INTEGRATED FACILITY SYSTEMS (IFS) PILOT PROJECT REPORT

SPORT ENGLAND

UNIFY

4GLOBAL

The future is active

Data shows significant energy use occurs when public leisure facilities are not in use creating clear opportunities to reduce demand , even before major capital investment decisions are considered

26% Electricity | 34% Gas | 32% Water
Used when there are no recorded bookings or in non-operational hours

Too often, facilities look to implement expensive capital upgrades to address energy consumption. The evidence suggests **operational and behavioural practices should be optimized first**.

Priority Actions

OPERATIONAL IMPROVEMENTS
- Align heating, ventilation, and plant schedules with booking patterns
- Reduce overnight and low-occupancy system operation

BEHAVIOURAL CHANGES
- Switch off lighting and equipment and unused areas
- Increase staff engagement in energy-saving practices

TARGETED CAPITAL INVESTMENT
- Use data to prioritise upgrades where they will have the greatest impact

Potential Impact

With **average utility costs** ranging from £140,000 to £700,000 with an average of **£400,000 per site**, reducing demand first can deliver :

- ✓ Immediate cost savings
- ✓ Smaller, lower-cost replacement plant in future
- ✓ Reduces long-term energy purchasing costs
- ✓ Lower carbon emissions

INTRODUCTION

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Purpose of this report

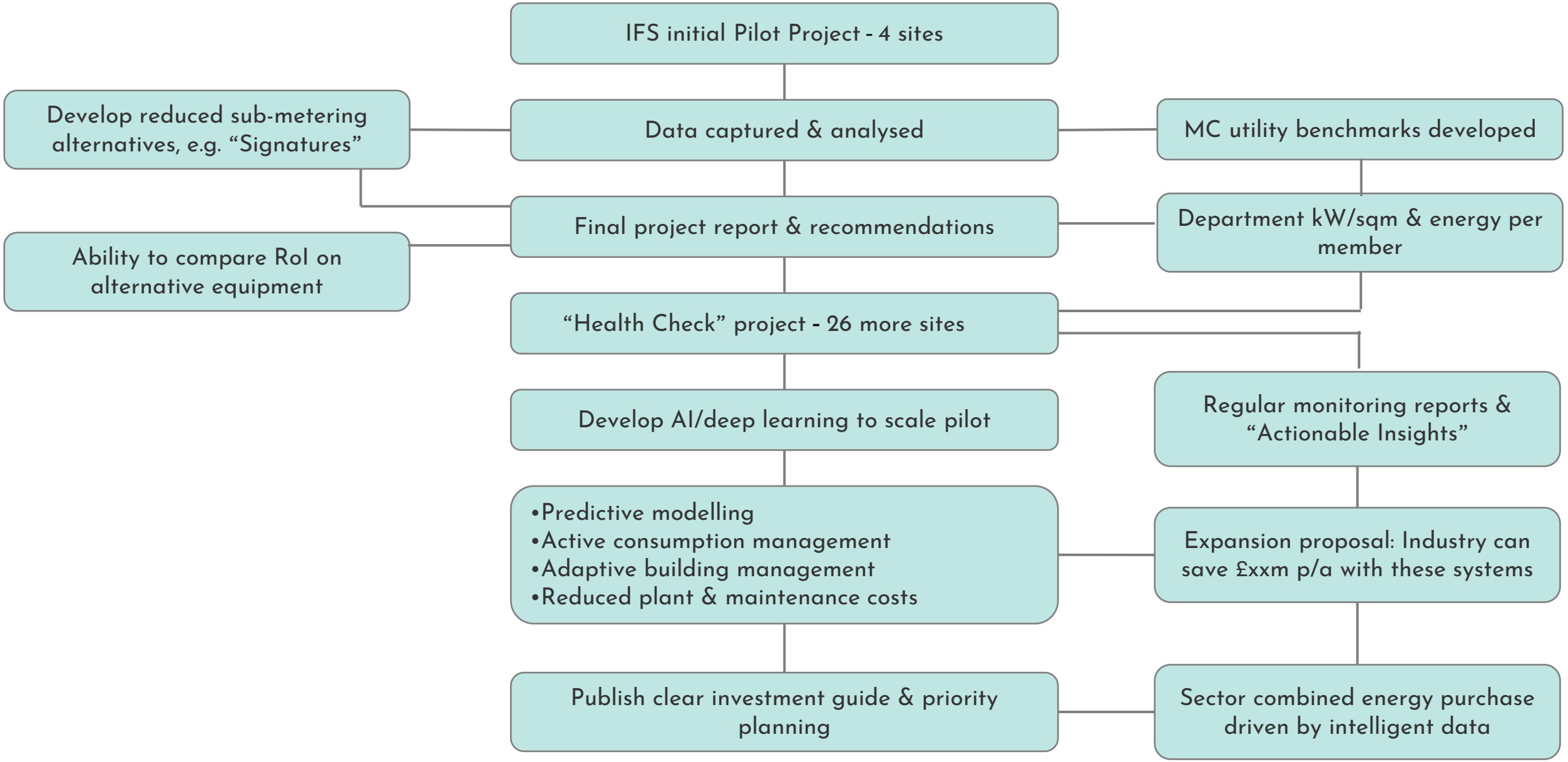
- Assess the feasibility of an integrated, real-time energy management system
- Build on the foundational understanding of energy consumption across public leisure centres

