater satisfaction in their work as they contribute to a broader net zero agenda.

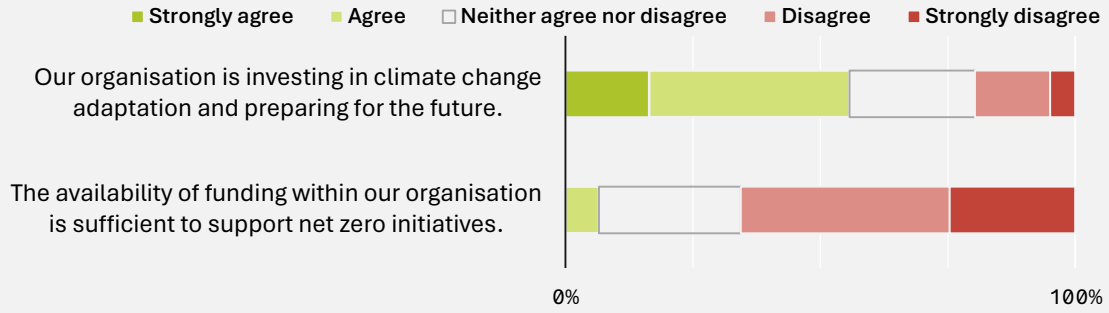
With the support of a Green Libraries grant, the team have focussed on increasing climate literacy and raising awareness of sustainability amongst university staff through online resources and carbon induction packs. They have also built themed displays within the library to engage students around topics of ecology, environmental destruction and sustainability, and facilitated activities to promote wider sustainability and circular economy practices.

Image: Carbon literacy training at Cardiff University

4.2. Funding and finance

A lack of funding and finance consistently emerged as a significant barrier to action across the sector. In our survey, 74% of respondents said that 'lack of financial resources' was a barrier to action, alongside 'lack of funding' (54%) and 'increased costs for green alternatives' (36%).

Figure 13
Stakeholders overwhelmingly feel there is a funding gap which needs to be addressed to tackle emissions reduction.



Notes: Respondents were asked, "To what extent do you agree with the following statements?"
Survey conducted by Regen in 2024; 61 respondents.

In focus group activities and wider stakeholder engagement, participants frequently cited funding limitations as the primary factor hindering their ability to implement desired actions. These actions ranged from retrofit measures (particularly in older buildings) and climate adaptations to improve visitor experiences, to enhancing sustainability in the screen sector.

Moreover, it was noted that the nature of funding itself posed challenges, particularly the lack of long-term funding, which prevents organisations from effectively embedding sustainable practices.

By contrast, where organisations had been successful in securing funding, they were able to support more extensive or widespread actions, including capital investments like heat pumps, development of carbon literacy training, and 'buying out' staff time to enable more people to support delivery of climate and nature action.

> "We work with a wide cross-section of the community. We are a lean organisation but like many are under threat as we are an older volunteer leadership team who need paid staff to take over. None of our 62 volunteers are likely to work full time for the organisation as we do. Times have changed. We need funding, we need the community and country around us to be more arts and climate friendly and to have positive ways of engaging people in enjoyable ways." Catherine Allan, Co-Director, CARAD

4.3. Resource and skills

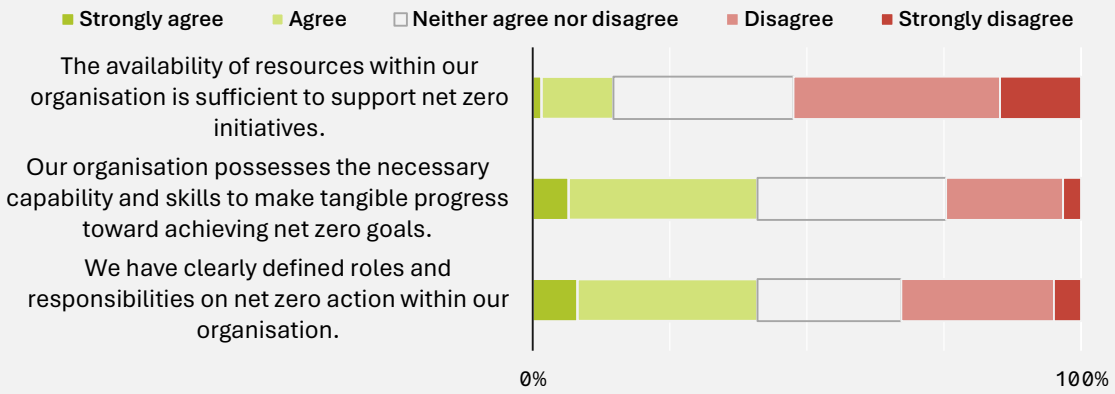
Stakeholder engagement undertaken as part of this research identified the risk of individuals overexerting themselves due to their passion for their work. Relying solely on personal passion as a motivation can lead to burnout and undermine efforts towards a fair and equitable transition. A Just Transition necessitates considering the well-being and fair treatment of all workers, ensuring that workload and expectations are reasonable and sustainable for everyone involved.

Shared resources can support staff and prevent duplication of efforts. Of those organisations who participated in our survey, 62% had previously used best practice guidance and resources, for example, Julie's Bicycle or the Theatre Green Book. This type of support has mainly been accessed in the form of guides and training ('peer-to-peer exchange', 'guide or toolkit', 'environmental training, webinars and events'). Of those who accessed this support, 51% were from the arts sector, with 23% from the heritage sector and 11% from the museum sector.

In relation to climate and nature knowledge, it was positive to see that most survey respondents felt there were high levels of general knowledge in their organisations and people within them who "knew what needed to be done, to reduce emissions". However, stakeholders also maintained that more could be done to improve knowledge, confidence and understanding of key terms such as 'climate mitigation', 'climate adaptation' and 'just transition'. Skills to undertake direct action on emissions were rarer – less than half of the respondents felt their organisation had the technical skills needed to track emissions and/or implement actions.

Figure 14

Stakeholders feel there is a skills gap which needs to be addressed to tackle emissions reduction.



Notes: Respondents were asked, "To what extent do you agree with the following statements?"
Survey conducted by Regen in 2024; 61 respondents.

For organisations that manage collections, several specific challenges were identified, particularly the balance of collection-specific environmental conditions and the listed status of the buildings where they are held. For example, collections need sensitive heating and cooling requirements and commonly use single-use materials for object storage. This was highlighted in our case study with Conwy Culture Centre, where we heard about the importance of involving staff with subject matter expertise in the design of building management systems. These people best understand the needs of the archive; however, their knowledge is often overlooked by building management teams. Better training or understanding from the building management teams could support constructive input from specialists in the future.

Case study summary: The CHERISH Project

The Climate, Heritage and Environments of Reefs, Islands and Headlands (CHERISH) project was an EU funded research project which ran from 2017 to 2023 across Ireland and Wales. The project aimed to raise awareness around past and future impacts of climate change and extreme weather events on the cultural heritage of reefs, islands and headlands of the Irish Sea.

These areas are often on the front line in terms of experiencing changes due to climate, which makes it particularly important to understand and quantify the impacts in these areas and identify adaptation opportunities.

The project focussed on targeting data and management knowledge gaps, employing innovative techniques to discover, assess, map and monitor heritage assets on land and beneath the sea. Over its five years, the project supported the collection of data across a range of areas.

A further area of impact has been in the toolkits left behind as a legacy of the research done by the project. These provide good practice guidance to others working on surveying, assessing, and developing management plans for heritage sites threatened by climate change, and were published in March 2023 in a how-to guide for researching at-risk sites. This guide is intended to be of use to individuals, local community groups, as well as heritage professionals, wanting to monitor changes, damage and loss at heritage sites.

The CHERISH project showed the power of bringing together key stakeholders across Wales and Ireland. It demonstrated how the culture sector, working with other cross disciplinary organisations, can use collective knowledge, skill, and equipment to look at climate change and start moving the conversation towards adaptation.

