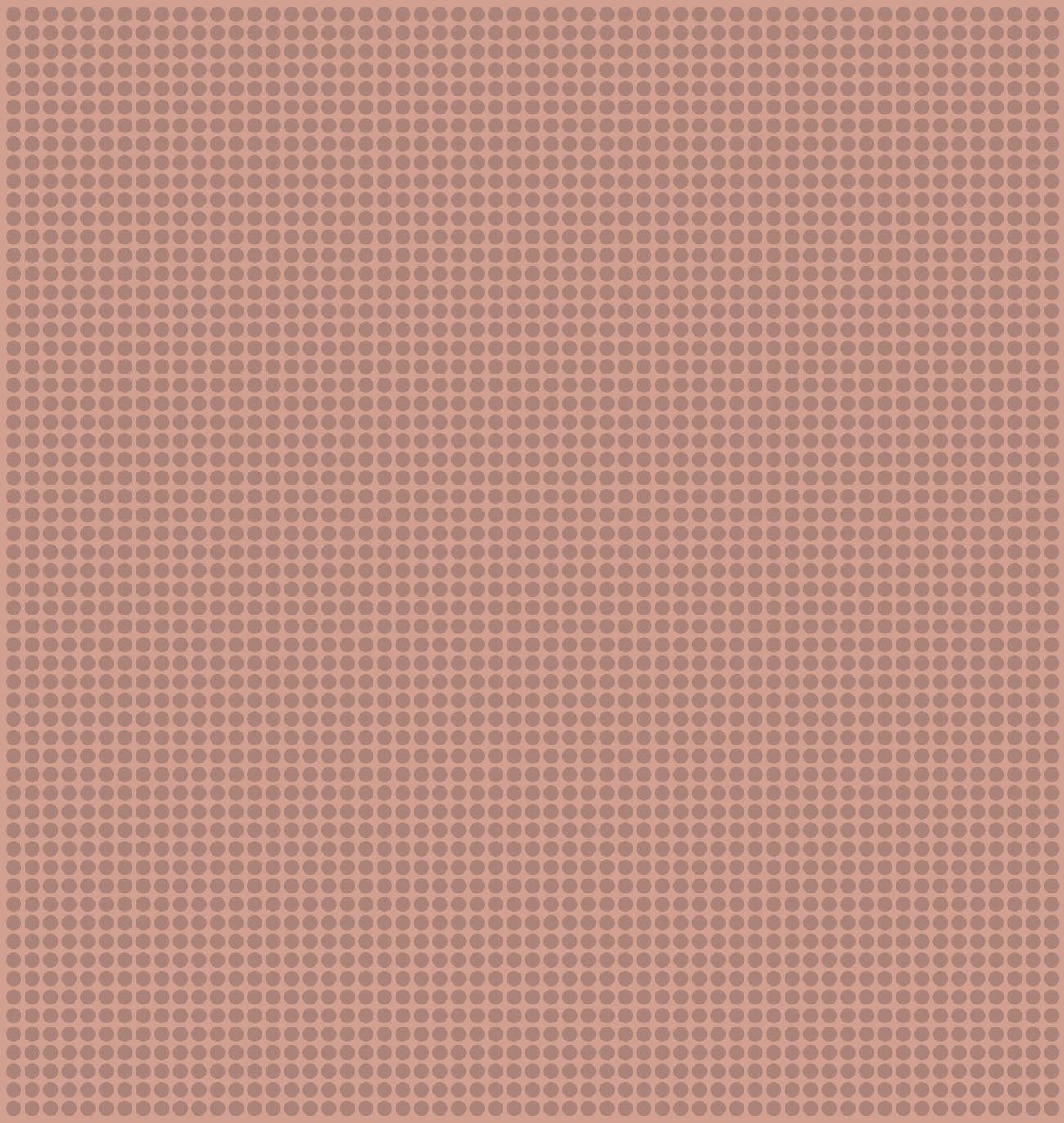
CULTURE & HERITAGE SECTOR DECARBONISATION

Decarbonisation Plan Guidance & Template



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Contents

Introduction

This document provides a step-by-step guide to creating a Decarbonisation Plan.

