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Decarbonising the Leisure Sector

A Practical Guide to Accelerating the Path to Net Zero.

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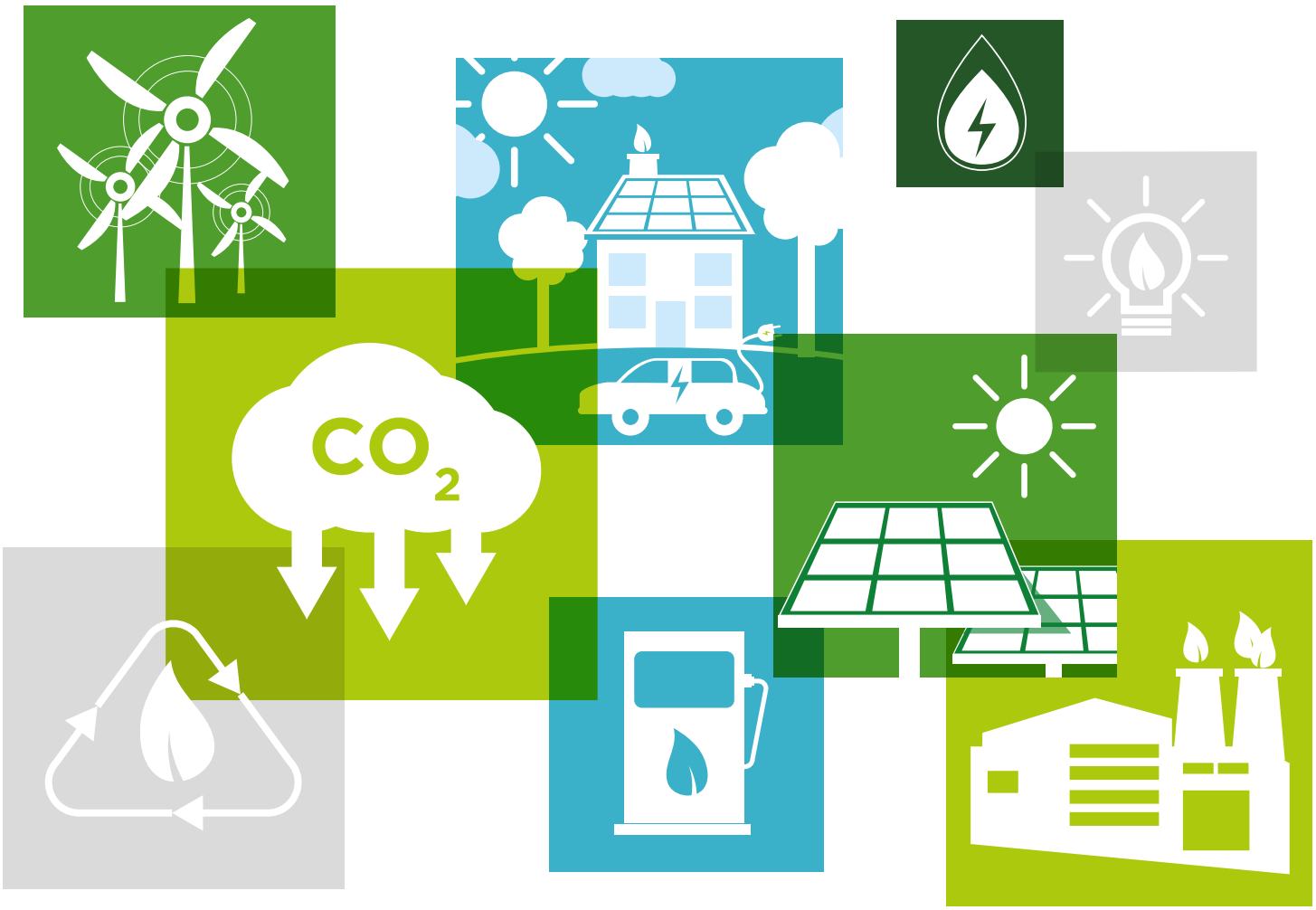

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1. foreword

We at the Midlands Net Zero Hub, are proud to introduce this guide, developed in collaboration with the Department for Energy Security and Net Zero. Leisure centres are vital community assets, they are places that health, wellbeing, and social connection thrive. Yet they are also among the most energy-intensive public buildings, often facing significant challenges in reducing carbon emissions while maintaining essential services.

This guide provides practical, actionable insights to support local authorities and leisure operators in their journey toward decarbonisation. It brings together technical expertise, real-world case studies, and strategic recommendations to help transform leisure centres into beacons of sustainability and resilience.

The ambition is clear: to empower decision-makers with the tools and knowledge needed to deliver net zero outcomes that benefit both people and planet. By investing in energy efficiency and low-carbon technologies, we can not only reduce emissions but also improve operational performance, lower costs, and enhance the user experience.

We hope this guide serves as a catalyst for change by supporting the sector to lead by example and contribute meaningfully to the UK's net zero goals.

Jack Hayhoe - Head of Net Zero Programmes, Midlands Net Zero Hub

1. foreword

At Sport England, we believe that **everyone should have the opportunity to be active in a way that works for them**. Leisure facilities play a vital role in delivering this vision, serving as trusted, inclusive spaces for communities across the country. Yet these spaces face growing pressure, from rising energy costs to the urgent need to decarbonise. This guide from the Midlands Net Zero Hub offers practical support for leisure operators and local authorities to review their sustainable procurement procedures and practices to support the transition to low-carbon operations in line with the Government's Net Zero Strategy and public sector decarbonisation targets.

By prioritising efficient designs and operational systems that support carbon reduction, we're not just investing in infrastructure, we're investing in the future of participation and physical and mental wellbeing. The Government's commitment to Net Zero by 2050, and its funding through initiatives such as the, now withdrawn, Public Sector Decarbonisation Scheme and Swimming Pool Support Fund, create a clear mandate for change. When leisure centres are more energy efficient, they are more affordable to operate, more resilient, and better able to serve their community's long term. This guide supports the aims of our Every Move Sustainability Strategy by helping those involved in local activity delivery to make climate conscious decisions that protect the spaces where people move, connect, and thrive. We encourage all those involved in leisure delivery to use procurement as a tool for positive environmental and social impact.

Denise Ludlam - Environmental Sustainability Strategic Lead - Sport England

2. executive summary

Leisure centres are vital assets in supporting health, wellbeing, and social inclusion within communities across the United Kingdom. They facilitate physical activity, social connection, and public health outcomes at scale. However, these benefits come at an energy and carbon cost, especially in buildings that include swimming pools. These facilities are among the most energy intensive in a local authority's property portfolio.

In the context of rising utility costs, mounting climate risks, and the launch of Sport England's new Every Move Sustainability Strategy (2024), there is growing pressure on councils and leisure operators to act. Decarbonising these sites is no longer optional, it is essential. Local authorities must develop and implement credible, fundable roadmaps that outline their path to achieving Net Zero.

This guide, developed by the Midlands Net Zero Hub (MNZH) in collaboration with ukactive's Sustainable Futures Advisory Group, responds to that need. It provides a practical, accessible framework to support decarbonisation in public leisure settings. **The guide simplifies a highly technical process into a four-phase, ten-step model** that outlines how to assess, plan, fund, and deliver energy efficiency improvements and carbon reductions.

Drawing from real world case studies involving six leisure centres across the Midlands, the guidance illustrates how carbon emissions can be significantly reduced.

David Gerrish - ukactive (Strategic Lead Digital & Sustainability).

"With the right technical support and targeted investment, leisure centres can become energy efficient, economically sustainable community assets."

3. Introduction – who is this guide for, including methodology

This guide is intended for a range of stakeholders responsible for the operation, funding, and strategic planning of leisure services. It is particularly relevant for:

- Local authority officers (climate, estates, leisure and finance teams).
- Leisure facility operators (both in-house and outsourced).
- Elected members and strategic policymakers.

Given the fact that **Scope 3 emissions** - which are indirect emissions from outsourced services - make up a significant proportion of a local authority's total emissions, decarbonising leisure centres under external management is as important as actioning in-house service provisions.

Methodology

The successful journey to decarbonisation is embedded in data. Midlands Net Zero Hub commissioned technical surveys of six leisure centres located across the Midlands region. These surveys were conducted by Leisure Energy, Chartered Energy Managers with specialist expertise in leisure facility performance. Data from these facilities forms the technical foundation of this guide, offering real world examples of retrofit opportunities, cost savings, and emissions reductions. Real world examples from case studies and data examples are included throughout, however, the Appendices detail more technical data across the case studies and pay-back periods.

Participating facilities included:

- Harborough Leisure Centre (District of Harborough Council).
- Hinckley Leisure Centre (Hinckley & Bosworth Borough Council).
- Loughborough Leisure Centre (Charnwood Council).
- Ashby Leisure Centre (North West Leicestershire Council).
- Huncote Leisure Centre (Blaby District Council, dry side only).
- Parklands Leisure Centre (Oadby & Wigston Council).

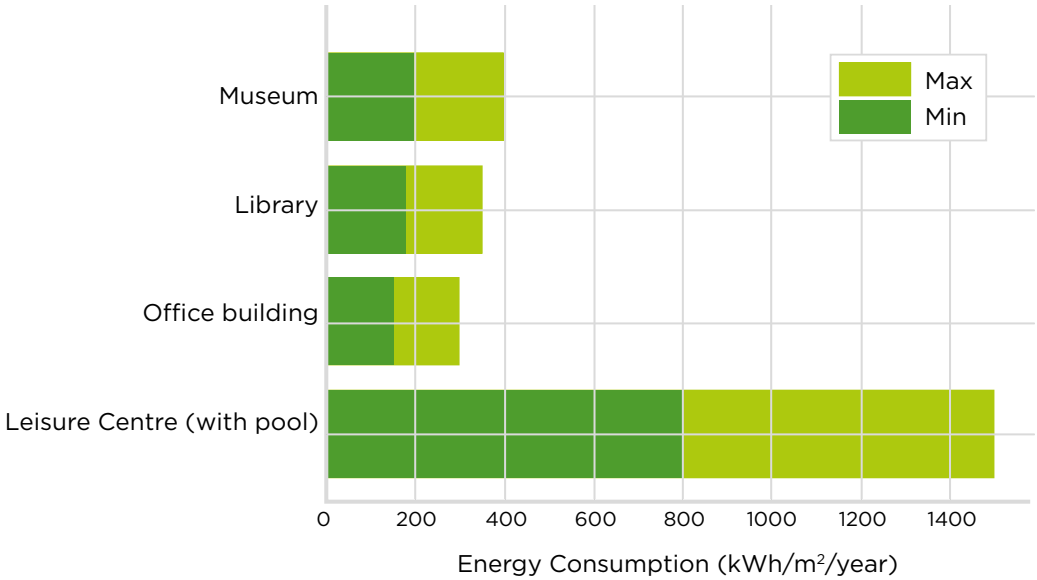
These sites were selected to represent a range of building ages, operational arrangements, and retrofit potential.