Image: Illustrated map of CHERISH Welsh projects

Section 5

Conclusions and action plan

The findings presented herein are based on an examination of current initiatives and challenges across the culture sector in Wales as it addresses achieving net zero emissions by 2050.

The following action plan outlines a preliminary framework which could help to address challenges and is based on the research and analysis presented in this report. It does not constitute a commitment from the Welsh Government and other bodies, and it is crucial to recognise the need for further refinement and consultation before the plan can be formally adopted.

A notable omission from this research is direct engagement with certain groups, particularly freelancers and volunteers, who make up a significant proportion of the culture sector workforce. At the time of writing, the Strategy for Climate Justice and the Arts, commissioned by the Arts Council of Wales in partnership with Natural Resources Wales, is in development and will look at issues such as using the arts to connect people with the nature and climate emergencies and the support required for artists and arts organisations to minimise the environmental impact of creating art.

5.1. Applying guiding principles

A clear desire to apply collective sector principles and goals emerged from stakeholders during this research. The ways of working set out in the Well-being of Future Generations Act have been used as a framework to collate guiding principles and these are presented below.

Prevention

"Prevent problems occurring or getting worse by preparing people for the changes ahead, ensuring fairness is embedded in the approach and building greater resilience to climate change within our communities."

Recognising the value of cultural spaces: Cultural spaces are an important part of social infrastructure and therefore it is of paramount importance that they are prepared for extreme weather – rainfall, heat, and cold - and that there is a commitment to move away from volatile energy prices and an over-reliance on fossil fuels.

Prioritising immediate impact: Recognising that the cultural sector bears a responsibility to mitigate its climate change impacts, focus first on implementing 'low hanging fruit' which quickly reduce emissions in the near term and improve the culture sector's climate change resilience.

Empowering the workforce: Ensure the workforce feels valued and supported to actively contribute to ideas and solutions to address climate change challenges within their organisations. Invest in worker well-being to foster a culture of creativity and problem-solving. The well-being and resilience of culture sector workers is critically important.

Long-term

"Balance the need for creating early momentum where we can and focus on addressing more of the long-term challenges where we can't."

Long-term financial thinking: There is a need for business models which help us move past short-term 'cheap' options.

Lead the way to inspire others: Actions taken by the sector to address the climate and nature emergencies should be communicated, with explanations about why actions are being taken. The sector should communicate with audiences and service users in a way that is relevant and builds on previous communications.

Transcend short-term policy constraints: Acknowledging the challenges posed by shifting political and economic landscapes, along with the short-term focus of parliamentary cycles, leverage culture sector expertise to offer evidence-based insights to policymakers.

Integration

"Adopt a whole systems approach to problem-solving and delivery of mutually beneficial solutions."

Collective impact monitoring systems should be developed in Wales which allow for meaningful, comparable, fair monitoring of emissions as well as other social and environmental impacts.

Adaptability: The full scope of emissions should be included in monitoring tools in order to identify where the most impact can be achieved. However, monitoring tools should be adaptable and able to meet the varied and limited resources of organisations.

Honesty and integrity: The aim of monitoring should not be to shame any organisation, but to encourage open and honest conversations about progress and focus on tangible actions.

Involvement

"Actively listen to and involve people in shaping solutions that will affect them."

Climate conversations: The culture sector has a role to play in facilitating open and honest conversations with Welsh communities, to alleviate climate anxiety and raise awareness and acceptability of sustainable lifestyles and policy choices.

Welsh language: The link between language and land can create a closer relationship between people and nature. Wales' unique relationship with its language and land also gives more context to Welsh culture on a global stage and should be celebrated.

Access and inclusivity: A diverse range of creative climate activities should be developed which aim to involve different groups across Wales. Continued attention should be given to developing accessible communications which avoid jargon and chimes with different groups.

Collaboration

"Ensure openness and transparency over the way in which action is delivered."

Openness: foster a collaborative, non-competitive culture where successes and failures are openly shared.

Partnerships: use collective influence to unlock economies of scale across the sector and encourage suppliers to move towards sustainable practices.

Collaborative expertise: Build relationships, trust, and ways of working with climate and nature experts to create mutually beneficial outcomes.

5.2. Recommendations and action plan

The Welsh Government has made notable progress in developing climate and nature policies. However, there remains a crucial need for stronger alignment between policy development and supportive actions to effectively implement these policies.

Funding cuts have presented significant challenges for culture sector organisations. Many face obstacles in their efforts to contribute meaningfully to climate and nature goals, highlighting the disconnect between policy aspirations and practical support. Addressing this gap requires a coordinated approach and sufficient resources to enable culture sector organisations to translate policy intentions into tangible actions and outcomes.

Based on the findings of this research, five overarching recommendations have emerged, each addressing key areas of concern. These recommendations are explored in greater depth below.

1. The Welsh Government and culture sector stakeholders should foster an autonomous sectoral peer network to focus on climate and nature in the culture sector in Wales.
2. The Welsh Government should develop its understanding of the culture sector infrastructure in Wales and work with sector stakeholders to ensure assets in the sector are both resilient to climate change impacts, and able to lessen their impact on the climate.
3. Culture sector organisations are supported to develop environmental policies and climate action plans[16]. The Welsh Government and sector stakeholders should work together to consolidate action across the culture sector and achieve improved momentum.
4. The culture sector should continue to embrace its role as a 'cultural changemaker' and strengthen it further. Collaborative and cohesive approaches are needed to strengthen messaging and facilitate meaningful climate and nature conversations.
5. The Welsh Government should ensure the culture sector is represented within climate and nature policy-making.

These recommendations are further broken down into recommended actions. Some of these actions cut across more than one of the recommendations, but have been categorised where they are most relevant. The actions have been contextualised against timelines for the Welsh carbon budgets, as follows:

- Short term - Second Carbon Budget (2021-2025)
- Medium term - Third Carbon Budget (2026-2030)
- Long term - Fourth Carbon Budget (2030 onwards)

[16] "Environmental policy is a statement of values, principles and commitment to positive environmental change" and an "action plan lays out how you will put these into practice... outlin[ing] the roadmap for making tangible change(s)." [25]

Recommendation 1:

The Welsh Government and culture sector stakeholders should foster an autonomous sectoral peer network to focus on climate and nature in the culture sector in Wales.

With the limitations on funding and finance across the sector, there is significant value in fostering collaboration to share knowledge and good practice and to avoid unnecessary duplication across organisations, from collecting data to building expertise. Stakeholders see the establishment of a formal network, hub, or community of practice (CoP) as vital to progress. A supportive framework would help build capacity to work and learn creatively together whilst harnessing the collective intelligence across different organisations. [21]

Across the UK, there are several freely available tools, guidance documents, and working groups already contributing to this goal. There are also organisations in Wales, which are developing business models around culture sector collaboration for climate and nature action. However, this is not fully coordinated nor centralised, i.e., not one body is accountable for ensuring an establishment thrives. Research by the European Commission states that a CoP cannot function without a community manager, who has the "dedicated time and support to carry out the role effectively" [21]. Critically, there is also a lack of Welsh language provision, where guidance has been developed by organisations in England and Scotland.

Establishing a more formal structure would not only support more innovative action across the sector but would also enable better knowledge sharing with those organisations that are less advanced in their climate and nature journeys. It could empower them to act by showing them their role is directly relevant to tackling climate change and making them feel part of a wider community.

