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A Guide to Public Sector Decarbonisation

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Agenda

- Contract considerations and efficient routes to market
- Installation and project management
- Example Case Studies
- Important lessons learnt

Project Stages

Process

Site wide strategy to identify high priority buildings

Feasibility studies

Detailed design

Installation of works on site

Post project monitoring

There are different funding options available through Salix and the Scottish Government, although availability varies.

Scotland's Public Sector Heat Decarbonisation Fund Phase 2 closed for applications from 27th May 2025.

They have currently not confirmed details of Phase 3.

Contract Considerations

Pre-Designed

- Greater technical resources required pre-contract
- Investigation and design time required
- More control over the final design solution & greater confidence when entering into contract
- Greater financial certainty
- More design risk as design responsibility stays with the client or client's consultant

VS

Contractor Design and Build

- Technical resources required pre-contract to produce the Employers Requirement/ Performance Spec
- Can be procured quicker
- Technical solution still to be fully detailed
- Budget risk if solution is not clearly defined
- Less design risk as design liability remains with the contractor
- Technical resources required to evaluate the contractor's design

Contract Performance Requirements

What System Performance Requirements are going to be included in the contract?

None	Contract is set up as an installation only project
KPIs	Energy, carbon, and financial saving targets Project delivery programme Success criteria
Guaranteed Savings	Guaranteed realisation of carbon reduction targets Financial incentives. Penalties for non-performance
Extended Handover	Monitoring, recommissioning, reporting requirements Soft Landings

Types of Contract

JCT

Minor Works (MW)

Minor Works with Contractor Design (MWD)

Design and Build (DB)

Intermediate (IC)

Intermediate with Contractor Design (ICD)

Standard (SBC)

Others

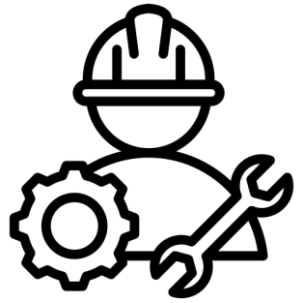
New Engineering Contract (NEC)

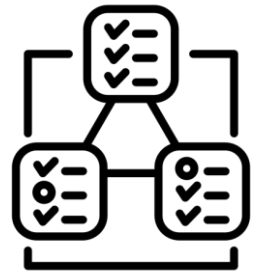
Time and Material

Guaranteed Maximum Price

Routes to Market

- Quotes
- Tender
- Framework
  - Established Frameworks
  - Client Framework
    - Direct Award
    - Mini Competition
- Maintenance Contractor
- Energy Performance Contract
- Direct Award





PRE-PROJECT PHASE

- Pre-Start Meeting
- Request for Information / Flow of Information

INSTALLATION & QC

- Cost Control / Variations / Instructions
- Installation Quality Checks
- Snagging & Defects Inspection

TESTING & HANDOVER

- Commissioning / Witness Testing
- Record Information
- Client Demonstration & Training
- Handover / Practical Completion

POST-PROJECT

- Seasonal Commissioning
- Defects Liability
- Performance Monitoring
- End of Defects Inspection

POST COMPLETION

- Maintenance
- Performance Monitoring

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Decarbonisation Case Studies

1. Leisure Centre

2. Architectural Greenhouse

3. Grade II Listed Building

Decarbonisation Options

Case Studies	Decarbonising Heating Options						Decarbonisng DHW Options			
	LT-ASHP	GSHP	WSHP	Hybrid	Heat Network	Electric Boiler	HT-ASHP	Hybrid	Electric Boiler/Calorifier	Instantaneous Electric Water Heaters
Leisure Centre	✓						✓			
Architectural Greenhouse	✓	✓	✓						✓	
Grade II Listed Building	✓	✓		✓					✓	