4. Why Leisure Centres Matter on the Net Zero Journey

The Climate Change Act 2008 mandates that the UK must reach net zero greenhouse gas emissions by 2050. Buildings account for around 21%[1] of the UK's total emissions with public sector estates contributing approximately 11% of this total. Many of the 397[2] UK councils have set targets to be either net zero or carbon neutral by 2030.

Within these local public portfolios are leisure centres and those with swimming pools who are often the highest emitting buildings in a local authority's estate. A single site with a pool can **produce up to 5 x more CO2 emissions** than a civic office, museum or library.

Energy consumption comparison by building type



Source CIBSE TM46, DEC database, Carbon Trust Data

What is the scope of the challenge and the opportunities for social impact?

- There are over 2,700 public leisure centres across England (Sport England).
- Approximately 1,603 pool facilities are publicly owned (2025 -State of the UK Swimming Industry Report).
- Majority of leisure centres in the UK were built in the 1970's and 1980's which do not meet current energy design specifications.
- The average age of a leisure centre is 53 years. (CLUK Leisure Trust membership data).
- 83% of centres are outsourced to third-party operators.
- 11.5 million members used UK health and fitness clubs in 2024 [3].
- Approximately 600 million total visits took place in that year.

Across the broader leisure, community, and sport sector, **30 million** [4] adults in England participate in sport or physical activity each week. This presents an opportunity to not only support mental and physical wellbeing initiatives and provide warm hubs to combat fuel poverty, but also to expand efforts in other areas of sustainability - such as community biodiversity projects that promote cleaner air and help tackle social inequalities.

Why are leisure centres so energy intensive?

1. Design Impact:

- 68% of leisure centres were built more than 20 years ago with the average being 53 years old.
- Legacy design significantly increases energy consumption.
- Inefficient heating, cooling, and lighting systems and inadequate insulation impacts emissions.
- These higher operational costs without intervention can impact local social and economic cost models through potential closures.

2. Swimming Pools

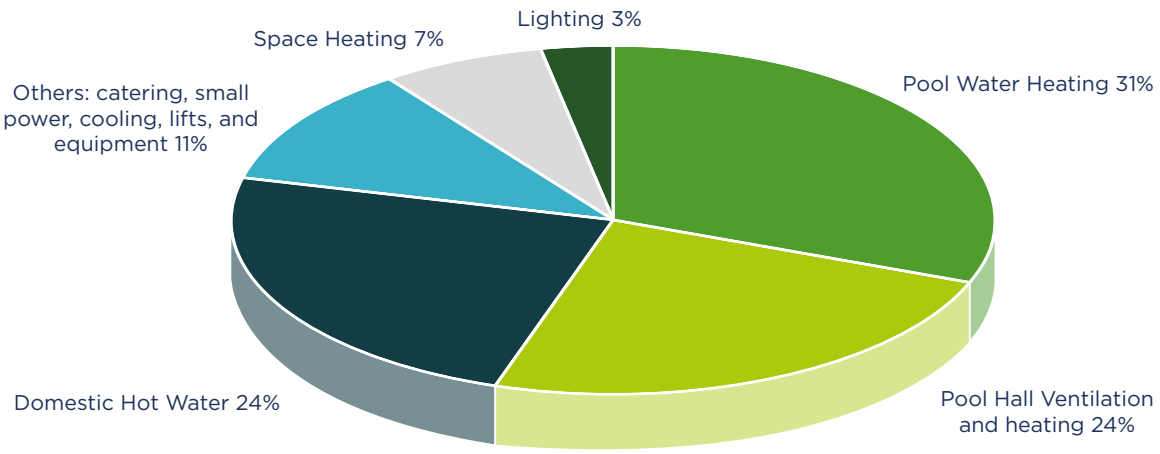
- Require constant heating (typically 28–30°C water temperature).
- High ventilation and dehumidification load due to evaporation.
- Heat losses without pool covers can be substantial.

3. High Occupancy & Long Hours

- Centres operate from early morning to late evening, 7 days a week.
- Multiple usage areas within a building : gyms, studios, cafés, sports halls, each with differing heating/cooling needs.

4. Wet & Dry Plant Demands

- Use of pumps, filters, chemical dosing for pools. HVAC systems for large open spaces and wet changing areas.



Source: Sport England predicted energy usage Community Leisure Hub (approx gross internal floor area (GIFA) 4,700m²)

"Leisure centres are (probably) the highest carbon footprint buildings in a council's portfolio, and the most expensive to run".

In short, although leisure centres are energy intensive, they are important community anchors. Their sustainable transformation is not only a climate imperative, it's a social and economic opportunity. Leisure centres are uniquely placed to address social equity, health, and environmental goals simultaneously.

Following current building guidelines and best practices ensures that leisure facilities remain sustainable and central pillars to community resilience'

1. 2024 UK Greenhouse Gas Emissions (DESNZ (provisional figures)
2. Cape Council target dates for Net Zero
3. ukactive UK Health and Fitness Market Report 2025
4. Sport England Active Lives Adult research 2023-24

5. The Case for Change: Understanding the Data

Leisure facilities, particularly those featuring swimming pools, are among the highest consumers of energy in the public estate. The primary contributor to these emissions is gas fired heating systems, which provide warmth for pool water, showers, space heating and hot water. Therefore, a transition away from the use of fossil fuels toward renewable and electrified systems (decarbonisation) would seem to be the logical first step. As a first step, embedding good house keeping behaviours, no matter how small, such as turning off lights, is a good foundation for energy efficiency and long-term cost saving. The financial benefits of investing in new energy-efficient technology will be less effective if small energy-saving practices are not continuously implemented in facilities.

> "Energy transformation isn't a one off project. It becomes part of how a leisure centre operates."
>
> Midlands Net Zero Hub

Understanding Your Estate: Example Leisure Centre Energy Profiles Facility Type

Facility Type	Typical Energy Use (kWh/m2/year)	Carbon Intensity	Notes
Wet Side Centres	1,500 - 2,500	High	Pool heating dominant
Dry Side only	300 - 500	Moderate	Light & ventilation key
Dual use sites	800 - 1,600	Variable	Shared utilities

> "Wet-side leisure centres can consume up to 10 times more energy per square metre than dry-side gyms."

Why Efficiency Comes First

Before investing in new technologies such as heat pumps or solar PV, it is essential to first reduce existing energy waste. This ensures that new systems are appropriately sized and cost-effective.

Key Efficiency Actions:

- Optimise control settings.
- Implement staff energy awareness programmes.
- Repair insulation gaps and install pool covers.
- Review other building fabric energy efficiency measures.

By improving baseline efficiency, facilities lay a solid foundation for low-carbon upgrades.

To illustrate this across the six featured regional facilities audited, several recurring themes emerged:

- High overnight energy use: Many centres consumed unnecessary energy outside of operational hours due to poorly configured controls or missing thermal pool covers.
- Poor Display Energy Certificate (DEC) ratings: Most centres received DEC ratings of E or below, indicating inefficiency.
- Constant electricity baseloads: Minimal change in electricity usage overnight pointed to outdated systems running continuously.

Quick Tip: Missing pool covers? Fixing this one issue can save tens of tonnes of CO_2 per year and reduce energy bills significantly.

Table: Carbon Emissions at Surveyed Sites

Site	Carbon (tCO2/year)	Key Feature
1	315	Wet and dry, high baseline
2	516	Large wet side facility
3	569	Significant energy variance
4	427	Lido (outdoor pool with associated F&B located near natural water) complicates load
5	32	Dry side facility
6	301	Dry and wet side facility

Case Study Spotlight: **Loughborough Leisure Centre**

A comprehensive decarbonisation plan was developed, informed by high-quality half-hourly data and expert technical input.

Key Interventions:

- Plate heat exchanger insulation (0.4-year payback).
- Motorised pool covers (2.7-year payback, 29.1 total carbon dioxide (tCO_2) saved).
- Roof and cavity wall insulation (longer payback: 17–26 years).
- Solar PV system funded via Sport England Swimming Pool Support Fund, avoiding an otherwise 13.2 year payback.
- Building Energy Management System (BEMS) upgrade (3-year payback, 56.9 tCO_2 saved).

Loughborough Leisure Centre Approach to Decarbonisation and Reasons for Success

Strategic Approach

Detailed Energy Audit
- Analysed half hourly gas and electric usage identified abnormal usage patterns.
- Electricity usage during non-operational hours found to be excessive. Lights left on.
- Gas usage showed minimal seasonal variation, revealing Combined Heat & Power forced to operate overnight due to poor boiler efficiency and lack of pool covers.

Site-Specific Energy Measures identified
- Plate heat exchange insulation with 0.4-year payback.
- Pool covers. 29.1 tones CO_2 2.7 year*.
- Building fabric upgrades.
- Solar PV. BEMS upgrade 56.9 tonnes CO_2 /3-year payback.

Funding & Application Excellence
- Public sector Decarbonisation scheme (PSDS 4) Grant: £2.7 million Match funding £381.255/12.37%.

Innovation

NET ZERO POD Installation
- Packaged plant room.
- 3x250kw CO2 air source heat (ASHPs).
- Dual temperature capacity (sCOP of 4.47).
- 100% gas removal from heating system.
- Full Air Source Heat Pumps (ASHPs).