> "It's about thinking about what we can do locally to make a difference, how we can raise awareness but also so that we can collaborate and build more with others ... working as part of a bigger picture, not just in isolation."
> Tracey Stanley, Director of Library Services, Cardiff University

	Proposals for action	Timeframe
1A	The Welsh Government to work with the steering group (established during this research commission) to co-create a vision for a peer network, ensuring transparent governance and accountability structures.	**Short term**
1B	The Steering Group to explore sustainable business model options for the network, and to define the remit, which could include actions 1C, 1D, and 3A, 3C and 3D.	**Short term**
1C	The network to collate a culture sector 'library' for all to access useful guides. Develop guidance with Welsh language provision.	**Medium term**
1D	The network to host an online forum and identify and collate already active and relevant working groups. Consider coordinating additional sectoral working groups to address gaps.	**Medium term**

Recommendation 2:

The Welsh Government should develop its understanding of the culture sector infrastructure in Wales and work with sector stakeholders to ensure assets in the sector are both resilient to climate change impacts, and able to lessen their impact on the climate.

The climate and nature crises bring a range of challenges for cultural assets and heritage sites, many of which are at the frontline of climate change and clearly demonstrate the impact. To address these challenges, policymakers and sector stakeholders need to simultaneously understand and quantify:

1. The impacts of climate change on these assets, communities and workers
2. The impact of these assets on the environment.

These two elements must be examined together; separating them in policy or decision-making could result in sub-optimal action. For example, when retrofitting a building aligned with net zero targets, it is also important to consider how this building may perform under different environmental conditions anticipated with climate change.

This will help the culture sector in Wales identify adaptation opportunities to protect cultural assets and maximise the opportunities to drive decarbonisation.

It is important more data is collected to support evidence-based decision-making. The CHERISH project made positive headway in collecting data and developing toolkits to monitor changes, damage and loss for heritage sites in coastal and marine environments. Many of these approaches could be adopted for other types of landscape, for example, upland environments. Public energy performance certificates are also only available for less than half of culture sector buildings (within the scope of this work). These certificates are also insufficient in providing appropriate information to help make decisions on improvements. [22]

It is important to consider the impact of all forms of infrastructure. This includes digital infrastructure. Digital platforms and spaces can offer powerful ways of connecting to culture and engaging with cultural programming. The culture sector has adopted digital technologies to build and manage world-class collections, provide greater public access to collections, and increase engagement with communities within Wales and across the world. However, using new technology carries a carbon cost. There is a need to be mindful of the energy costs and carbon footprint of maintaining digital content.

The Welsh Government should support and enhance good digital practice around standards, rationalisation, procurement and technology, and establishing green approaches to digital work.

	Proposals for action	Timeframe
2A	Targets should be set for culture sector organisations to conduct and collate a number of retrofit assessments, in line with latest BSI standards, by 2027 – aggregating these to improve evidence of building stock state. Consider also requesting and collating more non-public data from EPCs.	**Short term**
2B	Deliver 'demonstrator' retrofit projects for decarbonisation and adaptation. The programme would first develop capital-investment-ready retrofit design plans for each project. The culture sector organisations should lead on the engagement and promotion to exemplify and educate throughout projects.	**Medium term**
2C	The network should work with the Development Bank of Wales to promote the Green Business Loan Scheme to private culture sector organisations. Furthermore, in the medium term, advocate for culture sector needs in the development of future loan schemes.	**Short and medium term**
2D	Produce guidance to support culture sector organisations to develop climate risk assessment and adaptation plans for cultural assets, including buildings and archives.	**Medium term**

Recommendation 3:

Culture sector organisations are supported to develop environmental policies and climate action plans.[17] The Welsh Government and sector stakeholders should work together to consolidate action across the culture sector and achieve improved momentum.

This research demonstrates there are many actions the sector could take to address the climate and nature emergencies. Some organisations are delivering diverse activities ranging from renewable energy generation to pension investment decisions to digital decarbonisation. However, some actions are more widely undertaken than others. Most sector organisations are already engaged in practices to reduce waste and improve recycling, but other actions are less common. Many also lack data to inform decisions - tracking even Scope 1 emissions and/or energy consumption is uncommon.

Evidence suggests there are good levels of general knowledge within culture sector organisations and people within them "knew what needed to be done to reduce emissions". However, skills to undertake direct action on emissions are uncommon and more could be done to improve the understanding of key terms such as 'climate mitigation', 'climate adaptation', and 'just transition'.

Increased funding and investment are critical to support more ambitious and widespread action; many stakeholders noted that cuts to funding have created challenges in delivery, with only 6% of survey respondents reporting availability of funding is sufficient to support net zero initiatives.

[17] "Environmental policy is a statement of values, principles and commitment to positive environmental change" and an "action plan lays out how you will put these into practice… outlin[ing] the roadmap for making tangible change(s)." "Environmental policy is a statement of values, principles and commitment to positive environmental change" and an "action plan lays out how you will put these into practice… outlin[ing] the roadmap for making tangible change(s)." [25]

Greater investment is needed to develop specialist roles and skills for delivering climate and nature action within culture sector organisations; fewer than 30% of our survey respondents have clearly defined roles and responsibilities or capability and skills for delivering net zero actions.

	Proposals for action	Timeframe
3A	[Linked to action **1C**] The network and the Welsh Government should build on the Welsh Public Sector Net Zero Reporting Guide, to better encourage organisations to publish summary results annually.	**Medium term**
3B	The Welsh Government to continue work with the relevant funding bodies to ensure reporting is in line with the Wellbeing of Future Generation Act. The Welsh Government should also explore additional potential ring-fenced grant funding to help culture sector organisations develop and deliver against climate action plans.	**Medium to long term**
3C	The network should facilitate an upskilling programme (including climate mitigation, adaptation and just transition) for the workforce and volunteers, which also enables cross-organisation sharing of expertise.	**Medium term**
3D	The network should establish partnerships which develop circular supply chains and increase collective demand for sustainable materials and kit.	**Medium term**

Recommendation 4:

The culture sector should continue to embrace its role as a 'cultural changemaker' and strengthen it further. Collaborative and cohesive approaches are needed to strengthen messaging and facilitate meaningful climate and nature conversations.

Big changes are required across society, and some uncomfortable choices need to be made. If people don't understand this, there is a risk they may disengage or actively resist change. The culture sector is able to reach people in creative and imaginative ways, often stimulating an emotional response and providing people with the understanding, motivation and tools for change. 87% of stakeholders who responded to the survey agreed that the culture sector in Wales has unique skills it can use to engage with people, inform, and mobilise change, and 74% were confident in their team's ability to engage the public on the climate and nature emergencies.

Some of the most successful ways of reaching people are through creative methods. Human brains store ideas through metaphor and stories, so public engagement needs to embed facts in stories, and engage communities in culturally and contextually appropriate ways.

> "It's knowing your community and being able to engage that community in a way that isn't going to alienate them." Catherine Allan, Co-Director, CARAD

Bringing people together through creative activities can help build relationships between diverse stakeholders and inspire change. Creative approaches can also open up new ways of communicating and engaging on climate and nature policy, using tools like storytelling and visioning. The culture sector is uniquely placed to support this and engage wider society with Wales' net zero transition.

	Proposals for action	Timeframe
4A	The Welsh Government should involve the culture sector in public engagement on the climate and nature crises. This includes involvement of culture sector organisations in Welsh Climate Week. Additionally, the Welsh Government has committed to a review of deliberate public engagement being conducted in Wales. This review should build on the evidence collected in this commission and use the proposed network to continue to engage directly with the sector.	**Medium term**
4B	Across the culture sector, the Welsh Government should ensure any funded actions on tackling the climate and nature emergencies include requirements to communicate the *why* and *how* of the change to audiences and service users, using appropriate communication methods.	**Medium term**
4C	The proposed network should develop case studies and share examples of the Welsh culture sector as 'cultural changemakers' to inspire and engage other policy areas.	**Short term**

Recommendation 5:

The Welsh Government should ensure the culture sector is represented within climate and nature policy-making.