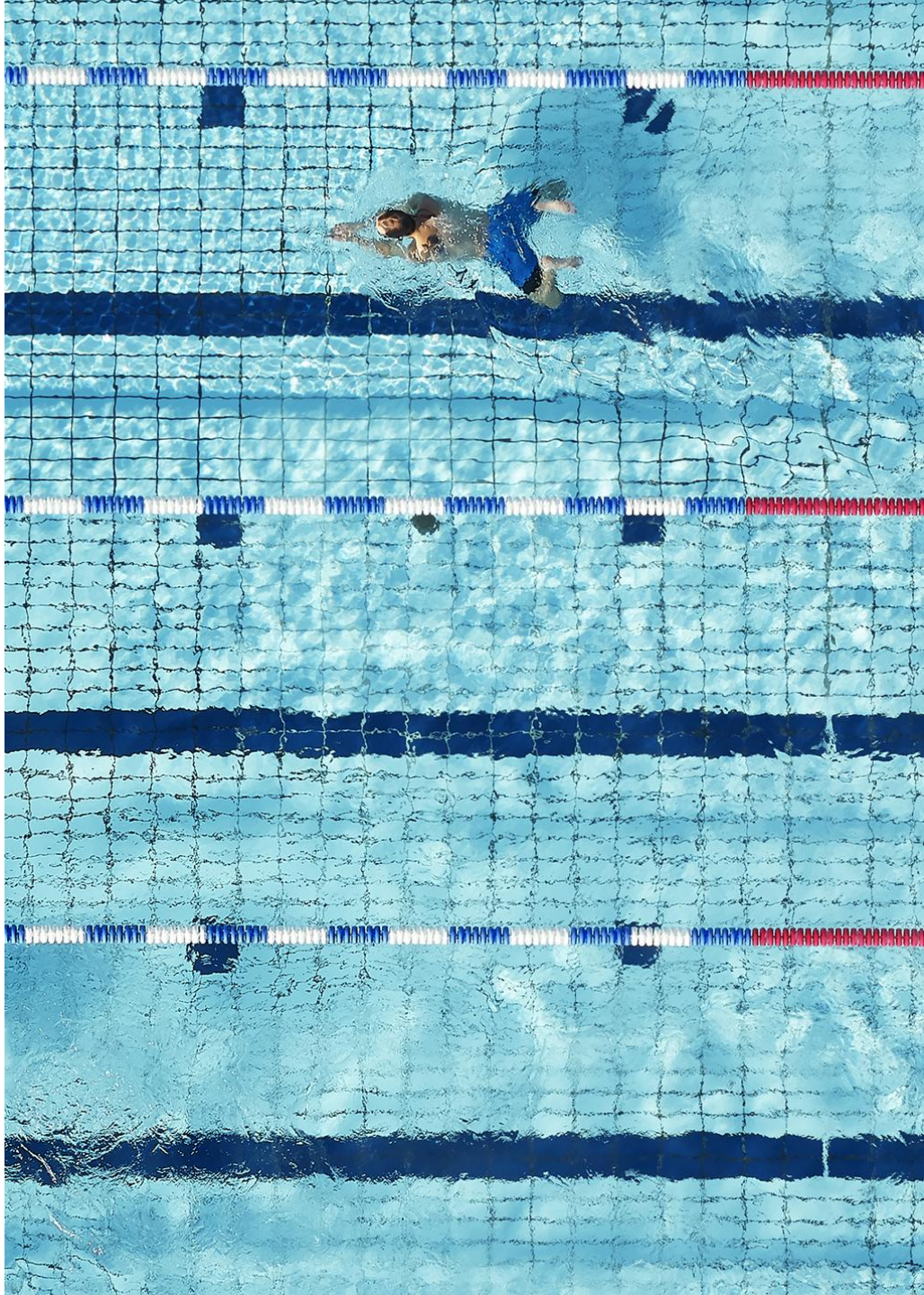
Case Studies	Decarbonising Fabric Options						Renewables		Reducing Energy Consumption
	External Wall Insulation	Loft Insulation	New Glazing & Doors	Secondary Glazing	Cavity Wall Insulation	Draught Proofing	Solar Panels	Solar Thermal	LED Lighting
Leisure Centre	✓		✓				✓		✓
Architectural Greenhouse			✓				✓		✓
Grade II Listed Building		✓		✓					✓