Outcomes
- Early technical audits to identify quick wins and major inefficiency.
- Over £66,000 annual energy savings.
- DEC Improvement from grade D to A.

Key Lessons
- Early technical audits to identify quick wins and major inefficiencies
- Combining funding streams (PSDS + Sport England SPSF) maximises impact
- A phased, data-driven plan that aligns with funding criteria ensures success
- Partnering with experienced technical advisors boosts bid strength

"Early data audits are critical. They uncover hidden inefficiencies and build the case for major investment."

Leisure Energy

Why They Succeeded:

Factor	Description
Strong Data Evidence	High quality half hourly energy data, clear problem identification
Experienced Partner	Support from Leisure Energy for feasibility design (up to RIBA Stage 2), and DNO application.
High Return on investment	Low Grant Carbon Cost (£223.82/tCO2 e vs £510 threshold).
Comprehensive Scope	Combined measures (insulation, solar, ASHP, controls) for deeper impact.
Timely Planning	All studies (DEC, fabric surveys, feasibility) completed before start of the submission process

Takeouts:

- Early technical audits are critical to identify quick wins and major inefficiencies.
- Combining funding streams (Public Sector Decarbonisation Scheme and Swimming Pool Support Fund) maximises impact and value for money.
- A phased, data-driven plan that aligns with funding criteria ensures success.
- Partnering with experienced technical advisors like Leisure Energy who understand both swimming pool and leisure facilities boosts bid strength.

This case study serves as a model for integrating technology, funding and project management. It adopts a systematic technical research based case study format that includes visuals and a quote from the local authority or operator to bring the project's impact to life.

When leisure centres are energy-efficient, they are more affordable to operate, more resilient, and better able to serve their communities long-term

6. Roadmap to Decarbonisation

Introduction

Decarbonising public leisure centres requires more than technological investment. It requires a structured process that builds capability, secures funding, and embeds long-term operational change. This guide recommends a **four phase, ten step approach** that provides a roadmap for leisure operators and local authorities alike.

Preparation

STEP	Action
1	Assemble team
2	Collect data & DECs
3	Commission a Heat Decarbonisation Plan

Design

STEP	Action
4	Prioritise ECMs
5	Prepare funding bids

Delivery

STEP	Action
6	Procure and install ECMs
7	Monitor savings via BEMs

Optimise

STEP	Action
8	Train staff and embed changes
9	Plan for long term upgrades
10	Report and replicate

Strategic Roadmap Timeline

Roadmap Milestones:

- **2025** – Develop full business cases and identify funding options.
- **2026–2027** – Deliver works supported by available grant and capital funding.
- **2028–2030** – Optimise operations using real-time data and digital twins.
- **2030+** – Transition to a fully fossil-free estate and share best practice nationally.

Lets break it down

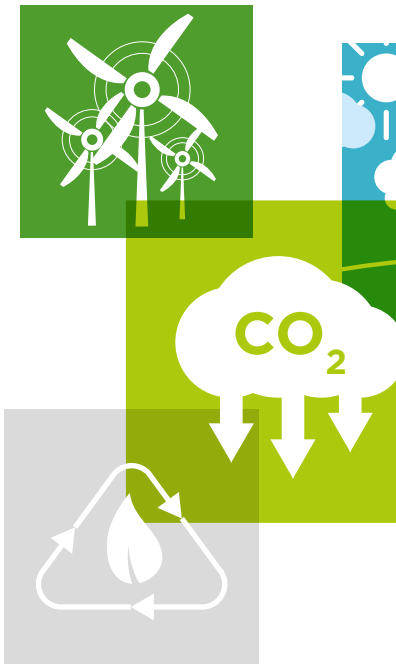
Phase 1: Preparation and Analysis:

Step 1: Assemble a Decarbonisation Taskforce/Working Group.

- Include Council officers, finance, estates, leisure operators and external advisors.
- Assign a project lead and identify external technical advisors or consultants.

Step 2: Review Energy Performance

- Gather 12–24 months of utility data (ideally half-hourly readings).
- Benchmark energy use in kWh/m2 using public database of Display Energy Certificates (DECs) and search leisure facilities.
- Identify anomalies and inefficient baseloads through visual data mapping.



For organisations managing multiple sites—such as local councils or leisure operators - having clear, consistent data on energy performance is essential. It enables effective prioritisation and helps target energy-saving interventions where they will have the greatest impact.

One of the simplest and most immediate indicators of a building's energy efficiency is its **Display Energy Certificate (DEC)**. Legally required for public buildings with a total floor area over 250m^2 that are regularly visited by the public, a DEC is issued annually by an independent assessor. It rates the building's actual energy performance on a scale from **A (most efficient) to G (least efficient)**, based on comparisons with benchmarks for similar buildings.

An **A-rated facility** signifies strong energy performance, lower running costs and a reduced carbon footprint. In contrast, a **G-rated building** signals high energy use and a clear need for efficiency improvements. In addition to the current rating, DECs also include data from the previous three years, allowing building managers to track performance trends over time and evaluate the impact of any changes made.

These certificates are publicly accessible and can be viewed online via the government's official portal. Searching via postcode, users can easily compare energy usage and ratings across multiple sites, helping identify outliers and benchmark performance within a wider portfolio.

"No two centres are alike. Solutions must be tailored to site specifics, age, and operational arrangements."

What to do next:

- Obtain 12–24 months of utility bills (gas, electricity, water). Ideally half hourly meter data if available, this provides 48 data points per day ideal for detailed analysis.
- Benchmark against building size.
- Calculate energy consumption per square metre: Use the following formula as a guide: (Annual kWh consumption) ÷ (Total floor area in m^2) = kWh/m^2.

Table: Sample taken from a survey site.

Utility (example)	Annual energy consumption	Energy consumption per square meter floor area
Electricity	249,325 kWh	42.1 kWh/m2
Natural gas	2,827,958 kWh	477.1 kWh/m2

- Review your energy performance through your Display Energy Certificates (DEC). Compare this to national or regional benchmarks (e.g. CIBSE, DEC performance data).
  - Use the DEC database to check: DEC check.
  - Review usage over the past 3 years and compare your performance vs similar buildings.
  - Chart monthly gas and electricity total to analyse usage patterns and identify anomalies.
  - Analyse half-hourly date (if applicable). Create Excel graphs of daily and weekly usage. Identify; baseloads, spikes outside of occupancy hours and look at seasonal variation (problematic for gas usage).
  - Look for targeted diagnosis such as lights being left on or misconfigured timing controls that may be using unnecessary amounts of energy. This could include the ability to recover and utilise waste heat through Combined Heat and Power (CHP) optimisation.

Step 3: Conduct a Technical Site Audit

- Commission a Heat Decarbonisation Plan (HDP). Output is an actionable plan showing current emissions, savings potential, and payback periods. Here is a guide to conduct your own HDP prior to commissioning. Salix Finance - Guide creating HDP.
- Ensure audits include:
  - Half-hourly data analysis.
  - Thermal imaging of plantrooms.
  - Pool-related heat loss diagnostics.
  - Review of BEMS and existing controls.
  - Onsite equipment inspection.

Phase 2: Design and Funding Readiness

Step 4: Prioritise Energy Conservation Measures (ECM).

There are a wide range of ECMs available, each varying in cost, effectiveness and the time required to deliver financial returns. These approaches broadly refer to actions and initiatives aimed at reducing energy consumption and promoting energy efficiency. This includes a range of strategies from individual behavioural changes (turning lights off, unplugging appliances and adopting energy efficient habits) to structural modifications and policy implementations. When considering which strategies to follow, it is important to take account of the different price of utilities between organisations and locations depending on how and when energy is procured, meaning that the **Return on Investment (ROI)** can vary significantly.

ROI is typically used to determine how long it will take for the savings generated by an intervention to offset its initial capital cost.

This guide groups ECMs into three common ROI categories, based on the typical payback period:

- **Quick wins:** ROI of **5 years or less**.
- **Medium term measures:** ROI of **more than 5 years but up to 10 years**.
- **Long term Strategic:** ROI of **more than 10 years**.

These bands help organisations assess and prioritise interventions based on budget availability, carbon impact and strategic need.

Group measures into:

- **Quick wins** (Payback < 5 yrs): LED lighting, insulation, pool covers, behavioural changes.
  - Promote staff energy awareness and tracking.
  - Upgrade to LED lighting.
  - Insulate boiler and plant rooms.
  - Install thermal pool covers.
  - Fit destratification fans in large spaces (evidence exists for dry sites only).

These low-cost, high-return measures are ideal starting points. Facilities should feel encouraged to implement them during regular maintenance or contract renegotiation cycles.

- **Mid term measures** (5–10 yrs): Solar PV, BEMS upgrades, high-efficiency motors.
  - Install roof-based solar PV.
  - Upgrade Building Energy Management Systems (BEMS).
  - Replace older pump motors with high-efficiency units.
  - Consider through research whether the switch from high quality sand to glass medial for pool filtration is viable.

These measures typically require moderate investment and often become feasible during contract extensions or refurbishment cycles.

- **Long term Strategic measures** (>10 yrs): Air Source Heat Pumps, microfiltration, building fabric upgrades.
  - Upgrade building fabric (such as insulation and windows).
  - Install microfiltration systems.
  - Connect to or develop a District Heat Network.
  - Fully decarbonise heating with Air Source Heat Pumps.

While costlier, these interventions are future-proofing investments that may be unlocked by grant funding or major refurbishment projects.

Step 5: Engage with Funding Bodies

Early engagement across all funding options as to feasibility for award is time well spent to identify the best options available and to prepare applications:

- Feasibility studies (first step using guide page 15 Step 3 is to create your own robust heat decarbonisation plan or engage specialist expert advice to support further funding if required).
- Capital Works(create business cases that are informed from feasibility studies and audits) not forgetting to review portfolio lifespan planning.
- Prudential Borrowing through Public Works Loan Board.
- Consider looking into capital.
- Consider other potential grant funding opportunities.
- Look to other considerations for local Authority funding.
- Potential use of third party external funding mechanisms, such as (Power Purchase Agreements, Higher Purchase, Leases).
- Also consider a blended funding model of all the above.