Culture sector organisations are not currently at the policy 'table.' If they are not part of the policy discussion, this will limit the ability to develop policy that is genuinely prosperous and relevant across the sector and wider society. Transitioning to net zero in a fair way means more than simply understanding the issues: it means bringing more people who have lived them intimately into the realms of policy design. This means ensuring culture sector representatives are in the policy making spaces to reflect their unique needs or challenges. This will support more creative thinking in policy making and help to ensure cross-cutting policy is integrated. As a result, the sector gets the support it needs on actions across buildings, heating, transport, recycling, biodiversity, and beyond.

	Proposals for action	Timeframe
5A	The Welsh Government and culture sector organisations should apply Just Transition framework principles to culture sector policy development.	**Medium term**
5B	The Welsh Government should explore opportunities for the culture sector to engage in climate and nature policy-making at a national and local level, e.g., the future of heat, transport, recycling, climate resilience and skills strategies. This should include representation where appropriate, and the use of evidence and best practise examples.	**Short to medium term**
5C	The Welsh Government should take opportunities presented through the delivery of existing Welsh Government strategies, bringing together representative samples of the wider culture sector to address public engagement and key areas of climate and nature policy.	**Long term**

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Appendix A - Building stock analysis

This appendix provides additional details on the buildings stock analysis which contributes to the evidence in Section 2, Climate impact and resilience within the culture sector, p. 11. The analysis, conducted by Energy Saving Trust (EST), includes;

- Building emissions and indicative retrofit cost analysis p. 55
- Community energy opportunity, p. 63
- Summary and conclusions, p. 66.

Data collation

Desk research collated existing data relating to the organisations' buildings within the six groups, as defined in 1.3.1 Stakeholder scope. The locational data for each site was used to determine if a Non-domestic Energy Performance Certificate (NDEPC) or Display Energy Certificate (DEC) existed for the site. This was collated in a database and shared with the Welsh Government and is available to be used for future research.

Energy Performance Certificates

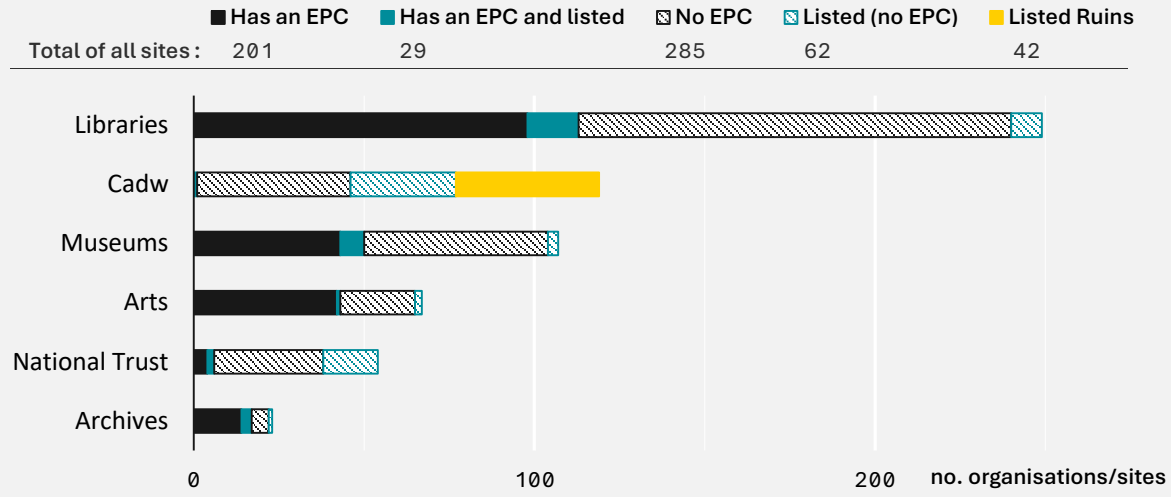
A total of 230 organisations had at least one type of Energy Certificate associated with the facilities. Table 2 shows the percentage of organisations with an Energy Certificate by stakeholder-defined groupings. Figure 15 shows the listed status of a building to a corresponding Energy Certificate. Note that the listing status and Energy Certificate type are further categorised within the database.

Table 2: **Prevalence of EPC data by subsector**

Stakeholder Grouping	DEC	NDEPC	Both DEC/NDEPC	Neither DEC/NDEPC
All Sites	**15%**	**12%**	**10%**	**63%**
Cadw	0%	1%	0%	99%
National Trust	2%	7%	2%	89%
Library	14%	18%	13%	55%
Museum	27%	11%	8%	53%
Arts portfolio	22%	22%	19%	36%
Archive	48%	4%	22%	26%

Figure 15

Prevalence of EPC data by subsector and listed status .



Source: Regen analysis of EPC databases

The factor of shared status of the building was also considered when reviewing the building stock for each organisation. As NDEPCS are carried out on a full building basis, understanding the occupancy of a building is important when reviewing the emissions associated with an organisation. Whilst extensive research was not conducted on all organisations, sites with an Energy Certificate were analysed to determine if they were the sole occupant of a building. Thirty-four organisations were found to share a building either with an organisation identified in this study or a separate entity. One notable site is the Arts Portfolio: Wales Millennium Centre, identified as one organisation within the Arts Portfolio grouping. However, six other organisations are occupants of the Wales Millenium Centre. Libraries saw the largest proportion of shared buildings, with at least 13 identified to be within a leisure centre or community hub. This type of multiple occupancy poses a challenge when attributing emissions for an organisation.

There is a gap in *public* data regarding Cadw and National Trust buildings. Following an in-depth review, 99 sites had no buildings or facilities associated with them. This included eight sites that are classed as 'Scheduled Monuments', 40 Cadw sites that are categorised as ruins, and 16 National Trust coastline sites of which six had associated facilities, such as a gift shop, book shops or cafes onsite. Due to the lack of public data, Cadw and National Trust have not been included in the data analysis.

High-level analysis

EST was contracted to examine energy performance data on buildings owned or used by these organisations via;

- A high-level estimate of carbon emissions for the culture sector,
- An illustrative estimate of sector-wide retrofit costs and potential energy and carbon savings,
- A discussion of the challenges and opportunities involved in carrying out the work, including limitations caused by buildings of multiple occupancy, community energy projects and heat networks.

Methodology

1. Data cleaning: For both DEC and NDEPC data, only the most recent entry for each building was taken based on the lodgement date for each building. For some DEC and NDEPCs, additional cleaning was required to identify DEC/NDEPCs for each building where the address name changed but was very similar. This was done based on the variables present in the dataset (e.g. similar floor area, energy usage and address names).
2. Carbon emissions: Using the cleaned DECs, carbon emissions were estimated using the data on the certificates. Total carbon emissions (TOTAL_CO2) were estimated using the following equation:

$$TOTAL\_CO2 = ELECTRIC\_CO2 + HEATING\_CO2 - RENEWABLES\_CO2$$

   where ELECTRIC_CO2, HEATING_CO2 and RENEWABLES_CO2 are the CO2 emissions from electricity, heating and renewable energy respectively. The renewables figure is negative as it calculates the emissions saved from the renewable installation.
   - NDEPCs report the total building emissions within the certificate already. If an organisation had both a DEC and NDEPC, the DEC was chosen as it uses actual recorded energy use, rather than a modelled estimate.
   - For organisations that had multiple DECs or NDEPCs associated with them, these were combined to give a total for that organisation. For organisations which shared a building (e.g. multiple organisations used the Wales Millenium Centre), the emissions were ascribed equally between the number of organisations.
3. Aggregated carbon emissions: Since not all organisations had DEC or NDEPC data, a mean for each archetype was calculated and scaled up to give an estimate of the emissions for that entire archetype. An associated error was also calculated using the 95% confidence interval.
4. Heat pump retrofit costs: Illustrative retrofit fit costs were determined for heat pumps and solar PV using information from the DECs.[18] For heat pumps:
   - The annual heating demand was calculated from the DEC data.
   - An estimation of the heat pump capacity was calculated by dividing the annual heating demand by the typical running hours of a heat pump (2000-2400 hours per year). A cost per kW figure was used to estimate installation costs of the heat pump.
   - Savings were estimated by calculating the difference between the cost to heat the building using the previous heating system and with a heat pump. A simple payback period for each system was also determined.
   - A similar calculation to the above was carried out using the carbon factors for the respective heating systems to estimate carbon emissions savings.
5. Solar PV retrofit costs: Retrofit costs for solar PV were determined via DECs;
   - Buildings were categorised into the likelihood for the supply to be either single or three-phase based on their annual electricity consumption. Properties above a threshold

[18] Other measures were considered to be too complex to estimate in this initial phase as they are very building dependent (e.g. listed status limiting what work can be done). It was not possible to use the NDEPCs to estimate retrofit costs as they do not have the required fields within their data. It was decided not to use the recommendations provide on the DECs and NDEPC for analysis as they did not give detailed information on potential costs and benefits and often had conflicting information on them. This is likely to be because the recommendations are based on the subjective opinion of the assessors.