✓ = Chosen Option

✓ = Considered Option

Leisure Centre

Item	Recommendation	Annual Electricity Savings (kWh)	Annual Gas Savings (kWh)	Annual Saving (£)	Capital Cost (£)	Payback in Years	Carbon Saving (tCO_2) per year
1a	Triple Glazing		74,771	£4,120	£137,730	33.4	13.7
1b	External Wall Insulation		22,739	£1,253	£191,280	152.7	4.2
2a	ASHP (Space Heating)	-166,681	933,400	-£25,180	£1,840,500	NA	136.2
2b	HT-ASHP (DHW)	-10,779	35,113	-£3,020	£258,500	NA	4.2
3	130.8 kWp Solar PV (used on site)	93,631	-	£43,035	£160,900	3.7	23.0
4	LED lighting	24,872	-	£11,432	£37,200	3.3	5.2
	Total	-41,712	1,066,023	£32,502	£2,626,110		186.4



Costing Detail: ASHP

Item	Description	Costs
1	Preliminaries	£19,000
2	**ASHP and Plant Room**	
	Construction Compound	£79,000
	Heating Air Source Heat Pump(s)	£239,000
	Acoustic Attenuation	£29,000
	Buffer Vessel(s)	£8,000
	Heating Primary Pump(s)	£26,000
	Heating Secondary Pump(s)	£32,000
	Pressurisation Unit(s) & Expansion Vessel(s)	£5,000
	Plant Room Pipework, Valves, & Ancillaries	£55,000
	Automatic Controls, Control Panel & BMS	£60,000
	Electrical Works	£24,000
	Interconnecting Pipework to Plant Room	£10,000
	Builders' Work	£27,000

3	**HEATING DISTRIBUTION**	
	Removal of Existing Building Plant & Equipment	£27,000
	Heat Emitters (Radiators)	£32,000
	Distribution Pipework	£74,000
	New AHU Heating Coils	£20,000
	Heat Exchangers for Pools	£28,000
4	Upgrading Main Incoming Electrical Supply	£122,810
5	Testing & Commissioning	£10,000
	Demonstration & Training	£2,000
	Record Information	£3,500
6	Contingency Sum	£94,000
7	**Works Budget Total**	**£1,026,310**
8	Design Fees	£93,000
	Project Management Fees	£47,000
9	**Project Budget Total**	**£1,166,310**

Architectural Greenhouse

- Temperate greenhouse housing multiple species of exotic plants
- New heating system needed to provide higher temperatures to maintain the plants.
- Nearby lake was considered as a heat source for a Water Sourced Heat Pump (WSHP). Estimated capital cost: **£620,000. SCOP: 4.24**
- A Ground Source Heat Pump (GSHP) was also considered. Estimated capital cost: **£890,000. SCOP: 4.24**
- The boreholes for the GSHP can be extremely disruptive, expensive and have a high embodied carbon content.