"Data-backed business cases are more likely to attract funding and deliver long-term value."

Phase 3: Implementation

Step 6: Secure Suppliers and Begin Works

- Use compliant frameworks (e.g. SCAPE, Crown Commercial Service Frameworks).
- Appoint contractors with leisure decarbonisation experience.

Implementation Examples:

- **Replace gas boilers** with ASHPs (e.g., Net Zero Pods).
- **Install Solar PV** (roof or carports).
- **Improve BEMS** and HVAC control systems.
- **Fit pool covers** and upgrade glazing/insulation.

Step 7: Monitor and Verify Performance

- Commission post-installation verification reports or audits. Dept for Business, Energy & Industrial Strategy Monitoring & Evaluation Framework Guide.
- Use BEMS to track consumption trends.
- Compare new data against baseline DECs and meter data.
- Use DEC improvement and kWh/£ savings to support future funding applications.

Phase 4: Long Term Optimisation

Step 8: Upskill Staff & Foster Culture Change

- Deliver staff training in energy awareness and system controls. Use subsidised training from organisations such as Right Directions and Future Fit's training: Energy Saving Training for the Workplace.
- Implement behavioural nudges like dashboards and energy leaderboards.
- Commit to staff Carbon Literacy Training. Example: Community Leisure UK (CLUK).
- Sport England's SPFS (Strategic Priority Funding Scheme) includes the Quest scheme providing training and assessment including environmental management.

Step 9: Plan for Further Measures

- Investigate larger-scale interventions like microfiltration, fabric upgrades or even district heating.
- Use reinvested energy savings to fund ongoing works.
- Procurement of utilities, through electrification give consideration of time of use electricity tariffs.

Step 10: Share Success and Replicate

- Produce case studies and reports for elected members and funders.
- Join networks to share results, consider entering sustainability awards and partner with other synergistic organisations. Refer to Chartered Institution of Building Service Engineers to help secure future funding.
- Apply lessons to other leisure sites in your portfolio.

"Across six diverse sites, the path to decarbonisation showed remarkable consistency: start with data, combine quick wins with strategic upgrades, and secure the funding to make long-term impact

7. Funding Pathways and Financial Frameworks

Introduction

Net zero public leisure estates requires not only clear strategy and strong technical planning, but also a proactive and flexible approach to funding. Given the withdrawal of some national schemes and the unpredictability of future grant rounds, local authorities and leisure providers must leverage a wider range of financial mechanisms, including capital reserves, borrowing, partnerships with Local Enterprise Partnerships (LEPs) or regional investment boards. Outlined in this section is a **six step funding preparation process**.

> "Identifying funding pathways should never be an afterthought. It is central to decarbonisation planning from day one."

Core Funding Principles

- Start with robust data (DECs, audits, carbon baselines).
- Develop well evidenced business cases with realistic timelines.
- Explore blended finance: combine grants, borrowing, and internal capital.
- Align projects with local priorities (health, regeneration, sustainability).

Overview of Funding Routes (July 2025)

Funding Option	Typical Capital Funding Range	Match Funding Required	Authorising Entity	Typical Use Cases	Key Criteria / Considerations	Funding Timeframes / Deadlines
Local Authority Reserves / Balance Sheet.	£10,000 – £1m+ (varies by authority).	Not usually required.	Local Authority.	Small/medium projects, match funding, rapid deployment.	Must align with council priorities; limited by available reserves; strong business case needed.	As determined by local budget cycles.
Prudential Borrowing (PWLB).	£100,000 – £100m+.	Not required.	UK Debt Management Office (PWLB).	Major capital works, retrofits, renewables, heat decarb.	Must comply with Prudential Code; projects must be affordable, sustainable, prudent; not for yield assets.	Application any time; subject to council approval.
Combined Authority / Regional Net Zero Funds.	£250,000 – £6m+.	Typically 10–50%.	Combined / Mayoral Authority.	Regional net zero projects, infrastructure, innovation.	Must align with regional priorities; strong business case; may require partnership or bundled projects.	Varies by region; typically annual or biannual.
Great British Energy Community Fund.	Stage 1 up to £40,000 Stage 2 up to £100,000.	Often 10–50%.	Net Zero hubs.	Community renewables, local energy, feasibility studies.	Must be for community benefit – most LA aren't eligible, but community organisations are. Match funding isn't required. This is for feasibility and development of business case. The funding covers the above plus engagement towards community ownership and installation of renewals – NOT for capital works.	Varies; often annual or rolling.
Local Authorities / Combined Authorities.	£5,000 – £15,000+.	Typically 10–50%.	Local Authority / Combined Authorities.	SME decarbonisation, innovation, pilot projects.	SME eligibility, local focus, excludes some orgs (e.g. charities /political), business case required.	Varies by scheme; often annual.
National Wealth Fund.	£1m – £100m+.	Not required.	UK Infrastructure Bank, major lenders.	Large-scale infrastructure, innovation, LA projects.	Must demonstrate additionality, value for money, net zero alignment; competitive process; strong governance.	Rolling; subject to application and due diligence.
Private Finance / Green Bonds.	£5m – £100m+.	Not required.	Private lenders, capital markets.	Large/innovative /long-term projects.	Must be investment-grade, offer clear returns, meet ESG criteria, robust governance required.	Rolling; subject to application and due diligence.

Six-Step Funding Preparation Framework

Step 1: Align Projects with Strategic Objectives

- Map projects to local climate action plans, leisure strategies and corporate objectives (energy efficiency, renewables, heat decarbonisation).
- Prioritise those with highest impact and strongest alignment.
- Identify projects can deliver multiple co-benefits (e.g. fuel poverty, health, community renewal).

Step 2: Build a Robust Business Case

- Use energy audits, utility bills and DEC data to establish baselines.
- Forecast savings, return on investment (ROI) on energy, carbon or operational costs and identify payback periods.
- Conduct risk analysis (energy pricing, delivery, governance).

> "High baseload leisure centres require stress-tested financial models that factor in price volatility."

Step 3: Secure Internal Governance and Approvals

- Present cases to finance directors, estates, and political leadership.
- Ensure project inclusion/compliance with the Prudential Code for Capital Finance.
- Seek Cabinet approval for borrowing or reserve use.

Step 4: Select Appropriate Funding Route

- Reserves:
  - Use for quick wins, pilot projects or grant match.
  - Confirm availability of reserves and alignment with the capital programme.
  - Obtain approval for net zero projects.
  - Ensure robust monitoring and reporting of spend and outcomes.

- Prudential Borrowing (PWLB):
  - Flexible long-term loans (fixed-variable rates) for energy infrastructure.
  - No minimum leading amount, secured on authority revenues, not assets.
  - Application process via the UK Debt Management Office (DMO).
  - Requires Prudential Code compliance (affordability, sustainability).
  - Town/Parish councils secure approval from the Ministry of Housing, Communities and Local Government (MHCLG) prior to application.
  - Use defined procurement and contract management tools. Monitor delivery, savings and compliance through reporting.

- Regional Funds:
  - Combine local authority and private-sector partners.
  - Ideal for innovation and bundled retrofits.

Step 5: Explore Additional Finance

- Consider blending reserves, PWLB borrowing, and external grants (e.g. Salix [or new equivalent] Infrastructure Bank, Community Energy Fund) to optimise affordability and impact.
- Consider private finance or local climate bonds for larger or innovative social impact projects attractive to finance houses.

Step 6: Track, Report and Reinvest

- Monitor via Building Energy Management Systems (BEMS) update DECs.
- Publicly report carbon and cost savings.
- For Public Works Loan Board (PWLB) and other lender options, ensure transparent financial management and demonstrate project viability and outcomes.
- Reinvest savings into the next phase of net zero delivery.

Case Example: Warrington Borough Council funded solar farms through PWLB, using a Power Purchase Agreement to guarantee revenue and support loan repayments, enabling a subsidy free, zero carbon energy supply.

Funding Considerations:

1. Local Authority Reserves / Balance Sheet

- **Administered by:**
  - Local authority (internal finance/cabinet).

- **Purpose:**
  - To fund small-to-medium decarbonisation projects, act as match funding, or enable rapid project deployment.

- **Application Guidance:**
  - Prepare a robust business case aligned with council priorities.
  - Secure internal approvals (finance, cabinet or committee).
  - Demonstrate clear outcomes and value for money.

- **Eligibility:**
  - The project must align with the local authority's capital programme and net zero strategy.

- **Key Documents Needed:**
  - Business case.
  - Energy/carbon baseline.
  - Cost/benefit analysis.
  - Project plan and risk register.
  - What the Funding Covers:
  - Any eligible capital works, including energy efficiency, renewables and enabling works.

Top Tips:
- Use reserves for quick wins or to unlock external match funding.
- Ensure strong internal engagement to accelerate approvals.

Sample Application Checklist:
- Business case approved by relevant officers.
- Energy/carbon baseline included.
- Project plan and timeline.
- Financial analysis (ROI, payback).
- Risk assessment.
- Cabinet/committee sign-off.

2.Prudential Borrowing (PWLB)

- **Administered by:**
  - UK Debt Management Office (PWLB), approved by local authority.

- **Purpose:**
  - To finance major capital works such as large retrofits, heat decarbonisation or renewables.

- **Application Guidance:**
  - Prepare a detailed business case under the Prudential Code.
  - Demonstrate affordability, sustainability, and prudence.
  - Obtain council approval before applying to PWLB.

- **Eligibility:**
  - Local authorities in England, Wales, Scotland, and Northern Ireland.

- **Key Documents Needed:**
  - Full business case.
  - Capital programme inclusion.
  - Prudential indicators.
  - Council approval minutes.