It is written for cultural and heritage organisations that own, manage or occupy historic buildings, whether they are listed or not. It is also useful for any organisation or owner responsible for commercial historic buildings, whether privately owned or in the public sector, as well as built environment professionals who may be commissioned to undertake decarbonisation assessments and retrofit work.

The development of any Decarbonisation Plan for a historic building should be underpinned by Historic England's Whole Building Approach (WBA) for historic buildings. This is a systematic process for devising and implementing suitable, coordinated, balanced and well-integrated solutions to improve energy efficiency and climate resilience.

Buildings are a major source of greenhouse gas emissions from the manufacturing processes and materials used in construction, as well as the energy used in operation for heating, cooling, lighting and other services. Climate change is also putting increasing pressure on the buildings we care for. Rising temperatures and extreme weather events pose growing risks to buildings and their occupants, and this has the potential to increase the energy use required to maintain healthy indoor environments.

In this context, there is an urgent need to adapt or upgrade ('retrofit') existing buildings to improve energy efficiency, enhance climate resilience, and accelerate the transition from fossil fuel heat sources to low carbon alternatives.

There are many ways to improve the energy efficiency and climate resilience of a historic building. However, the need or the opportunity to do so will vary widely depending on the building and its context. In the cultural and heritage sectors, opportunities may be affected by:

- heritage designations associated with listed buildings and conservation areas.
- complex or divided ownership and management structures.
- limited funds for both maintenance and repair as well as capital works.

In 2025, Haworth Tompkins were commissioned by Historic England (HE) and Arts Council England (ACE) to undertake a Pilot Study on the Decarbonisation of the Cultural and Heritage Sector. The Pilot Study has been developed in collaboration with engineers Skelly & Couch; building surveyors Conisbee and cost consultants Gardiner & Theobald.

The study has produced this Decarbonisation Plan Guidance and Template. The Guidance sets out the process of commissioning and developing a Decarbonisation Plan. The Template sets out the main headings and contents that a client should expect to see in a Decarbonisation Plan, depending on the scale and scope of the commission.

As part of the Pilot Study, the team also prepared 'Case Study' Decarbonisation Plans (with their accompanying technical reports) for three listed cultural buildings, and a series of supporting factsheets, which are referenced within this document.

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What is a Decarbonisation Plan?

A Decarbonisation Plan is a strategic roadmap to guide the progressive reduction of carbon emissions associated with the use and operation of a building.

This can be achieved through a range of potential measures that aim to:

- reduce energy demand
- improve the efficiency of building services
- transition away from fossil-fuels towards low-carbon technologies and renewable energy sources.
- improve the resilience of the building to future climate change.

A Decarbonisation Plan will usually be developed for the building owner/operator by a consultant, often working with other built environment specialists, such as conservation architects, building surveyors, building services engineers and quantity surveyors.

The consultant will start by developing an understanding of the building: its history and heritage values; how it is currently used, the condition of its fabric and services, and its overall energy performance.

They will then appraise all options available and set out a list of preferred measures to reduce emissions, considering factors including the building's heritage significance; logistical and spatial constraints; budget and funding opportunities.

The result is the production of a decarbonisation pathway illustrating how the measures can be prioritised and implemented over time, to progressively reduce the building's energy use and transition towards low carbon and renewable energy sources.

The decarbonisation pathway provides a framework to help organisations plan the next steps including identification of funding and budgets; design development, planning and listed building consents and delivery.

A Decarbonisation Plan will typically align with RIBA Stages 0–1+. It sets the groundwork for progressing to RIBA Stages 2–3, where design development and planning and listed building consent applications take place.

The process of developing a Decarbonisation Plan is set out in six steps. This process provides a clear and practical framework for collecting information, evaluating options and choosing a route forward.