Water Source Heat Pump Array. Kensa 2023

Ground Source Heat Pump Array. Kensa 2023

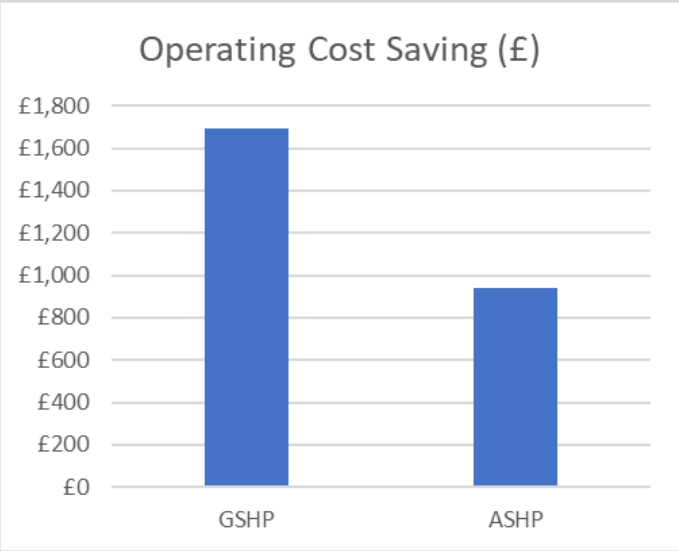
Grade II Listed Building

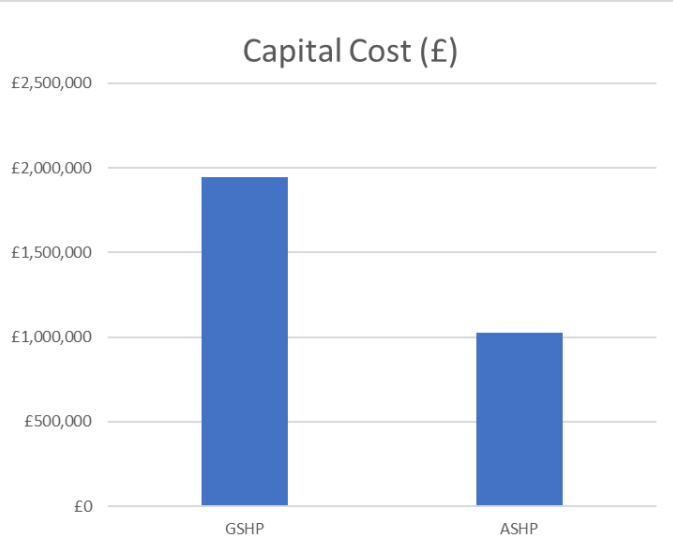
Energy Audit

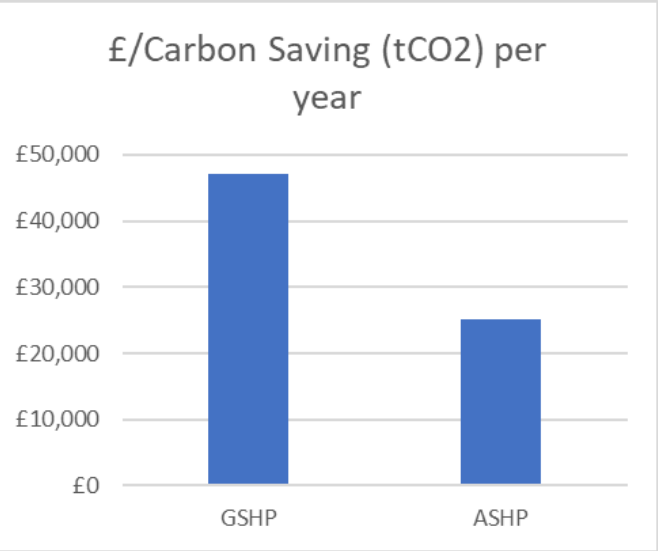
- Grade II listed building
- Listed Status restricts typical decarbonisation options, such as fabric improvements, equipment locations, heating system upgrades.
- Existing gas boilers and radiator systems replaced with modern lower temperature radiators and GSHP.
- Total heat load 125kW
- Drilled 18 boreholes to 167m depth (3,006m total)
- PSDS funding of £342,218 awarded

Air Source v Ground Source

Heat Pump	Capital Cost (£)	Operating Cost Saving (£)	SCOP	Carbon Saving (tCO_2) per year	£/Carbon Saving (tCO_2) per year
GSHP	£1,945,870	£1,694	4.13	41.4	£47,027
ASHP	£1,027,600	£937	3.90	40.8	£25,211