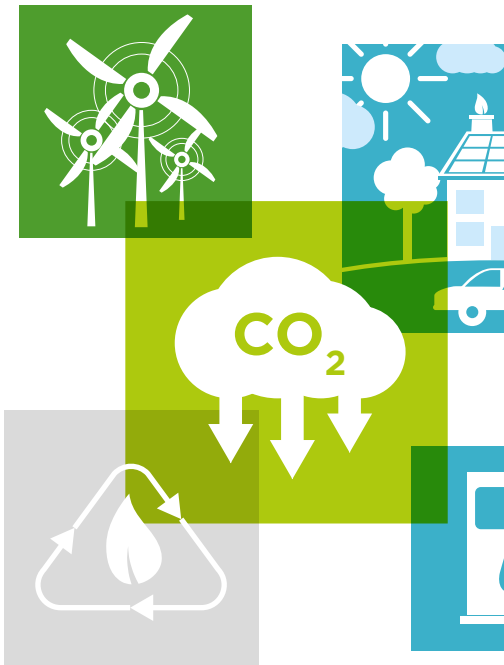
  - What the Funding Covers:
  - Major capital investments in decarbonisation and infrastructure.

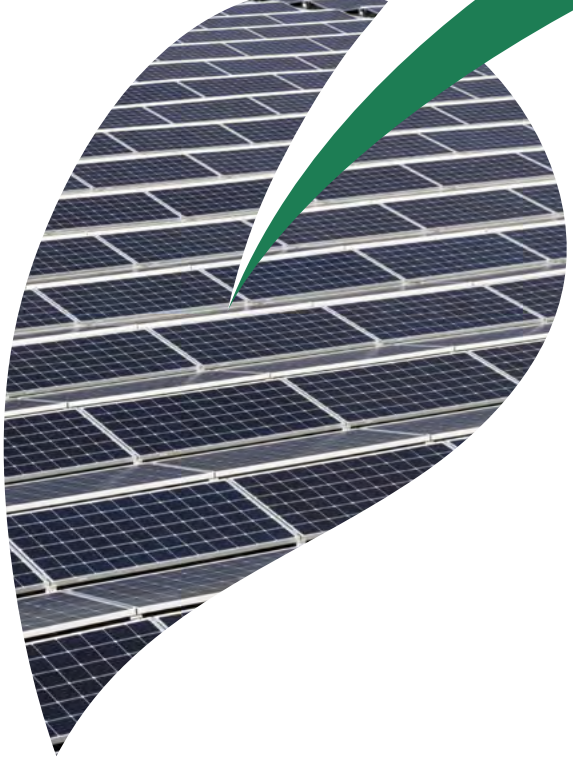
- **Top Tips:**
  - Use for large-scale, long-term projects.
  - Blend with grants or reserves for best value.

- **Sample Application Checklist:**
  - Business case aligned with Prudential Code.
  - Capital programme inclusion.
  - Financial modelling (affordability, sustainability).
  - Council approval.
  - Application to PWLB completed.

3. Combined Authority/Regional Net Zero Funds

- **Administered by:**
  - Combined Authority or Mayoral Combined Authority.
- **Purpose:**
  - To support regional decarbonisation, infrastructure and innovation projects.
- **Application Guidance:**
  - Follow regional guidelines; often require partnership or bundled projects.
  - Match funding (10–50%) usually needed.
- **Eligibility:**
  - Local authorities, public sector, sometimes community/SME partners.
- **Key Documents Needed:**
  - Regional business case template.
  - Evidence of match funding.
  - Project plan and partnership agreements.
  - Risk assessment.
- **What the Funding Covers:**
  - Regional infrastructure, large-scale retrofits, innovation pilots.
- **Top Tips:**
  - Build strong regional partnerships.
  - Align with regional strategies and demonstrate scalable impact.
- **Sample Application Checklist:**
  - Regional eligibility confirmed.
  - Business case completed.
  - Often requires a legal entity (e.g., CIC, coop). Match funding secured.
  - Project plan and timeline.
  - Partnership agreements.
  - Risk assessment.
  - Local authorities, public sector, sometimes community/SME partners.



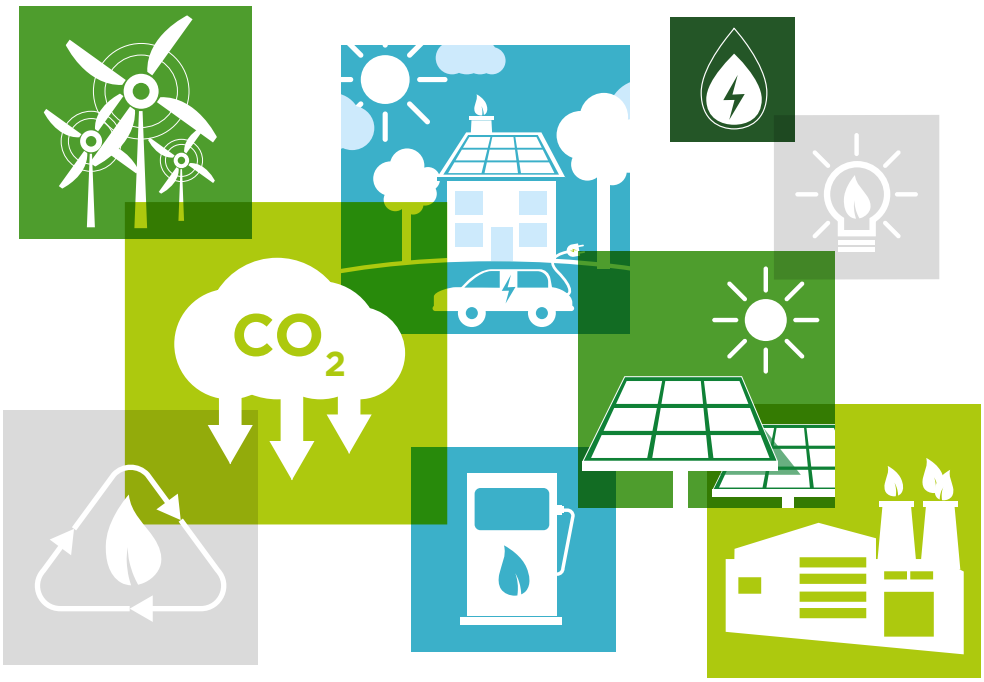


4. Great British Energy Community Fund

- **Administered by:**
  - Net Zero Hubs.
- **Purpose:**
  - To support community-led renewable energy and decarbonisation projects.
- **Application Guidance:**
  - Must be community-led and benefit local people.
- **Eligibility:**
  - Community groups, local partnerships.
- **Key Documents Needed:**
  - Application form.
  - Business case/feasibility study.
  - Evidence of community benefit.
  - Legal structure documents.
- **What the Funding Covers:**
  - Feasibility studies and development business case plus engagement towards community ownership and installation of renewables. NOT for capital works.
- **Top Tips:**
  - Engage early with local stakeholders.
  - Demonstrate strong community support and legacy.
- **Sample Application Checklist:**
  - Community eligibility confirmed.
  - Application form.
  - Business case/feasibility.
  - Legal documents.
  - Letters of support.

5. Local Authorities/Combined Authorities

- **Administered by:**
  - Local and Combined Authorities.
- **Purpose:**
  - To fund SME decarbonisation, innovation and pilot projects.
- **Application Guidance:**
  - Follow local scheme guidance.
  - Match funding (10–50%) is often required.
  - Excludes some organisations (e.g. charities, political).
- **Eligibility**:
  - SMEs, sometimes public sector or community groups.
- **Key Documents Needed:**
  - Application form.
  - Business case.
  - Evidence of match funding.
  - Project plan.
- **What the Funding Covers:**
  - Energy audits, upgrades, pilots, innovation.
- **Top Tips:**
  - Prepare a clear and concise business case.
  - Engage with scheme officers for feedback.
- **Sample Application Checklist:**
  - SME eligibility confirmed.
  - Application form.
  - Business case.
  - Match funding evidence.
  - Project plan.



6. National Wealth Fund

- **Administered by:**
  - UK Infrastructure Bank, major lenders.

- **Purpose:**
  - To finance large-scale infrastructure, innovation, and local authority net zero projects.

- **Application Guidance:**
  - Submit a detailed business case and financial model.
  - Demonstrate additionality, value for money and net zero alignment.

- **Eligibility**:
  - Local authorities, public sector, some private consortia.

- **Key Documents Needed:**
  - Business case.
  - Financial model.
  - Governance and delivery plan.
  - Risk assessment.

- **What the Funding Covers:**
  - Major infrastructure, decarbonisation, innovation.

- **Top Tips:**
  - Engage early with the bank/lender.
  - Ensure robust governance and risk management.

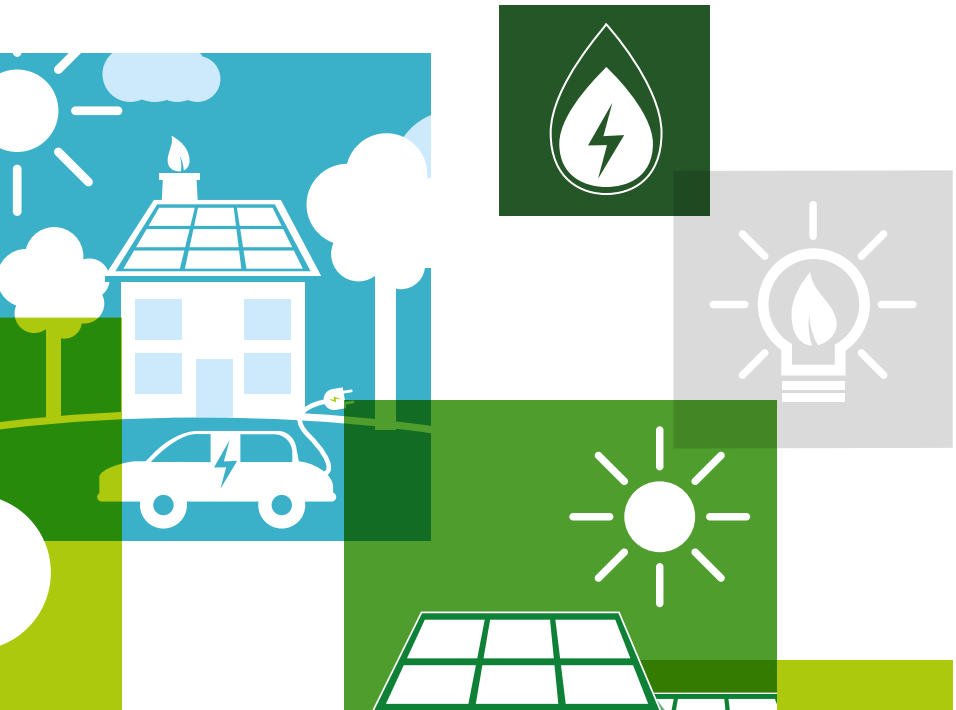
- **Sample Application Checklist:**
  - Eligibility confirmed.
  - Business case.
  - Financial model.
  - Governance plan.
  - Risk assessment.