The six steps align with Stages 1 and 2 of Historic England's Whole Building Approach:

1. Gather Data & Surveys
2. Assess & Plan

The process also aligns with two established industry models:

PAS 2038 – the British Standard for retrofitting non-domestic buildings

RIBA Plan of Work – the framework used across the design and construction industry

1 **DEFINE** the goals of the project

2 **GATHER** existing data and documentation

3 **SURVEY & ASSESS** the building and services systems

4 **OPTIONS APPRAISAL** of potential improvement strategies

5 **DEVELOP** a prioritised list of improvements

6 **FORWARD PLAN** the implementation of the decarbonisation pathway

Relevant Frameworks

Whole Building Approach

Historic England have developed guidance on how to improve the energy efficiency and climate resilience of historic and listed buildings, using a 'whole building approach.'

There are many ways to improve the energy efficiency and climate resilience of a historic or traditional building, but whether there is need or opportunity to do so will vary widely depending on context. To make sure a building is resilient, well adapted, and able to provide a healthy internal environment in our changing climate, it is best to consider all proposals in a holistic manner.

The whole building approach is a systematic process for devising and implementing suitable, coordinated, balanced and well-integrated solutions that:

- are based on a thorough understanding of the building in its context and how it performs
- avoid harm to the significance of the building
- minimise the risks of negative or unintended consequences
- ensure a healthy and comfortable internal environment
- increase climate resilience and minimise environmental impact
- are proportionate, effective, and cost efficient

Work can be undertaken in phases to suit budget constraints, tie in with replacing services or fit around other planned building works. Properly considering and coordinating the phases can prevent unnecessary works being undertaken at any stage. Savings from early energy efficiency interventions can fund later improvements.

A whole building approach is best implemented in a series of consecutive stages. Decisions and actions taken at every stage have a bearing on the quality and success of the outcome:

Stage 1: Gather Data and Surveys

Stage 2: Assess and Plan

Stage 3: Design and Specify

Stage 4: Procure and Install

Stage 5: Use, Evaluate and Maintain

Input from all parties involved in the project, including surveyors, assessors, designers, contractors and building users, is vital throughout. Any interventions proposed should be reviewed and assessed carefully at every stage of the process. Building owners, managers and occupants play a crucial role in reducing energy use and should be fully engaged throughout the process. Conflicting aims can then be reconciled, or compromises agreed.

A Decarbonisation Plan broadly corresponds to the first two stages of the Historic England Whole Building Approach.

Whole Building Approach for Historic Buildings

PAS 2038:2021 Retrofitting non-domestic buildings for improved energy efficiency.

PAS 2038 is a British Standard that sets out requirements for retrofitting non-domestic buildings for improved energy efficiency.

The document is designed to be used by anyone involved in the funding, assessment, specification, design, and installation of building improvement measures, including building and construction professionals. It is also of interest to owners, developers, insurers, investors, tenants and landlord bodies, local authorities, building control bodies, energy assessors, and auditors.

The requirements of PAS 2038 cover the:

- Management of the retrofit process from start to finish.
- Assessment of buildings for retrofit of energy efficiency and related measures
- Identification and evaluation of improvement options (energy efficiency measures).
- Preparation of medium-term improvement plans.
- Design and specification of energy efficiency measures (whether individual Measures or packages of multiple measures).
- Installation of measures.
- Testing, commissioning, and handover of installed measures.
- Fine tuning of the performance of retrofitted buildings.
- Evaluation of retrofit projects

A Decarbonisation Plan broadly corresponds to the first four components of the PAS 2038 framework process.

Use of the PAS will support:

- Improved functionality, usability, and durability of buildings
- Improved comfort, well-being, health and safety (including fire safety) and Productivity of building occupants and visitors
- Enabling buildings to use low- or zero-carbon energy supplies
- Improved energy efficiency, leading to reduced fuel use, fuel costs, and pollution (especially greenhouse gas emissions associated with energy use)
- Reduced environmental impacts of buildings
- Protection and enhancement of the architectural and cultural heritage as represented by the building stock
- Avoidance of unintended consequences related to any of the above
- Minimisation of the "performance gap" that occurs when reductions in fuel use, fuel cost, and carbon dioxide emissions are not as large as intended or predicted

PAS 2038:2021
Retrofitting non-domestic buildings for improved energy efficiency. Specification

See also:

Net zero and the UK's historic building stock

LETI Climate Emergency Retrofit Guide

Process

The development of a Decarbonisation Plan may form part of a capital project structured around the RIBA Plan of Work, or it may be commissioned as a standalone study to help inform strategic decision- making.