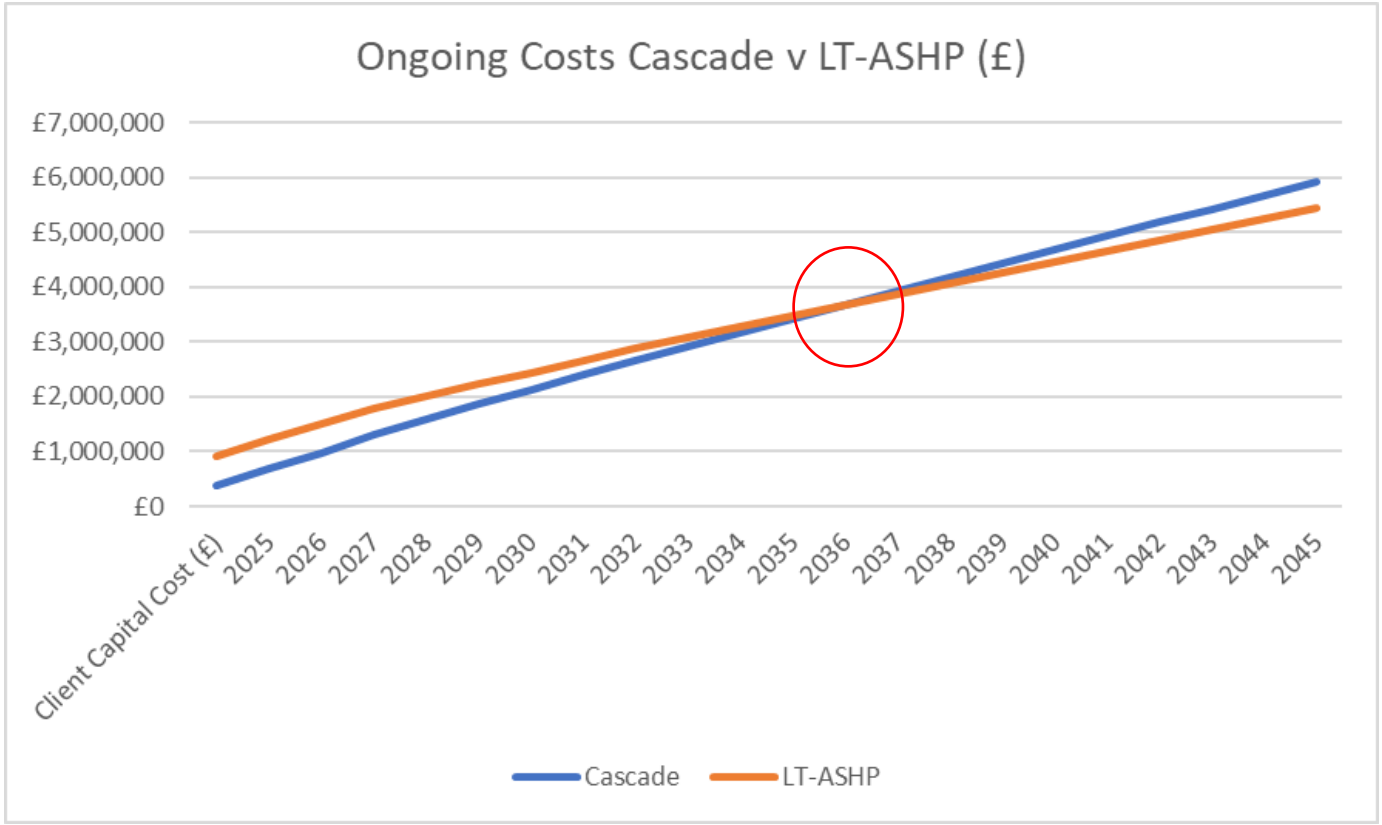






Other Low Carbon Heating Options

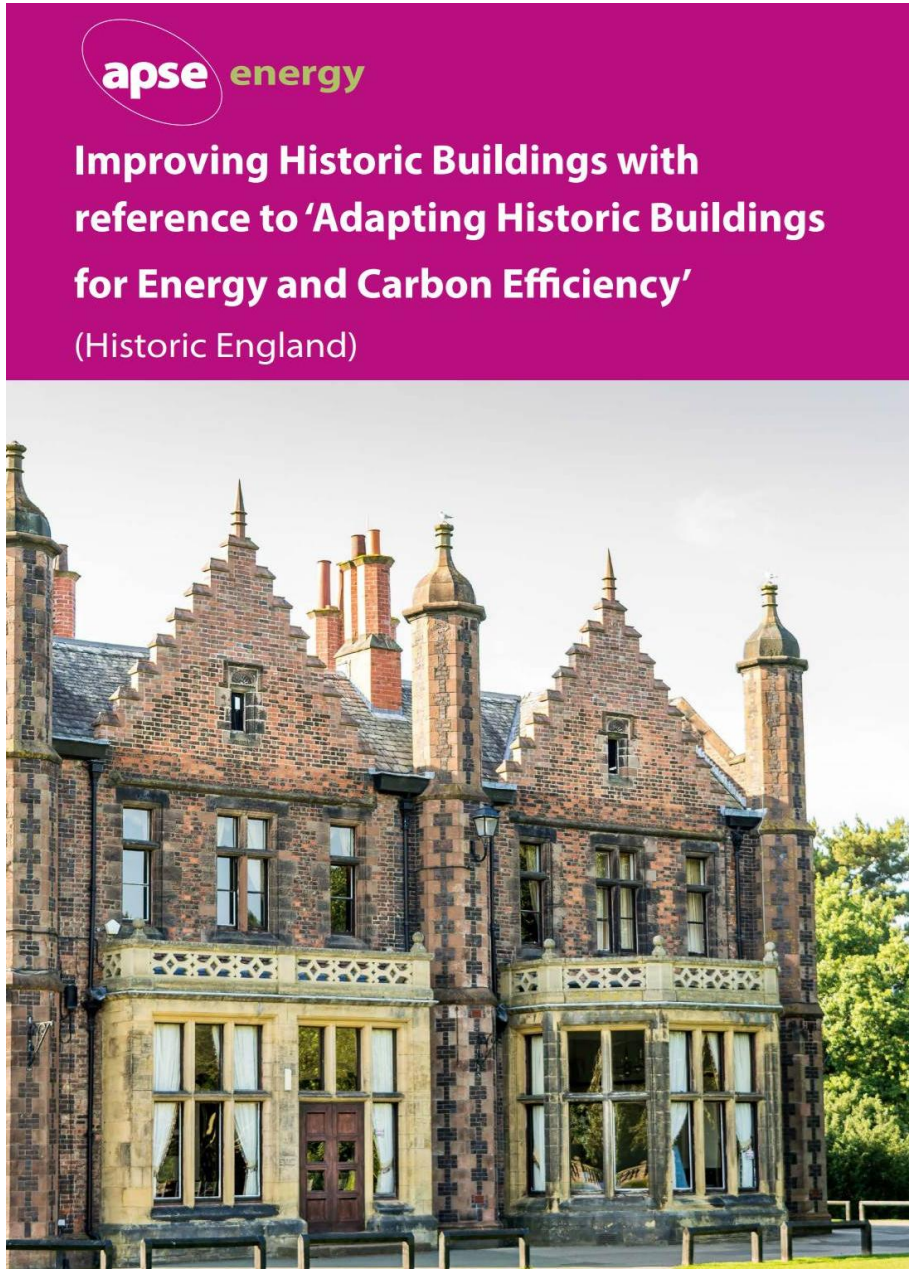
- Cascade system combines water and air source heat pumps.
- Water source unit boosts air source to provide higher flow rates.
- Financial model compares cascade vs low-temperature ASHP.
- Low-temperature ASHP has better financial performance over 20-year period.