(100,000 kWh) were classified as more likely to be three-phase, whilst those below were single-phase.
- Depending on their classification, each building was prescribed a solar array size. An associated cost for that size system was calculated based on the information provided in the appendix.
- To determine savings, the amount of electricity generated, used on-site and exported were calculated and the associated cost savings/payments were calculated. A simple payback period for each system was determined.
- A similar calculation to the above was carried out using the carbon factor for electricity to estimate carbon emissions savings.

6. Heat network proximity: the Welsh Government has already identified several locations across Wales where it may be advantageous to consider heat network development under Policy 16. [23] The heat networks planning database provides a list of projects that are currently in the pipeline (either in scoping, planning, under construction or operational) [24].
- Using the location data for each Welsh cultural organisation, the distance between each organisation and each heat network location was determined using the geosphere package in R. For each organisation the closest heat network was filtered and the distance was recorded. Buildings that were close to each of these heat network locations were considered suitable for consideration as heat network hubs.

Assumptions

Table 3:
Assumptions used in the cost analysis. Assumptions are correct as of April 2024

Variable	Description	Value	Additional notes
Energy Prices			
Electricity Import Price	Cost to import electricity from the grid	£0.2450/kWh	
Electricity Export Price	Cost to export electricity to the grid	£0.12/kWh	
Gas Price	Cost for gas	£0.0604/kWh	
LPG Price	Cost for LPG	£0.0906/kWh	
Oil Price	Cost for oil	£0.0713/kWh	
Carbon Factors			
Electricity Carbon Factor		0.225 $kgCO_2e/kWh$	
Gas Carbon Factor		0.213 $kgCO_2e/kWh$	
LPG Carbon Factor		0.240 $kgCO_2e/kWh$	
Oil Carbon Factor		0.298 $kgCO_2e/kWh$	
Solar PV cost assumptions			
Three-phase power energy cut off	Cut-off electricity demand threshold for a three-phase system. Below - single phase, above - three phase	100,000 kWh	Based on mean amperage of 50A across an entire year.
Single-phase solar array size	Assumed size range of single-phase solar systems	4-5 kWp	
Three-phase solar array size	Assumed size range of three-phase solar systems	12-15 kWp	
Solar PV cost (<10 kW)	Cost of solar PV systems per kWp	£1,594-£1,884	Slate or tile roof

Solar PV cost (10-50 kW)	Cost of solar PV systems per kWp	£1,377-£1,449	Tile or commercial roof
Assumed solar generation	Electricity generated per kWp of solar PV	1000 kWh/kWp	Typical value for Wales
Assumed solar self-consumption rate	The percentage of solar generated used on-site	50%	
Assumed heating efficiencies			
Heat pump efficiency		300%	
Electric heating efficiency		100%	
Gas heating efficiency		85%	
LPG heating efficiency		85%	
Oil heating efficiency		82%	
Heat pump cost assumptions			
Heat pump running hours	The number of hours the heat pump is assumed to run for during the year	2000-2400 hours	
Heat pump cost	Cost of the heat pump per kW of installed capacity	£1200-1600/kW	

Building analysis results

Indicative building use emissions

The table below gives an estimate of the carbon emissions for each archetype. Total emissions for the entire culture sector (minus Cadw and NT) are estimated to be 77,184 ± 30,300 tCO2e per year.

It should be noted that this is a very high-level estimate and it is unclear if this is an over or underestimate given the data that is available. However, it does provide a reasonable ballpark figure with which to make further plans to investigate the sector.

Table 4
Average annual carbon emissions per archetype and scaled to all organisations.

Archetype	Sub archetype	Number of Orgs.	Number of Orgs. With emissions data	Average Emissions (tCO_2)	Average Emissions tCO2 CI	Total Scaled Emissions tCO2	Total Scaled Emissions CI tCO2
Archive	NA	23	17	471	358	10,829	8,231
Arts portfolio	NA	68	40	355	128	24,139	8,724
Library	NA	249	109	107	26	26,594	6,373
Museum	Large	22	11	422	201	9,283	4,420
Museum	Medium	41	21	90	37	3,686	1,526
Museum	Small	44	16	60	23	2,654	1,026
Overall	**-**	**447**	**214**	**173**	**68**	**77,184**	**30,300**
Cadw	-	119	-	Unable to assess emissions			
NT	-	54	-	Unable to assess emissions			

Indicative building retrofit costs

Total installation cost of rooftop solar PV across the sector was estimated at around £5 million, with a total installed capacity of around 3-4 MW. This may be an underestimate of capacity; in many cases those in properties in or near cities and towns may find electrical connection upgrades are relatively cheap, justifying larger installations.

Heat pumps have an estimated install cost between £83m and £111m. The analysis also highlighted that heat pump installations are unlikely to see significant operational savings if current high relative cost of other heating fuels compared to electricity remain. However, the carbon emission savings for the assessed properties are considerable at around 25,000 tCO2e annually.

Table 5

Costs and savings for solar PV

Archetype	# Orgs	# orgs with DEC	# with solar noted	Average per organisation					Subsector total				
				Solar Install Capacity (kWp)	Solar Install Cost (GBP)	Solar Generation (kWh)	Solar Total Savings (GBP)	Solar Total Savings (kgCO2)	Solar Install Capacity (kWp)	Solar Install Cost (000s GBP)	Solar Generation (MWh)	Solar Total Savings (GBP)	Solar Total Savings (tCO2)
Archive	23	16	0	14.4 – 18	£20,310 - £27,328	14,375 – 17,969	£2,623 - £3,279	3,234 – 4,043	330.6 – 413.3	£467 - £629	331 – 413	£60,339 - £75,424	74 – 93
Arts portfolio	69	27	0	8.4 – 10.5	£11,896 - £16,087	8,370 – 10,463	£1,528 - £1,909	1,883 – 2,354	577.6 – 721.9	£821 - £1110	578 – 722	£105,404 - £131,755	130 – 162
Library	251	68	2	5.3 – 6.6	£8,113 - £11,652	5,294 – 6,618	£966 - £1,208	1,191 – 1,489	1,289.7 – 1,612.2	£1977 - £2839	1290 – 1612	£235,378 - £294,222	290 – 363
Museum – Large	23	11	1	14 – 17.5	£19,830 - £26,742	14,000 – 17,500	£2,555 - £3,194	3,150 – 3,938	292.7 – 365.9	£415 - £559	292 – 366	£53,423 - £66,778	66 – 82
Museum – Medium	42	20	1	7.1 – 8.9	£10,471 - £14,600	7,100 – 8,875	£1,296 - £1,620	1,598 – 1,997	283.3 – 354.1	£418 - £583	283 – 354	£51,700 - £64,626	64 – 80
Museum – Small	44	9	0	4.7 – 5.8	£7,149 - £10,265	4,667 – 5,833	£852 - £1,065	1,050 – 1,312	205.3 – 256.7	£315 - £452	205 – 257	£37,473 - £46,842	46 – 58
Total	**452**	**151**	**4**						**2,979.3 – 3,724.1**	**£4411 - £6171**	**2979 – 3724**	**£543,717 - £679,646**	**670 – 838**