The diagram below illustrates how the six-step process of developing a Decarbonisation Plan can be mapped against both the Historic England ‘Whole Building Approach’, and RIBA work stages 0 - 7.

Whole Building Approach to Retrofit and Decarbonisation

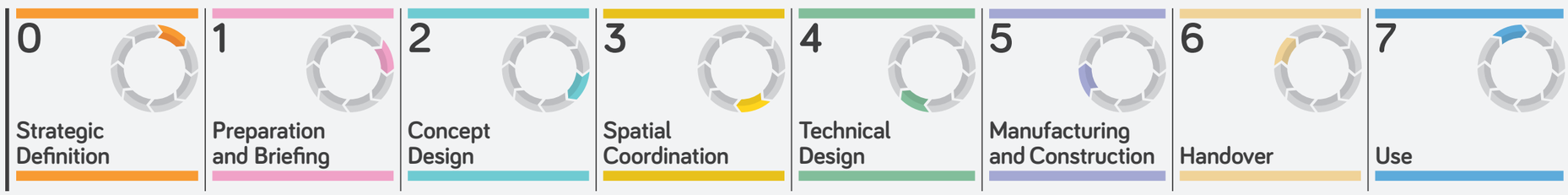
Decarbonisation Plan

Historic England

Whole Building Approach

WBA Stage 1 Gather Data & Surveys	WBA Stage 2 Assess & Plan	WBA Stage 3 Design & Specify	WBA Stage 4 Procure & Install	WBA Stage 5 Use, Evaluate & Maintain
• Define brief and objectives • Collect information and data • Establish performance baseline • Identify inefficiencies	• Appraise opportunities for improvements • Shortlist preferred options • Create implementation plan • Set pathway to Net Zero			

RIBA
Plan of Work
2020



Define

The first step of the process is to define the aims and objectives of the Decarbonisation Plan for the building owner, operator or Board of Trustees.

Key questions:

- What is the intended purpose of your Decarbonisation Plan?
- How will it be used?
- What resources are available ?
- Who do you need to support you in the development of the Plan?

Actions

- Appoint a consultant team
- Establish key points of contact for the consultants and how information will be shared.
- Develop, in collaboration with the consultant team, the principle aims and objectives of the Decarbonisation Plan for the building or site.

Further reading

Decarbonisation Glossary

Professional competencies

Decarbonisation Plan process

The purpose of your Decarbonisation Plan will be specific to the current use, condition, heritage significance and management of your building.

Defining the **key aims and objectives** of the Plan at the beginning of the project will help your consultant team to understand the key drivers for undertaking the study. These might include:

Heritage value and accessibility:

- protection or enhancement of architectural and cultural value
- integration of energy efficiency measures with other improvements, e.g. extension, change of use or general refurbishment.
- improving the usefulness, accessibility or sustainability of the building

Building Performance:

- reductions in energy costs
- improvement of internal comfort and indoor environmental quality (IEQ)
- improvement of indoor air quality (IAQ);
- elimination of condensation, damp and mould
- reducing risk & mitigating overheating
- improvement in energy rating (e.g. asset rating, base building rating, EPC or DEC band)
- meeting a performance standard

Building Condition:

- protecting the building against decay or deterioration.
- improving resistance to water penetration and resilience against flood risk
- improving resilience to potential future issues caused by climate change e.g. Structural stability issues due to drought, overheating, increased rainfall etc

Gather information

At the project outset, the consultant team will need to access and review a range of data and information about the building.