System	Capital Cost Contribution	Carbon Saving	Operational Cost	Need to replace Heating Distribution System
Cascade	Medium	Medium	High	No
LT-ASHP	High	High	Low	Yes

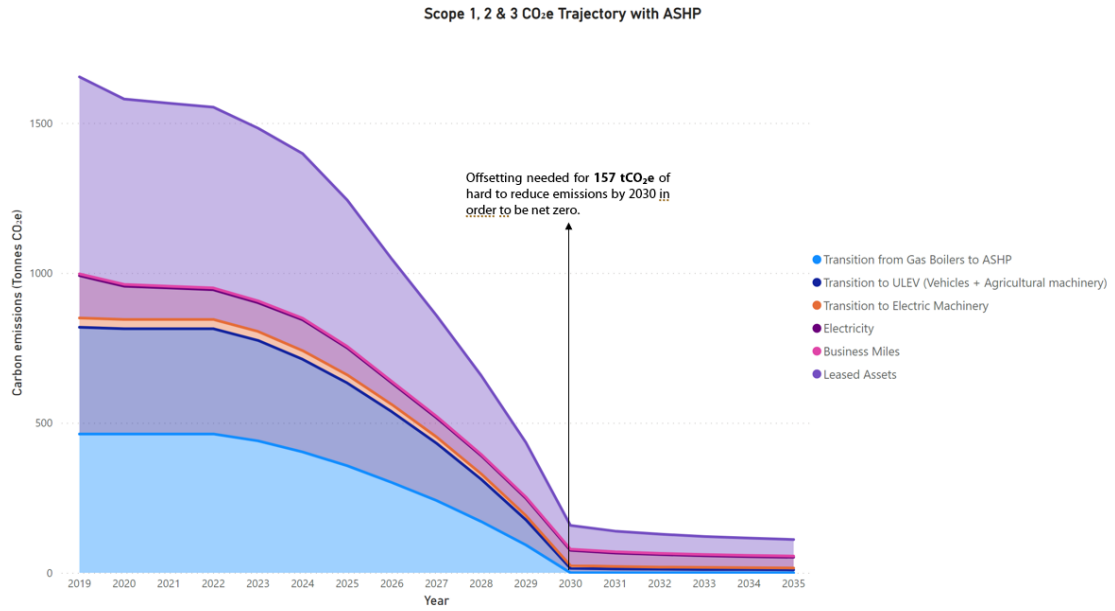
Guide to Historic Buildings

SCAN ME



The Net Zero Journey Summary

- Get your **Data** & estate in order
- Calculate **Baseline Emissions** & **Set Net Zero Targets**
- Do a **Net Zero Trajectory**
- Carry out **on-site Energy Audits**
- **Engineering Design**
- Procurement
- Installation
- **Measure & Optimise** for *Continuous Improvement*



Decarbonisation Support

Services Offered

- Energy Decarbonisation Audits
- Carbon and Energy Footprint Reporting
- Building Part L Compliance
- Building Energy Modelling
- Heat Network Consultancy
- Solar Panel Design and Procurement
- Building Management System Audits

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ECA CONSULTANT & SPECIFIER ASSOCIATE | Crown Commercial Service Supplier | CYBER ESSENTIALS CERTIFIED | CIBSE | Heat Networks Consultant HNC31669

URS ISO 9001 | UKAS MANAGEMENT SYSTEMS | URS ISO 14001 | UKAS MANAGEMENT SYSTEMS | UKAS PERSONNEL CERTIFICATION | CIBSE | Low Carbon Consultant LCC150535

Decarbonisation Next Steps

Ready to take action?

Contact Phil Brennan for further details on delivery of projects

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