Table 6:

Costs and savings for heat pumps

Archetype	# Orgs	# orgs with DEC	Average per organisation				Subsector total			
			Heat Pump Capacity (kW)	Heat Pump Cost (GBP)	Heat Pump Savings (GBP)	Heat Pump Savings (kgCO2)	Heat Pump Capacity (MW)	Heat Pump Cost (£m)	Heat Pump Savings (GBP)	Heat Pump Savings (tCO2)
Archive	23	16	363 – 436	£435,833 - £581,111	-7426	132,928	8.4 – 10.0	£10m - £13m	-£170,804	3,057
Arts portfolio	69	27	366 – 439	£439,012 - £585,350	-7496	131,580	25.2 – 30.3	£30m - £40m	-£517,208	9,079
Library	251	68	96 – 115	£114,931 - £153,241	-1961	34,330	23.7 – 28.4	£28m - £38m	-£484,864	8,490
Museum – Large	23	11	303 – 364	£363,811 - £485,081	-6561	108,598	7.0 – 8.4	£8.4m - £11.2m	-£150,897	2,498
Museum – Medium	42	20	85 – 102	£101,633 - £135,510	-889	31,181	3.6 – 4.3	£4.2m - £5.7m	-£37,335	1,310
Museum – Small	44	9	31 – 37	£36,790 - £49,053	-454	7,521	1.3 – 1.6	£1.6m - £2.2	-£19,992	330
Total	**452**	**151**					**69.2 – 83.0**	**£83m - £111m**	**-£1,381,100**	**24,764**

Heat network proximity

Heat networks require a significant amount of pipework to move the heat around. Therefore, cutoffs have been set at 500, 1000 and 1500 m to highlight the number of organisations that might be able to be part of a heat network or potentially provide a large heat load/base for the network. Within 500, 1000 and 1500 m there are 39 (6%), 54 (9%) and 69 (11%) organisations, respectively. Whilst this may seem a relatively small amount, each location could be examined for its own merits. For example, the National Waterfront Museum in Swansea is within 500 m of the location identified and has a heating load of over 1 GWh, equivalent to around 100 average homes.

The UK government publishes information on heat networks which are under consideration. Sixteen of these are within Wales. Figure 8 shows the proportion of properties within a certain radius of the heat networks. Looking at the 14 organisations within 500 m of these locations, this covers six individual heat networks, all of which run on heat pumps (five ASHP and one GSHP). Five of these are for residential (with one mixed use for unspecific non-domestic), with one non-domestic heat network at Porthcawl Maritime Centre. Both Porthcawl Library and Museum are within 500 m of this heat network and could potentially connect to it.

Community energy opportunities

In addition to the buildings analysis, EST conducted an interview with the Chair of Community Energy Wales to gather their thoughts on the opportunity for community energy group involvement in the future-proofing of culture sector buildings.

The Welsh Government has a strong history of promoting community energy in Wales. Primarily this support is shown through provision of the Welsh Government Energy Service (WGES), a consortium made up of the Carbon Trust, the Energy Saving Trust and Local Partnerships: the WGES is a conduit to financial assistance provided by the Development Bank of Wales (DBW). Other support is given through financial aid to Community Energy Wales (CEW). CEW is a membership organisation which unites the many smaller co-operatives and community interest companies (CICs) spread across the country. Through this unification they aim to influence decision makers and promote the projects being carried out.

From the CEW 2023 State of the Sector report:

- There are 36 active community energy groups based within Wales.
- 29.2 MW total of community-owned energy capacity, a 6% increase from 2021.
- 2.9 MW of new electricity capacity installed during 2022, including three new solar projects.
- 160 Full Time Equivalents working across the sector in Wales, an increase of 15 FTE from last year.
- Some of the organisations have experience in setting up sophisticated and wide-ranging projects at £multi-million scale and can draw on significant financial support from existing memberships.

Potential motivations for culture sector collaboration with community energy groups

A key challenge for community energy organisations has been delivering in the financial climate created during the COVID lockdown, and the removal of both the Feed-in Tariffs (FiTs) and Renewable Heat Incentive (RHI). However, the recent increase in wholesale energy prices has helped to counteract this problem.

There are tax advantages for businesses and Local Authorities using 3rd Parties to procure renewable energy, which has been used as a tactic to facilitate one of the largest community energy share offers ever carried out in the UK. The EGNI co-operative installed solar on nearly 200 buildings throughout South Wales, and a significant number of these installations were a result of Local Authorities deciding that these arrangements would be advantageous when compared with the financial and tax implications of procuring installations themselves.

Many of the community energy co-operatives could be interested in working with the culture sector to provide renewable energy. Their expertise could be very useful to culture sector organisations, dealing with some of the complexities around procurement and project management that present steep learning curves for the inexperienced.

Allowing energy co-operatives to own and operate renewable energy assets also benefits the culture sector by demonstrating a willingness to engage with the Welsh Government policy ambition on “local ownership” and the Wellbeing of Future Generations Act.

Community ownership financial models

The most frequently used model for electricity generating projects is the community share-offer financed “own/operate/sell” type. A co-operative will raise capital through a combination of share-issues, development loans and grants. The Cooperative owns and maintains the installation, and they take on all the construction and financial risk.

The community organisations rely on selling Power Purchase Agreements (PPAs) for the generated energy to the grid and/or the host site owner, to facilitate the revenues necessary to finance the projects. They then pay out dividends to the investors, whilst repaying the capital on loans, (which are usually prioritised in the repayment schedule). Investors typically receive modest dividends which represent a return of around 4-6% on their stake, and these payments are not guaranteed or protected in any way.

Heat generation projects present a more challenging proposition, for a number of reasons:

Electricity has a commodity value whether it is used at a specific location or exported. If it is used on-site or sold to a host, it has a higher value, but unused electricity can still be sold at advantageous rates on the open PPA market. Heat installations on the other hand have no opportunity for “export”. Whilst the co-operative must be careful to size the installation carefully in any situation, it is more finely balanced when selling heat because of this.

This places any co-operative in a more difficult position when planning heat projects because they need to be confident that the building will continue to be operated in a reasonably similar way for the length of time it takes to repay the investment cost and beyond. It is also worth noting that there is a lack of practical experience around heat projects in the community sector as the right economic conditions rarely presented themselves in recent history.

Enhanced benefits of co-located renewables with heat projects

Where there are the right physical conditions, co-located solar PV, wind and hydro present opportunities for reduced running costs with heat pumps due to low-cost electricity. This could be a significant factor in tipping marginal projects over into being viable for co-operative ownership. This means that there are stronger opportunities for community heat projects either;

- where there is already existing energy generation
- the opportunity for the cooperative to propose a package of measures to help improve the financial model or de-risk it

For the purposes of exploring this further, an interview was conducted with the Chair of Community Energy Wales, to gather their thoughts on the opportunity of community involvement.

The conversation highlights how useful culture sector energy generation projects with the culture sector could be, for both parties. Where there is uncertainty in some commercial buildings around tenancy lengths and occupation patterns, many of the culture sector buildings are likely to have a slightly less risky profile – though the risk is only lowered, not negated.

Participation of culture sector properties in property-specific projects is welcome from the community energy sector. However, community projects for both heat and electricity generation can also be part of a portfolio of opportunities in a geographical area which may include culture sector buildings as useful “customers”, helping de-risk and diversify the financial model for everyone.

Interview with Chair of Community Energy Wales

What are the preferred models for community energy involvement and ownership of energy generation projects, and the key challenges?