Information required (if available):

- Drawings of the building
- Heritage information
- Fabric Condition Surveys
- Services Condition Surveys
- Maintenance Schedules or Plans
- Environmental policies and Plans
- Information on the use of the building, such as occupancy numbers, hours of operation and seasonal patterns of use
- Utility bills / metered energy data

Actions

The site owner will:

- Collate and share site information with the consultant team

The consultants will:

- Undertake site visits
- Hold briefing meetings
- Define the scope of further surveys

Further reading

Information gathering and surveys

Maintenance good practice

See also:

Historic England Maintenance and Repair of Older Buildings

Heritage Fund Management and maintenance plan good practice guidance

In order to assess the current performance of the building, the consultant team will need to develop a broad understanding of:

- **heritage significance** - its history and heritage values
- **physical characteristics** - construction and materials, current condition.
- **how it is used** - hours and days of operation, occupancy numbers, seasonal variations.
- **how it is serviced** - heating, cooling and ventilation systems, lighting and specialist systems
- **how it is experienced** - is it too cold, draughty, does it overheat in summer?
- **how it is managed** - details of any maintenance schedules or plans
- **how it is funded** - public funding, commercial activities, fundraising and support
- **current challenges** - such as operational pressures, financial constraints, accessibility issues
- **current opportunities** - potential new uses, expansion or change

Survey & Assess

Following the initial gathering of available information, the consultant team will undertake site surveys and prepare reports assessing the key characteristics and condition of the building and its services.

Actions - Consultant team

- Collate and assess information gathered from desktop research.
- Research and assess the history and significance of the site.
- Undertake site surveys.
- Prepare drawings illustrating the distribution of uses.
- Assess current energy use and benchmark performance.

Further reading

Information Gathering

Building Performance Surveys & Assessments

Energy and Carbon Evaluation methods

During the Survey & Assess stage the consultant team may need to revisit the information gathering exercise and request further site information, to fill in any gaps highlighted during the assessment process.

Understanding Building Performance

The next step of the process is to analyse and assess the information gathered to build a picture of how the building currently performs. This includes how much energy it uses, how comfortable it feels inside (e.g. temperature, draughts, damp), and how reliant it is on mechanical systems like heating and ventilation.

Improving a building's performance means it can stay comfortable with less energy input, for example, avoiding the need to turn up the heating in a draughty room or installing air conditioning to manage overheating. Reducing the demand for heating, cooling, and ventilation leads to lower energy use and better overall efficiency.

To assess building performance, a range of factors should be looked at holistically, including but not limited to:

- Occupancy and usage patterns – How and when is the building used?
- Condition of the building – Are the walls, roof, and mechanical systems in good condition?
- Thermal performance of the external fabric – How well does the building retain heat?
- Airtightness – Are there draughts or air leaks?
- Operational energy – Are there systems / processes that use particularly high levels of energy?

Collecting and analysing this information creates a baseline of the building's current performance. This can then be compared to similar buildings (benchmarking) and used to set realistic targets for improvement. It also helps to identify specific areas where the building is performing poorly, so that opportunities for improvement can be clearly defined.

Estimating annual energy use

A number of methods are available to assess the annual energy use of the building. These vary in terms of inputs required, level of complexity and accuracy, and the MEP Services Consultant or Retrofit lead professional will select an appropriate method for the project in consultation with the wider professional team.

Options Appraisal

The purpose of the Options Appraisal is to identify and appraise the range of potential improvements to the building fabric and services to reduce energy use and carbon emissions.

The potential measures are then compared against a range of criteria including carbon saving, capital cost, heritage sensitivity and logistical and spatial constraints.

Actions & Outputs - Consultant team

- Prepare longlist of options for measures to improve energy efficiency and reduce carbon emissions. This will typically include:
  - improvements to the thermal performance of the external envelope, such as additional insulation to walls, floors and roofs, or upgrades to windows and doors.
  - improvements to the energy efficiency of building services such as lighting, heating and ventilation, including addressing metering and controls.
  - introduction of low and net zero carbon technologies, including decarbonised heat sources and renewables.
- With input from the client team, appraise the longlist of potential improvements and outline considerations for implementation.

Further reading

Low and net zero carbon technologies

Maintenance good practice

See also:

Historic England Maintenance and Repair of Older Buildings

Heritage Fund Management and maintenance plan good practice guidance

APPRAISE

In the next stage, opportunities for improving the building's performance are identified and appraised in more detail. These opportunities should include both upgrades to the existing building fabric and systems (to reduce energy use), and introduction of low or zero carbon technologies (to reduce the carbon impact of the energy still being used).