7. Private Finance/Green Bonds

- **Administered by:**
  - Private lenders, capital markets.
- **Purpose:**
  - To fund large, long-term, or innovative net zero projects.
- **Application Guidance:**
  - Must be investment-grade with clear returns and ESG benefits.
  - Requires robust governance and reporting.
- **Eligibility:**
  - Local authorities, public sector, large consortia.
- **Key Documents Needed:**
  - Prospectus/business case.
  - Financial and ESG reporting.
  - Governance structure.
- **What the Funding Covers:**
  - Major capital works, long-term or innovative projects.
- **Top Tips:**
  - Work with experienced advisors.
  - Ensure transparent reporting and strong governance.
- **Sample Application Checklist:**
  - Investment-grade business case.
  - ESG reporting plan.
  - Financial and governance documents.
  - Legal/market compliance.

General Application Tips (All Funds)

Tip	Description
Data is king	Baseline your energy use, CO_2 emissions and utility costs. Use meter readings and utility bills. The application process has built in review periods to check technical data for accuracy and relevance.
Stakeholder Buy-In	Secure written support from key stakeholders (e.g. Board, Local Authority) early in the process.
Timelines	Projects must align with funding timelines (typically 1-2 years). Show clear delivery stages through a structured communications plan for development of submission and follow up is established. Upload and submission methods verified.
Clarity	Avoid jargon. Explain how your project supports decarbonisation in layman's terms. Ensure clarity and correct figures are used.
Documentation	Prepare visuals (site maps, photos), quotes and procurement frameworks in advance. Have a methodical approach to ensure all required attachments are included. Reports, quotes, letters of support and site data are all relevant for the bid. Create a number of templates (see Appendix 1), Pre-Application Carbon & Cost Model (Excel) Risk Register (Word) Stakeholder Engagement Plan (Word) Project timeline Gantt Chart (MS Project).



8. Conclusion and Sector Call to Action

Leadership at a Critical Moment

Public leisure centres are facing unprecedented pressures, rising operational costs, volatile energy prices, climate-related risks and tightening budgets. In such an environment, it is understandable that decarbonisation might feel like an aspirational luxury. However, this is the moment when strategic leadership matters most.

> "Decarbonising leisure centres is no longer optional. It is essential to delivering local and national net zero commitments and retaining core community facilities."

Why Decarbonisation Matters Now

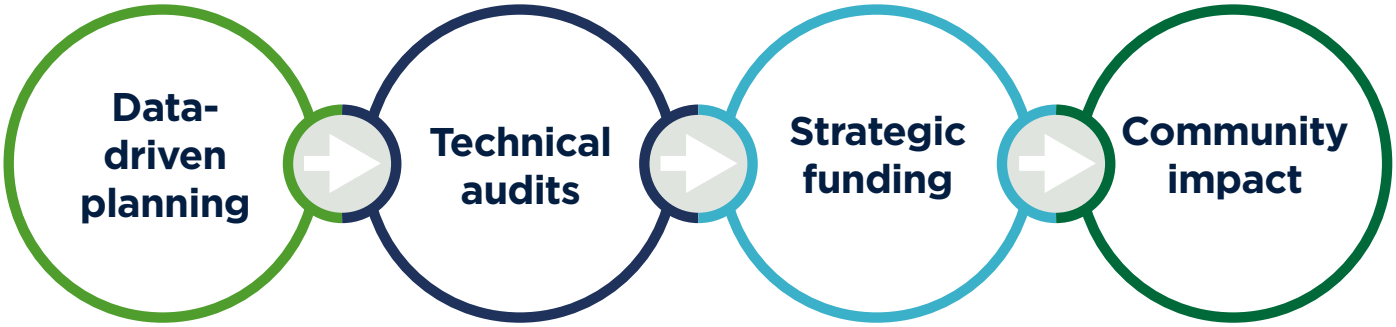
Decarbonising leisure infrastructure is not solely an environmental imperative, it is an economic and social one. Energy efficient facilities are more affordable to run, more resilient to shocks, and better placed to remain open and accessible to communities. Net zero investments protect services that contribute to physical health, mental wellbeing, and community cohesion.

Embedding decarbonisation into leisure provision helps local authorities:

- Reduce emissions from one of their highest energy consuming assets.
- Improve value for money across their estate.
- Leverage national and regional funding.
- Safeguard essential public services for future generations.

From Ambition to Action

This guide has outlined the tools, technical pathways, and funding strategies required to deliver decarbonisation in practice. With a structured approach grounded in data and driven by partnership every **local authority** and leisure provider no matter the size can make progress.



Your Next Steps

1. **Start with data**: Review Display Energy Certificates and commission a technical audit.
2. **Engage your team:** Form a working group including operations, finance, and sustainability leads.
3. **Secure funding**: Prepare a business case using this guide's templates and checklists.
4. **Deliver with purpose**: Implement measures with both carbon and community value in mind.
5. **Share and replicate**: Document your journey and inspire other regions to follow.

Final Words

The path to net zero may be complex, but it is achievable. With courage, collaboration and investment, we can build resilient leisure infrastructure that enhances both community wellbeing and environmental stewardship. Now is the time to act with urgency, clarity and shared commitment.

"Public leisure is where health, equity, and sustainability intersect. Decarbonising it is not just good policy, it's good leadership."

9. With Thanks and Glossary of Terms

Acknowledgements

This guide was made possible through the collaboration and shared expertise of numerous partners. We extend our sincere thanks to the following organisations for their leadership, technical insights and commitment to a sustainable future:

- **Midlands Net Zero Hub** – Project commissioning and strategic oversight.
- **Leisure Energy** – Technical audits and decarbonisation consultancy.
- **Sport England** – National policy alignment and funding strategy.

In addition, we gratefully acknowledge contributions and feedback from the following members of the **ukactive Sustainable Futures Group**: Alliance Leisure, Airius, Community Leisure UK, Everyone Active, Freedom Leisure, Future Fit, GLL, PureGym, The Gym Group.

Here are additional links you may find useful for further resources:

- Energy Systems Catapult.
- Local Partnerships.
- Sport England Every Move.
- Sport England - Sustainable facilities and planning.
- Theatre Green Book - survey tool for theatre decarbonisation plans.
- Local Government Association - Sustainability Roadmap.
- BASIS - British Association for Sustainable Sport.
- Sport Scotland - tackling climate change.

Glossary of terms:

- ECM: Energy Conservation Measure: any retrofit or behaviour based initiative aimed at reducing energy use.
- BEMS: Building Energy Management System: technology used to monitor, control, and optimise building energy use.
- DEC: Display Energy Certificate: public rating showing a building's actual energy performance.
- LSCF: Low Skill Carbon Fund: historic UK government funding scheme to support heat decarbonisation.
- PSDS: Public Sector Decarbonisation Scheme: historic UK funding programme supporting capital works in public sector buildings.
- SPFS: Swimming Pool Support Fund: historic short term funding scheme to improve the sustainability of pool based facilities.

To support the design of your decarbonisation roadmap this guide includes the following resources and templates which you can download and alter to suit local needs.

Appendix 1 : Templates and guidance notes.
Appendix 2: Energy Conservation Measures.
Appendix 3: Case Study overview.

Appendix 1: templates and guidance notes:

- Resource 1: Step-by-step Checklist.
- Resource 2: Funding Readiness Checklist.
- Resource 3: Example Funding Application Template.
- Resource 4: Suggested Funding Evidence Submission Template.
- Resource 5: Supplier Sustainable Procurement Template.
- Resource 6: Summary Guide of Resources required for submission.

Resource 1: Step by Step Decarbonisation

Create a word doc with the following headings:

Title: Facility name - Step by Step Checklist

- **Step 1**: Data & Baseline.
  - Gather utility bills and half-hourly data for at least 12 months. ☐
  - Obtain current Display Energy Certificates (DECs). ☐
  - Commission a professional energy audit (ideally by a Chartered Energy Manager). ☐

- **Step 2**: Identify Quick Wins (ECMs).
  - Review audit for low-cost, high-impact measures (e.g., pool covers, LED lighting, BEMS upgrades). ☐
  - Assign responsibility and timeline for each measure. ☐

- **Step 3**: Engage Stakeholders.
  - Brief leisure centre staff, management, and local authority decision-makers. ☐
  - Consult with users/community if major works are planned. ☐

- **Step 4**: Prepare for Funding.
  - Use the funding readiness template (see below). ☐
  - Gather supporting documents: energy data, audit reports, business case, match funding evidence. ☐

- **Step 5**: Apply for Grants.
  - Identify suitable schemes. ☐
  - Submit application using the provided template. ☐

- **Step 6**: Procurement.
  - Use the procurement template to embed sustainability in your tender process. ☐
  - Score suppliers on carbon reduction, lifecycle costs, and social value. ☐

- **Step 7**: Implementation.
  - Appoint contractors and suppliers. ☐
  - Monitor progress against milestones. ☐
  - Ensure ongoing existing and new support is captured and maintained. ☐

- **Step 8**: Monitoring & Evaluation.
  How will you track energy and carbon savings?
  - Install/upgrade BEMS - download and review data. ☐
  - Who will be responsible for monitoring? List within documentation for accountability. ☐

  What is the Frequency of Reporting (monthly/quarterly/annually).
  - Track energy use and carbon savings monthly - compare actual vs projected savings. ☐
  - Investigate anomalies and take corrective action. ☐
  - Report outcomes to funders and stakeholders quarterly. ☐

Resource 2 - Funding readiness template

Format: Excel.