We are still fairly 'young' in the journey of understanding the governance constraints and mechanisms that come into play with shared ownership. Constraints to be considered include Developer finance arrangement/equity investor red lines, FCA regulations especially constraining advice to investors, community counterparty governance constraints.

The common financial approach raises a significant constraint, which is that traditional bank finance costs are prohibitive for the community stake where it is structured as equity, with no physical asset to securitise debt.

Shared ownership is a relatively new proposal in a rapidly changing technical context. The potential wider benefits of long-term shared ownership relationships between the community sector and developers are barely understood. New models may include 'subsets' where the community owns actual portions of projects, 'adjunctive' projects where early engagement widens the Developer planning application and grid/land arrangements to incorporate an additional community generation project alongside the core developer project, and further co-project development cutting across different sectors and vectors (for example housing and food, and heat/transport/local energy markets.

Proposing fixed models is a starting point but must not be allowed to stifle continued innovation and a high level of ambition. Developers should engage shared ownership counterparties a great deal earlier than is currently happening.

What is the likely attitude of CEW members to getting involved in heat projects, rather than the more common electricity generation projects?

Future involvement is more than likely, as we already have CEW members seeking to develop heat projects. We have a Working Group on heat which is evolving to cover whole energy systems and markets, so this would extend from heat to transport. We have members looking at domestic and commercial heat supply from heat pumps, medium sized ambient heat loops and hydrogen.

What are the likely models implied by riskier / more novel heat projects?

The model emerging in the case of a community heat project in North Wales (which has received Innovation Funding) is for the creation of a Community Energy Supply Company. This demonstrated useful benefits for linking existing renewable power generation in the local area, which included many power and heat consumers, heat networks, and opportunities for EV charging etc. Bids are being taken forward for capital to pilot this model.

Summary and conclusions

EST was contracted to examine energy performance data on buildings owned/used by organisations within the Welsh culture sector. Colleagues at Regen pulled together a database of data sources which included Display Energy Certificates (DEC), Non-Domestic Energy Performance Certificates (NDEPC) and general information about the activities of the organisations. These were used to examine the current carbon impact of the sector and the decarbonisation potential it holds.

The culture sector comprises some 620 organisations. These were divided into the following archetypes: Archives, Arts Portfolios, Libraries, Museums (small, medium and large), Cadw properties and National Trust properties. Within these, Cadw and National Trust properties were excluded from the analysis due to a lack of data. For the other archetypes, the total carbon impact was assessed to be 77,184 ± 30,300 tCO2e per year. It should be noted that this is a rough estimate which is based on information where it is unknown what the data completeness levels are since these are simply taken from Display Energy Certificates (DECs) and Non-Domestic Energy Performance Certificates (NDEPCs). This figure should be treated only as an illustrative figure.

The costs and savings for potential retrofit for the culture sector with solar panels and heat pumps were estimated. This was based on simple building-mounted solar panels and heat pumps to cover the heating load. Total carbon savings amounted to approximately 25,000 tCO2e, around a third of the estimated current sector. Most savings come from the heat pumps, mainly due to the modest solar array sizes (4-15 kWp). It may be possible that some organisations could create significantly larger arrays and increase their carbon savings. However, it is very difficult to make assumptions about what might be realistic as grid connection upgrade costs are highly variable. We therefore assumed that no upgrade would be realistic.

The payback period for solar panels is between 6 and 13 years, whilst heat pumps do not currently provide operational savings, given the disparity between gas and electricity prices, unless they can be well matched with onsite renewable electricity generation. These figures are likely to improve as the grid decarbonises and if the relative cost between gas and electricity decreases.

Some buildings within the data are used by multiple cultural organisations, as well as other stakeholders out with this sector. This makes it difficult to accurately ascribe the emissions for these buildings to the culture sector. In these cases, it may be the case that a proportion of their emissions have to be used to avoid overcounting. However, this should not change any retrofit pathways that should be actioned to decarbonise the buildings, there may just be more challenges in determining who will be responsible for the financing of such measures.

The culture sector could make use of the numerous community energy opportunities available in Wales. Community energy projects have traditionally been “single installation / single location”, but there is an emerging narrative of more complex arrangements utilising multiple sources of energy and novel financial approaches that could see benefits for both the cultural and community energy sectors if they work together. By working with others in the local community, these buildings could become part of community energy projects where resources are pooled to maximise benefits and reduce risk for a wider range of organisations and individuals.

There are a limited number (less than 10%) of organisations/buildings which are in close proximity to planned or proposed heat networks. These are typically centred around more populated cities and larger towns. The larger cultural buildings could provide ‘anchor’ loads which would help de-risk new heat networks in built-up areas.

Future work in this area should be focussed on the following key areas:

- Improvements to data availability, especially for Cadw and National Trust properties. This should include an evaluation of how many buildings within each organisation do not have a DEC or NDEPC. This could be achieved through bespoke surveys for each organisation, which could then be cross-matched with the existing data. It is suggested that representatives of each organisation should be consulted as to how to best obtain the data required.
- More accurate cost estimates for retrofit could be obtained through more detailed surveys, which could also explore renewable energy opportunities. This deeper dive into the building stock data could facilitate more accurate cost estimates and better estimation of the savings potential.
- Buildings of multiple occupancy present a unique challenge and may require agreement from multiple parties on the best approach going forward. For these properties, it may be worth considering an official policy for minimum energy efficiency levels.
- The culture sector should consider actively engaging with the community energy sector to explore potential opportunities that may exist across their portfolios.

Appendix B - Stakeholder engagement

Methodology

Research commissioned by the Welsh Government found that "the availability of data within the sources reviewed concerning the environmental impact of organisations in the five culture subsectors and their commitment to decarbonisation is extremely limited" [2].

The aim of stakeholder engagement was to help build a stronger evidence base on the current attitudes, behaviours, understanding, skills, resource, and approaches to the climate and nature emergencies. Sector stakeholders were engaged from across organisations under the scope defined on p. 7, 1.3.1. Stakeholder scope. In total this scope represents 620 organisations/sites.

Methods of engagement included:

1. Steering group meetings: provide guidance throughout project (eight members)
2. A survey: targeted at organisational activity to gather representative quantitative evidence on relevant activity already happening across the sector. (61 respondents)
3. Two stakeholder focus groups: building on survey data, collect qualitative data with an increased focus on developing collective goals and priorities. (51 attendees)
4. Case study interviews: collect detailed stories of those leading the way (eight interviews)

In this appendix, we detail who was engaged (p.69) and the types of data collected (p. 71).

Limitations

- Outreach relied heavily on the contacts from 8 steering group members. In generating a stakeholder list and during engagement, data was not collected on diversity aspects of individuals, i.e., race, gender, etc.
- The research focussed on organisational action, there is a significant proportion of the sector who are represented by freelancers, particularly across the arts.
- Climate and nature is a large umbrella term and many terms and practices are still emerging. There is therefore a risk that some important activities have been omitted.
- While representatives from each subsector and from across Wales were successfully engaged, archives and libraries were nevertheless under-represented.

Who was engaged?

Survey engagement

The survey received 61 responses (~10% of the scope), 56 in English and 5 in Welsh.

There was significant crossover between industry sectors, with 25% of respondents listing more than one industry sector. 45% of respondents associated with the 'Arts' sector and 23% associated with the 'Museum' sector.

The responses have been reclassified into primary sector categories to produce the chart right.

The responding organisations were well distributed across Wales. 57 out of 61 responses provide valid Welsh postcodes. The remainder were from Scotland and England.

Based on government postcode classifications, 28% of these postcodes are in rural areas, with the other 72% in urban areas. Demographic datasets show a large proportion of 'cosmopolitan' and 'multicultural metropolitan' areas (35 of the 57 valid postcodes), as well as many 'hard-pressed' areas (7 out of the 57 valid postcodes). Three of the respondents live in rural farming communities. One respondent was from an industrial community and seven were based around student campuses.