Each option should be assessed against project-specific criteria to find the best fit for the building and the client's needs. The criteria used in the appraisal should consider more than just energy efficiency. Other important factors might include:

- Practical constraints (e.g. site access, disruption to operations)
- Heritage or conservation requirements
- Upfront cost
- The cost effectiveness of the measure - expressed as £ spent per ton of CO_2e reduction
- Urgency due to existing defects, and any maintenance and/or repair required prior to implementation of improvements to ensure their efficacy and longevity.
- Any specific goals or limitations set by the building owner
- Climate change resilience and other considerations.

Develop

Following discussion and feedback from the client team and other stakeholders, the consultant team will develop a list of preferred or prioritised measures.

Actions & Outputs - Project team

- Discuss and review the findings of the Options Appraisal report.
- Agree the list of achievable measures and outline the practical considerations associated with implementation.
- Undertake further design assessments in response to spatial, heritage and logistical considerations.

Further reading

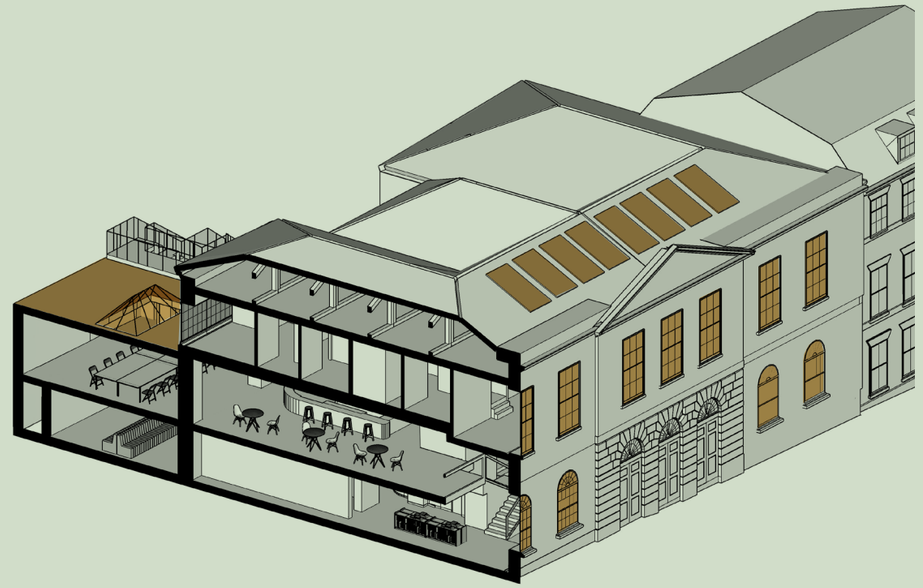
Occupant Engagement

Maintenance good practice

DEVELOP

Following the options appraisal and discussions with the client, a shortlist of preferred measures should be developed. These chosen improvements will form the basis of the Decarbonisation pathway.

This stage may include further design development to test and illustrate the proposed measures. The scope of design work will be tailored to the available budget for the Decarbonisation Plan but may include markups of plans and elevations, or 3d sketches.



Above: Axonometric diagram of the Shire Hall, Dorchester illustrating areas of potential fabric improvement such as window upgrades and roof insulation, and indicative solar PV arrangement

Forward Plan

The final step of the Decarbonisation Plan is to set out how the prioritised measures will be implemented over time.

Actions & Outputs - Consultant team

- Develop a decarbonisation pathway illustrating how the prioritised measured will enable progressive decarbonisation of the building's energy use.
- Set out the next steps for implementation, including funding, design development and delivery. This may include:
  - Developing a fundraising strategy.
  - Defining the brief, budget and programme for a capital project.
  - Procuring a design team for RIBA Stages 2 - 7
  - Undertaking further Building Performance Evalulation to inform design development.