Title: Facility Name - Funding readiness template

Requirement	Status (Y/N)	Notes/Actions Required
Professional energy audit complete		
12 months' utility data available		
Display Energy Certificate (DEC)		
List of ECMs with payback analysis		
Outline business case prepared		
Match funding identified (if req'd)		
Stakeholder sign-off		
Procurement plan in place		
Risk assessment completed		
Monitoring plan drafted		

Resource 3: Example Funding Application Template (Summary)

Project Title:
Organisation:
Contact Person:
Facility Address:

1. Executive Summary

- Brief overview of objectives, carbon targets, expected financial and social outcomes.

2. Current Baseline and Technical Evidence

- Annual kWh and tCO_2, DEC ratings, audit highlights, major inefficiencies. Key challenges (e.g. aging plant, high baseload).

3. Proposed Interventions

- List of ECMs (with projected savings and payback periods). Estimated carbon and cost saving.

4. Funding Breakdown

- Total cost, requested grant, local match, other funding sources.

5. Timeline and Milestones

- Key dates for procurement, installation, reporting.

6. Monitoring and Evaluation

- How outcomes will be measured, KPIs, BEMS setup, reporting frequency.

7. Supporting documentation

- Attach audit reports, DECs, letters of support, business case.

Resource 4 - Word Template: Detailed Funding Evidence Submission

Net Zero Funding Application Evidence Pack
Project Title:
Leisure Centre Name/Site:
Local Authority:
Date:
Contact Person:
Email/Phone:

Executive Summary. Provide a concise summary of the project, its objectives, and expected outcomes.
Site Information.

- Address.
- Type of Facility (e.g., wet/dry, pool, gym, etc.).
- Year Built.
- Operator (if outsourced).

Baseline Data & Energy Profile

- Annual Gas Consumption (kWh).
- Annual Electricity Consumption (kWh).
- Annual Water Consumption (m_2).
- Current Carbon Emissions (tCO_2e).
- Display Energy Certificate (DEC) Rating:
- Attach 12 months of utility bills and DEC certificates.

Energy Audit & Recommendations

- Date of Professional Energy Audit:
- Auditor/Organisation:
- Key Findings:
- Main sources of energy use/waste.
- Identified Energy Conservation Measures (ECMs).
- Payback periods for ECMs.

Attach full audit report.

Include: Proposed Measures:

Measurement/Intervention	Estimated Cost (£)	Annual Savings (kW/£)	CO_2e Savings (t/year)	Payback (years)
Example: LED Lighting Upgrade	£20,000	60,000/£10,000	12	2
Example: Pool Cover	£15,000	30,000/£4,000	8	3.5

Funding Request:

- Total Project Cost:
- Funding Requested:
- Match Funding (if applicable):
- Other Funding Sources:

Project Timelines:

Requirement	Status (Y/N)
Audit Complete	DD/MM/YYYY
Funding Application	DD/MM/YYYY
Procurement Start	DD/MM/YYYY
Works Start	DD/MM/YYYY
Project Completion	DD/MM/YYYY

Monitoring & Reporting:

Month/ Quarter	Gas Use (kWh)	Electricity Use (kWh)	Water Use (m^2)	CO_2e Emissions (t)	Notes/ Anomalies
Jan					
Feb					
–					

Supporting Evidence Check List:

Document/Requirement	Provided (Y/N)	File Name/Location	Notes
Energy Audit Report			
12 Months Utility Bills			
DEC Certificate (s)			
Letters of Support			
Procurement Plan			
Risk Assessment			
Monitoring Plan			

Resource 5: Supplier Sustainable Procurement Template.

Format: Excel - supported narrative within Resource 3.

Criteria	Weighting (%)	Supplier Response Required
Carbon reduction (lifecycle)	30	Describe how your solution reduces emissions.
Energy efficiency	20	Provide evidence of performance.
Cost (capital and lifecycle)	20	Detail upfront and ongoing costs.
Social value/community benefit	10	Outline local employment/training impacts.
Delivery timescales	10	Confirm ability to meet project milestones.
Experience with leisure facilities	10	Provide relevant case studies.

Supplier Declaration:

We confirm that our submission meets the above criteria and will support the authority's net zero objectives.

Resource 6: Summary Guide of Resources required for submission.

Format: Excel

Title: Summary Guide of Resources required for submission.

Feature	Included
Visual roadmap/infographic	✓
Step-by-step checklist	✓
Funding readiness template	✓
Funding application template	✓
Procurement template	✓
Monitoring framework	✓
Ongoing support contacts	✓
Glossary	✓

Appendix 2

ECM and Retrofit Options

Energy Conservation Measures (ECMs) with Payback ≤ 5 Years

Targeting Low-Cost, High-Impact Interventions for Immediate Return.

Energy Conservation Measures (ECMs) with a payback period of five years or less present a highly effective means of reducing operational costs and emissions in leisure facilities. These measures offer strong returns on investment, align well with standard 10-year leisure contract cycles, and require minimal capital outlay compared to major infrastructure changes. This section outlines three key categories of short-payback ECMs proven to deliver consistent energy and carbon savings across the sector.

Staff Behaviour & Energy Reporting

Operational behaviours significantly influence energy consumption. Encouraging staff engagement through visible energy data and targeted awareness campaigns can yield substantial savings with little to no capital investment.

Recommendations:
- Install energy dashboards and monthly usage graphs in staff areas.
- Make energy performance a standing item in team meetings.
- Encourage staff suggestions to improve operational efficiency.

Expected Benefits:
- Energy consumption reductions of 10–15% are commonly reported.
- Enhances ownership and embeds a culture of continuous improvement.

‘Energy awareness alone can deliver 10-15% reduction in consumption, without any capital investment’.

Lighting Automation

Automation removes the reliance on staff to manually control lighting, ensuring systems operate only when needed. This is especially useful in spaces with variable occupancy or inconsistent use patterns.

Recommended Measures:
- Install PIR/motion sensors in changing rooms, toilets, storerooms, and corridors.
- Use daylight sensors in glazed areas (e.g., foyers, pool halls).
- Zone lighting controls for large multi-use spaces like sports halls and studios.

Rationale:
- Particularly cost-effective in buildings over 10 years old, where such systems may not be present.
- Typical paybacks are under five years, with measurable reductions in energy costs.

Insulation of Mechanical Plant

Upgrading insulation around boilers, pipework, and heat exchangers in plant rooms is one of the most cost-effective ECMs available. It reduces heat loss, improves system efficiency, and lowers strain on mechanical components.

Key Benefits:
- Heat retention minimises unnecessary energy use.
- Improved system efficiency through reduced thermal losses.
- Reduced boiler cycling, extending system life and lowering maintenance costs.

Implementation Tip:
Use thermal imaging equipment to identify high-loss areas, assess glazing performance, and detect faults in motors and electrical infrastructure. Affordable handheld devices or smartphone plug-ins are widely available and offer long-term diagnostic value.

Pool Covers

Reducing Heat Loss and Operating Costs through Evaporation Control

Swimming pools are among the most energy-intensive features in leisure centres, primarily due to the constant need to maintain water temperature and control humidity. One of the most cost-effective and proven interventions to reduce this load is the installation of a pool cover, particularly for overnight use when the facility is closed.

Energy-Saving Benefits

Installing a pool cover yields significant operational savings by minimising evaporation and heat loss from the water surface. Associated benefits include:

- **Reduced water evaporation:** Limits the amount of 'make-up' water required, lowering both water bills and the energy needed to heat replacement water.
- **Lower air handling demands:** With less moisture in the air, ventilation systems can operate at lower volumes, reducing fan energy use and heating costs.
- **Decreased air temperature requirement:** Reduced evaporation means less heat is lost from the pool surface, allowing pool hall air temperatures to be lowered without impacting comfort or safety. Combined, these factors contribute to substantial reductions in energy, water, and chemical usage:

Resource Impact Area	Typical Savings Range
Energy Use	50% - 70%
Make up Water	30% - 50%
Chemical Use	35% - 60%

Deployment and Operation

While manually deployed pool covers exist, they are rarely used in commercial environments due to labour intensity and operational inconsistency. Instead, motorised covers are strongly recommended for leisure centres.

- **Motorised spool system**: Electrically powered rollers allow fast and efficient deployment by a single staff member.
- **Ease of use**: Covers are typically tensioned via a guide rope, enabling one operator to deploy and retract with minimal effort.
- Mounting options: Units may be wall-mounted or column-mounted, depending on site layout and spatial considerations.

Real-World Example

At Loughborough Leisure Centre, a motorised pool cover was identified as a priority intervention with measurable impact. The projected benefits were:

- Annual carbon savings: 29.1 tonnes of CO_2
- Financial payback period: 2.7 years

These results demonstrate that pool covers not only offer environmental benefits but also make strong financial sense within the typical lifecycle of public leisure investments.

Pool covers are a low-disruption, high-return solution suitable for immediate implementation. They deliver tangible savings across multiple resource streams while improving building performance and environmental impact. Their installation should be considered standard practice for any facility aiming to reduce operational costs and support net zero objectives.

> "LED lighting upgrades typically reduce energy costs by 50% with the added benefit of reduced maintenance."

Case Study Highlights

Site	Measure	Payback	CO2 Savings
Loughborough	Insulate plate heat exchangers	0.4yrs	15.5 tCO2/yr
Ashby LC	Insulate pool PHX and pipework	0.9yrs	4 tCO2/yr
Harborough LC	Replace pool PHX	1.3yrs	27.9 tCO2/yr

Energy Conservation Measures (ECMs) with Payback Between 5 & 10 Years

Strategic Upgrades for Long-Term Savings and Decarbonisation

Energy conservation measures with a medium-term payback of 5 to 10 years are typically more capital-intensive than quick-win interventions but offer substantial long-term benefits. While these ECMs may be more difficult to justify within shorter leisure contract cycles, they are essential for meeting decarbonisation goals and future-proofing facilities.

Solar Photovoltaics (PV)
Solar PV systems convert sunlight into electricity, helping sites reduce grid reliance and carbon emissions. Electricity generated can be used directly on-site, stored in batteries, or exported to the grid. They are particularly effective when paired with electric heating systems, as they offset rising electrical demand from decarbonisation.

Deployment Options:
- Roof-mounted arrays (most common and cost-effective).
- Solar canopies over car parks (dual use of space).
- Integration with battery storage systems (where feasible).