Figure 16
Survey responses by primary subsector

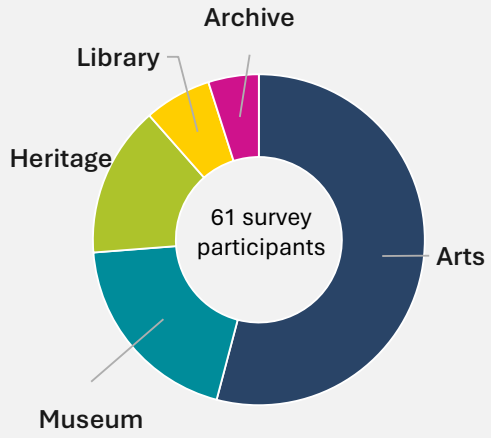
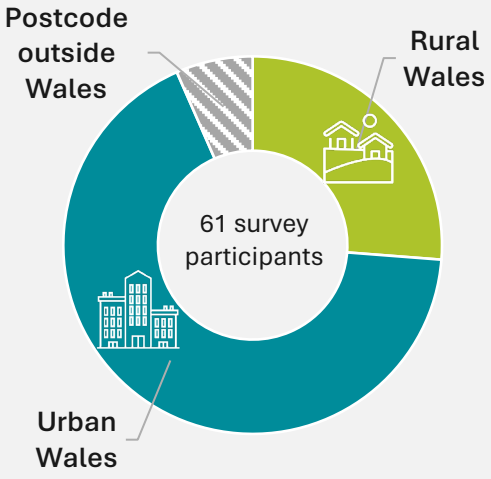


Figure 17
Geographical spread of responses
57 out of 61 responses provided Welsh postcodes.



Focus group engagement

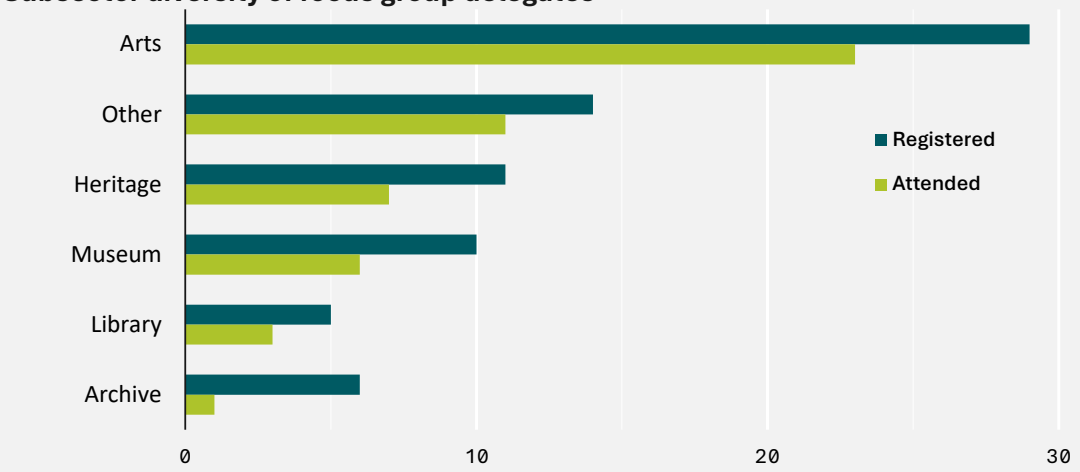
The focus group events welcomed attendees from north, central and south Wales. Half of the attendees were based in Cardiff and the surrounding areas. In addition to those in Wales, a quarter of attendees were based in Scotland and England. Each subsector had at least one representative.

Where subsector was not relevant, these have been defined as 'other' in the chart below. Umbrella organisations, regulators and governing bodies were also in attendance, including; Creative Carbon Scotland, Arts Council Wales, Arts Council England, Amgueddfa Cymru, Cyfoeth Naturiol Cymru - Dewis Iaith / Natural Resources Wales, The Royal Commission on the Ancient and Historical Monuments of Wales.

Delegates were engaged in two breakout sessions of 30 and 45 minutes. Breakout groups were made of between five and eight delegates to give time for everyone to contribute to questions.

Figure 18

Subsector diversity of focus group delegates



Data collected

Focus group agenda and questions

Focus group attendees provided evidence in two ways: firstly, anonymised discussion within breakout groups, collected by notetakers; secondly, delegates were invited to use an online interactive mind map platform to fill in digital 'post-its'. Both sources were analysed to form the evidence detailed in this report.

The makeup of the focus groups was as follows;

15 mins, **Plenary introduction** (Welcome from facilitator, project introduction, workshop plan and aims, and research findings to date.)

30 mins, **Breakout session 1:** Organisational actions

> *Q1: Tell us about the top 1-3 actions you'd like to take as an organisation. Use the axis on Miro to distinguish whether actions are a near term priority or a long term goal, whether they are easy to implement challenging.*
>
> *Q2: Tell us about the challenges your organisation faces in implementing actions and initiatives? Where relevant, tell us what you've done to overcome challenges internally.*

15 mins, **Provocations from ...**

> Mark Thomas, Maenordy Scolton, Scolton Manor
> Emrys Barnes, The Emergency Room
> Phil Bushby, Amgueddfa Cymru
>
> *Q3: Based on the provocations, add any additional post-its.*

10 mins, **Break**

45 mins, **Breakout session 2:** Collective actions

> *Q4: Tell us what actions you think the Welsh Government and other governing bodies should take to support the culture sector to do more? Similarly, what collective actions should be taken as a sector?*
>
> *Q5: The guiding principles from the Well-being of Future Generations Act are listed below. How should these be considered in the development of future work? Each principle has a starter for 10 for comment.*

5 mins: **Next steps**

Close

Survey questions

- *Q3 – postcode*
- *Q4 – industry sector*
- *Q5 – funding streams and governance structures*
- *Q12 – employees*
- *Q13 – freelancers*
- *Q14 - volunteers*
- *Q15 – visitor numbers*
- *Q16 – organisational impact on Climate and nature*

- *Q17 – perception of Welsh culture sector responsibility*
- *Q18 & Q19 – engaging employees/freelancers/volunteers*
- *Q20 & Q21- engaging visitors/audiences*
- *Q22 – how much of a priority do you think the climate and nature emergencies currently are for the Welsh culture sector*
- *Q23 – what is your perception of your organisation's overall attitude towards the climate and nature emergency?*
- *Q24 – how far along do you feel your organisation is in terms of taking action on climate and nature?*
- *Q25 – which of the following factors influence your organisations action?*
- *Q26 – to what extent do you agree with the following statements regarding capacity and skills on climate and nature action?*
- *Q27 – does your organisation have policies and strategies in the following areas?*
- *Q28 – do you have an organisational target for achieving net zero emissions?*
- *Q29 – please provide the target year*
- *Q30 - To what extent do you agree with the following statements on your progress to net zero and climate adaptation?*
- *Q32 - Does your organisation monitor and track your emissions?*
- *Q33 - Does your organisation monitor and track energy consumption?Q37 & 38 – which of the following net zero actions has your organisation undertaken?*
- *Q34 – Fuel type*
- *Q35 - Do you provide on-site EV charging?*
- *Q36 – manage and monitor vehicle miles travelled*
- *Q37 & Q38 – which of the following net zero practices…*
- *Q39 – which of the following circular economy actions…*
- *Q40 – which of the following climate adaptation measures…*
- *Q41 – main challenges to taking action?*
- *Q42 – challenges associated with managing collections*
- *Q43 & 44 – what support do you receive and what would most help you?*
- *Q45 – which of the following best practice guidance and resources have you used?*
- *Q46 – skills statements*
- *Q47 – opportunities resulting from taking action*

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