Further reading

Example Decarbonisation Plans:

- Shire Hall, Dorchester
- Lit & Phil, Newcastle
- Royal & Derngate, Northampton

DECARBONISATION PATHWAY

A decarbonisation pathway is a phased strategy for the progressive reduction in carbon emissions associated with the building's operational energy use. It can be represented graphically to illustrate the relative impact of individual measures on the rate of decarbonisation over time.

The prioritisation and sequence of proposed measures will be determined by a number of project-specific factors, including funding availability, heritage and logistical constraints.

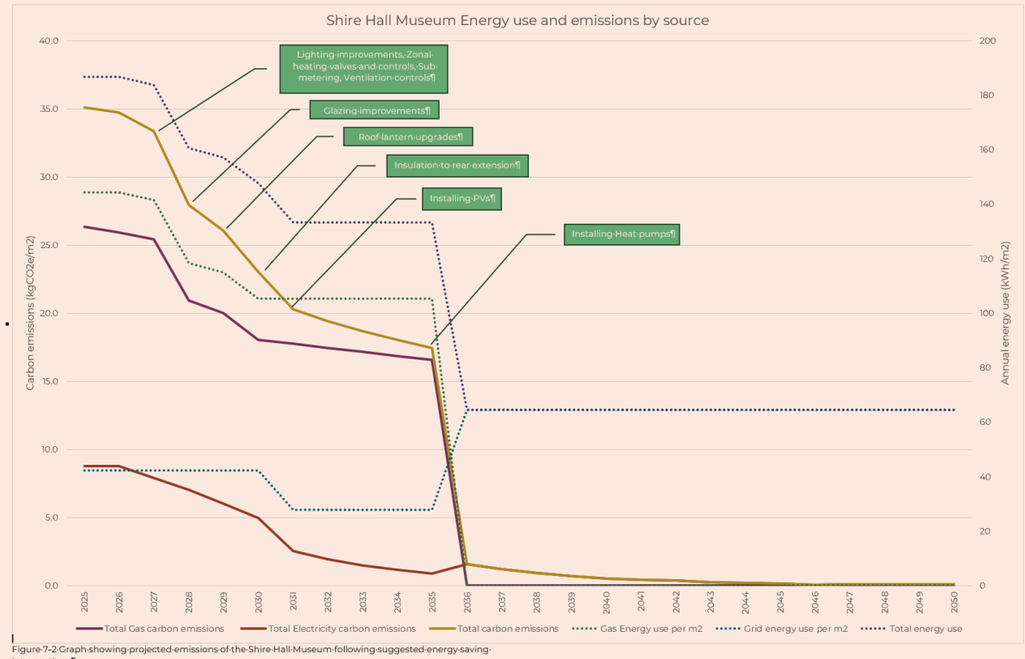


Figure 7-2 Graph showing projected emissions of the Shire Hall Museum following suggested energy saving interventions

Above: Example Decarbonisation Pathway for the Shire Hall, Dorchester

Template Contents

Content Guide

EXECUTIVE SUMMARY

The scope, purpose and structure of the plan; authorship and consultation

1. INTRODUCTION

1.1 Decarbonisation context

Summary of the role of the built environment in climate change Adaptation and retrofit in the context of existing and listed buildings.

1.2 Project context

Current circumstances, challenges and opportunities for the building or site

1.3 Decarbonisation Plan aims and objectives

Project-specific aims and objectives for the decarbonisation plan

2. BACKGROUND INFORMATION

2.1 The Existing Building & Site

- History
- Heritage designations
- Building significance
- Site conditions and constraints
- Current use, occupancy & management
- Construction
- Building fabric condition and repair need
- Building services systems

3. SURVEYS & ASSESSMENT

3.1 Building Condition

Summary of the Fabric condition and repair need; Building services condition; results from thermal imaging or other building performance surveys

3.2 Fabric Performance

Summary of assumed fabric performance by area and/or construction typology

3.3 Building services

Observations on the nature, age and condition of existing building services based on site walkarounds and review of record information. Include relevant information on occupancy patterns, thermal comfort, controls and any highly serviced zones in the building.