Examples:
- Harborough, Hinckley, Loughborough & Parklands Leisure Centres: All installed roof-mounted PV systems through Sport England's Swimming Pool Support Fund
- K2 Leisure Centre, Crawley: Installed 1,002 solar panels in a carport array—saving 66 tonnes of CO_2 annually the equivalent of planting 3,023 trees annually. Part funded through Sport England's Swimming Pool Support Fund

Typical Payback: 6–9 years
- Carbon Benefit: Immediate and ongoing CO_2 savings

High-Efficiency Electric Motors

Upgrading to IE3-rated electric motors from older IE2 units significantly reduces the electricity used by pool circulation pumps—typically the largest constant energy consumers in leisure centres.

Why it matters:
- Older motors often run 24/7 and suffer from efficiency losses.
- Higher IE ratings mean reduced operational cost and extended equipment life.

Efficiency Ratings (IEC Standard):
- IE1 – Basic
- IE2 – High
- IE3 – Premium (recommended standard)
- IE4 – Super Premium (for continuous heavy-duty operations)

Example:
- Harborough Leisure Centre: Identified savings of 12.5 tonnes CO_2/year by upgrading pool pumps, with a 3-year payback.

Building Energy Management Systems (BEMS)

BEMS integrate and optimise building services like HVAC, lighting, and power systems. They enable remote control, automation, and energy monitoring—maximising returns from other ECMs such as variable speed drives and low-carbon heating systems.

Benefits:
- Dynamic control based on real-time building usage
- Alarm monitoring and historical data reporting

Integration with low-carbon heat sources (e.g., ASHPs)

Examples:
- Harborough Leisure Centre: Identified BEMS upgrade with a 6.4-year payback and annual saving of 15.8 tonnes CO_2.
- Loughborough Leisure Centre: Estimated savings of 56.9 tonnes CO_2per year with a 3-year payback.

Typical Savings: Up to 20% of total energy costs

Air Handling Unit (AHU) Improvements
AHUs circulate, filter, and condition air in leisure centres. Upgrades to include variable speed drives (VSDs) and heat recovery systems can drastically reduce electrical load and heat loss

Improvement Areas:
- Retrofitting VSDs to control airflow dynamically
- Upgrading heat recovery systems or installing where absent
- Repairing dampers, actuators, and seals to prevent inefficiencies

Maintenance Warning: Poorly maintained AHUs (e.g., blocked filters, seized dampers) can cause excessive energy waste if left unaddressed.

Carbon Saving Potential: High, depending on unit size and operation hours
Payback: Typically 5–8 years, depending on scope

These medium-term ECMs are critical enablers of long-term energy resilience and emissions reduction. While they may require more robust business cases and capital planning, the financial and environmental returns justify their inclusion in any serious decarbonisation roadmap.

Energy Conservation Measures (ECMs) with Payback ≥ 10 Years

Long-Term Investments in Sustainability and Efficiency

Energy interventions with a payback period of over 10 years often involve higher capital investment but yield substantial environmental and operational benefits. These measures are typically undertaken during major refurbishment programmes or when supported by external grant funding, such as the Sport England Swimming Pool Support Fund.

Microfiltration Pool Systems

Replacing traditional sand filtration with microfiltration offers transformative improvements in water quality, resource efficiency, and operational automation. Instead of filtering to 10–20 microns, ceramic membranes in microfiltration systems filter pool water to as fine as 3 microns, capturing more particulates and reducing chemical and energy demands.

How It Works:

- Pool water is pushed through ceramic filters.
- Backwashing uses just 60 litres of cold, untreated water per cycle.
- Self-cleaning systems ensure longevity with minimal manual intervention.
- Membranes typically have a lifetime warranty and require no planned maintenance beyond automated cycles.

Benefits:

- Reduced chemical dosing due to lower water turnover.
- Reduced water consumption and associated energy use.
- Lower electricity demand due to reduced pressure drop.
- Reduced gas/heat demand by minimising heated water loss.

Real-World Examples of microfiltration (Sport England-funded sites):

Site	CO2 Saving (tonnes/year)	Payback (years)
Harborough Leisure Centre	10.0	11.9
Hinkley Leisure Centre	15.6	22.4
Ashby Leisure Centre	6.1	18.0
Loughborough Leisure Centre	10.7	20.1

Building Fabric Upgrades

Improvements to the building envelope—walls, roofs, windows, and doors—offer foundational energy efficiency benefits by reducing heating and cooling loads

Common Measures:
- Cavity wall insulation: Enhances thermal performance by reducing U-values.
- Roof insulation: Minimises heat loss through large, often poorly insulated surfaces.
- Window replacement: Upgrading to double or triple glazing improves airtightness and thermal control.
- Door upgrades or repairs: Improved weatherstripping and fit help prevent draughts and heat loss.

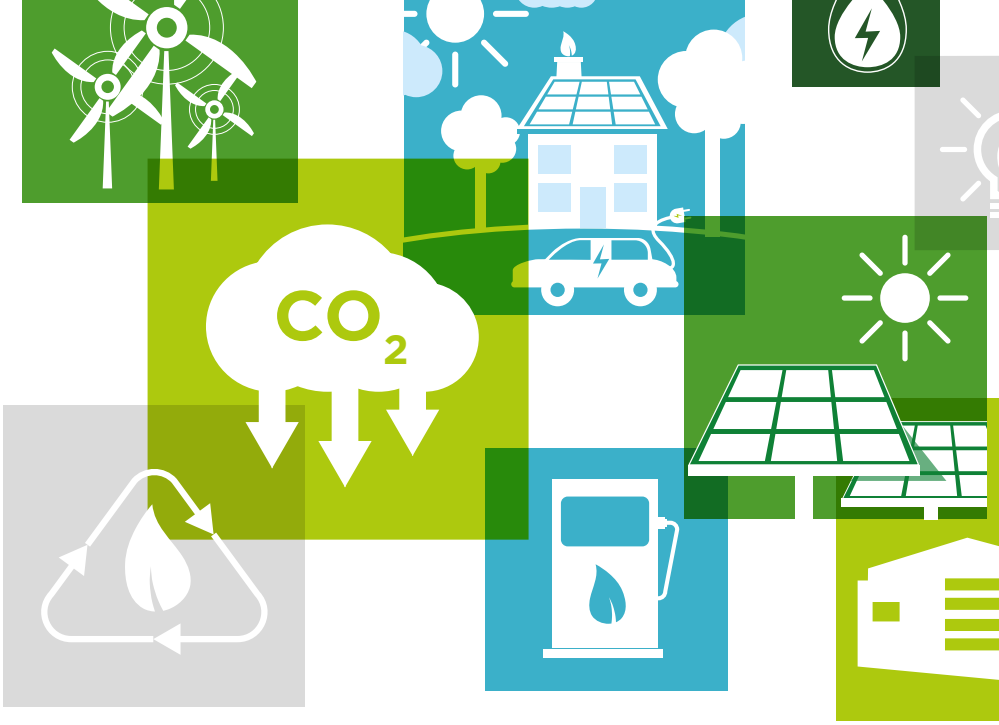
Challenges:
- High capital cost vs. moderate energy savings = longer payback.
- Significant disruption to operations, sometimes requiring partial closure. Better suited to major refurbishments or capital development phases.

Example – Loughborough Leisure Centre Fabric Assessment:

Measure	CO2 Saving (tonnes/year)	Payback (years)
Roof Insulation	12.6	26.7
Cavity Wall Insulation	20.7	17.6

Summary
While these ECMs may not yield rapid returns, they are essential to achieving deep decarbonisation, improving environmental performance, and aligning with long-term net zero targets. When timed with major capital works or supported by grants, they present a compelling opportunity to future-proof leisure facilities and deliver meaningful reductions in carbon emissions and utility costs.

"Torbay Leisure Centre removed 100% of its gas heating and improved its Display Energy Certificate from a C to an A."



Appendix 3 Case Studies

Below is a comparative summary of the six surveyed sites.

Site	Key Interventions	Funding Source(s)	Outcomes	Payback Summary
Loughborough LC	Net Zero Pod (ASHP), pool cover, BEMS, solar PV	PSDS, SPSF	452 tCO_2 saved annually, £66K/ year savings	Range: 0.4 – 3 years
Harborough LC	BEMS upgrade, PHX replacement, microfiltration	PSDS (proposed), MNZH toolkit	Up to 27.9 tCO_2/ year saved via PHX upgrade	Range: 1.3 – 11.9 years
Hinckley LC	Microfiltration, solar PV	SPSF	15.6 tCO_2/year saved from microfiltration	22.4 years (Microfiltration only)
Ashby LC	PHX insulation, microfiltration, solar PV	SPSF, MNZH support	6.1 tCO_2/year from MF, pool insulation savings	Range: <1 – 18 years
Parklands LC	Solar PV installation	SPSF	Day-one benefit from self-generation	ROI via carbon subsidies.
Huncote LC	Full site upgrade incl. renewables and wider transformation	PSDS, Sport England & local match	Facility upgrade integrated with community park	Strategic/ transformational

Similarities in approach

1. Holistic Energy Reviews
   All six centres started with a detailed audit, usually involving DEC analysis, half-hourly data, and thermal imaging.

2. Combination of Measures
   Sites implemented a mix of low-cost (lighting, pool covers) and capital-intensive upgrades (ASHPs, solar PV, microfiltration).

3. Funding-Driven Strategy
   Nearly all projects were viable because of grant funding—particularly through:
   - Public Sector Decarbonisation Scheme (PSDS)
   - Sport England's Swimming Pool Support Fund (SPSF)

4. Focus on Pool-Related Systems
   Every site targeted pool systems—PHX upgrades, microfiltration, or pool covers—reflecting pools' dominance in energy load.

5. BEMS Integration
   Loughborough and Harborough notably improved control systems to coordinate savings from other ECMs.

Other Case Studies:

Oxford Council 4 Leisure Centres

Lancaster Council - 1 Leisure Centre

Carbon Trust

Exeter - St Sidwell's Point Leisure Centre

Torbay Leisure Centre Case Study

Ashbourne Leisure Centre Case Study

Other Energy Efficiency Case Studies