- Summary of existing services
- Building utilities & meters
- Heating, Cooling and Ventilation
- Domestic hot and cold water supply
- Above ground drainage
- Small power and lighting
- Other services

4. ENERGY & CARBON ASSESSMENT

4.1 Overview

Confirmation of scope of energy assessment, particularly in buildings with multiple tenants

4.2 Data collection

Methods and limitations of data collection and analysis, including notes and assumptions such as carbon conversion factors.

4.3 Heat energy usage estimate

- Design temperature assumptions
- Ventilation assumptions
- Infiltration (air tightness) assumptions
- Heat loss baseline results
- Operational energy baseline

4.4 Metered Data

- Metered annual energy use
- Metered monthly energy use
- Tabulated comparison against Heating Degree Days

4.5 Building Benchmarking

Comparison of building energy use and carbon emissions against buildings of a similar type in terms of use profile. Include commentary on limitations of benchmarking.

4.6 Summary of energy and carbon evaluation

5. OPTIONS APPRAISAL

5.1 Objectives

Summary of the key aims and objectives for improvement measures, informed by site surveys and investigations. These might include:

- Improve energy efficiency / reduce energy consumption
- Reduce greenhouse gas emissions / carbon intensity
- Maintain or improve occupant comfort
- Reduce utilities bills
- Improve resilience to climate change
- Define pathway to Net Zero

5.2 Energy Use Intensity Targets

Include relevant published targets

5.3 Opportunities to reduce energy consumption

- Improvements to building fabric performance
- Improved efficiency of services including heating, ventilation, lighting
- Metering
- Controls

5.4 Opportunities for Low/zero carbon technologies

- Photovoltaics
- Air Source Heat pumps
- Decentralised Air Source Heat Pumps
- Solar Thermal
- Biofuels
- Ground-source Heat pump: Closed Loop
- Ground-source Heat pump: Open Loop
- Surface Water-Source Heat Pump
- Air Source Heat Pumps – Exhaust Air
- Air Source Heat Pumps – Domestic Hot Water Heating
- Variable Refrigerant Flow (VRF)

5.5 Option Evaluation

Tabulated evaluation of all opportunities identified, assessed against set criteria eg. difficulty of implementation, heritage impact, capital cost scale, estimated energy/ carbon reduction, payback term, condition priority, and any other other project specific considerations. This table should be used to guide conversations with the client/ building owner about their needs and aspirations and to help define the priority of implementation.

6. KEY RECOMMENDATIONS

6.1 Reducing energy consumption

Development of preferred / prioritised measures for reducing energy consumption based on discussions with client

6.2 Low/zero carbon technologies

Development of preferred / prioritised low and net zero carbon technologies

The selection of measures for reduced energy consumption and carbon emissions should be explained in terms of the following (where applicable):

- Client and occupant priorities
- Legal or planning requirements
- Defined Performance Outcomes, such as:
  - Energy consumption targets (e.g. kWh/m^2/yr)
  - Carbon reduction targets (absolute and %)
  - Internal environment performance (temperature, IAQ)
  - Operational rating objectives (e.g. DEC)
- Non-Energy Outcomes, such as:
  - Improved usability or comfort
  - Fire safety strategy updates
  - Preservation of heritage elements
- Performance Metrics eg.
  - Key performance standards and monitoring plan
  - Post-occupancy evaluation intentions

7. CARBON AND ENERGY PATHWAYS

This section should identify an appropriate phasing strategy for implementation of the improvements needed for significant reduction in energy demand and carbon emissions.

This should be developed in close consultation with the client team, and will be informed by wider strategic considerations such as:

- management and maintenance planning including repair and remediation
- fundraising
- logistical interdependencies

7.1 Pathways

The sequence of measures can be illustrated graphically as a decarbonisation pathway, which shows the individual and cumulative impact of each measure over time.

7.2 Towards Net Zero Carbon

Summary of the strategy for progressive decarbonisation and the feasibility of achieving net zero carbon over time.

8. NEXT STEPS

- Set out the next steps for implementation, including funding, design development and delivery. This may include:
- Developing a fundraising strategy.
- Defining the brief, budget and programme for a capital project.
- Procuring a design team for RIBA Stages 2 - 7.
- Undertaking further Building Performance Evaluation to inform design development.

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