The Pilot Programme

- Aligns customer activity data with energy and operational data
- Provides more accurate energy consumption data, though improved data collection technologies
- Provides visibility at department level (e.g. pool, gym, sports hall)
- Explores the possibility of smarter, demand-led operational decision making

Our Approach

- Prioritise making existing building systems more efficient *before* recommending major capital investment
- Use operational improvements to reduce overall energy demand first
- Identify capital priorities based on evidence, once demand has been optimised
- Ensure any replacement plant is correctly sized and considers reduced capacity requirements
- Support more informed and potentially lower-cost future energy procurement


IFS initial Pilot Project - 4 sites
Develop reduced sub-metering alternatives, e.g. "Signatures"
Data captured & analysed
MC utility benchmarks developed
Ability to compare RoI on alternative equipment
Final project report & recommendations
Department kW/sqm & energy per member
"Health Check" project - 26 more sites
Regular monitoring reports & "Actionable Insights"
Develop AI/deep learning to scale pilot
•Predictive modelling
•Active consumption management
•Adaptive building management
•Reduced plant & maintenance costs
Expansion proposal: Industry can save £xxm p/a with these systems
Publish clear investment guide & priority planning
Sector combined energy purchase driven by intelligent data

Selection of the pilot sites ensured there was a variety in size, age and condition to enable greater understanding of and applicability to leisure centres across the UK

The four pilot sites vary widely in age, condition and facilities, providing a strong basis for comparison. However, a common theme is reliance on external contractors for maintenance, meaning detailed knowledge of building systems and energy management is often limited within both the local authorities and leisure operators.

Active Life Whitstable Swimming Pool

- Operational since 1993
- 263m^2 main swimming pool
- 79m^2 secondary swimming pool
- 25 station gym
- 75m^2 fitness studio
- DEC rating = C

Brio Leisure Ellesmere Port Sports Village

- Operational since 2015
- 375m^2 main swimming pool
- 77m^2 secondary swimming pool
- 80 station gym
- 7 fitness studios totaling 700m^2
- 2 sports halls totaling 1,533m^2
- DEC rating = D

Brio Leisure Northwich Memorial Court

- Operational since 2015
- 325m^2 main swimming pool
- 77m^2 secondary swimming pool
- 95 station gym
- 50m^2 fitness studio
- 153m^2 sports hall
- DEC rating = E

Life Leisure Romiley

- Operational since 1973
- 250m^2 main swimming pool
- 80m^2 secondary swimming pool
- 55 station gym
- 225m^2 fitness studio
- DEC rating = C

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INITIAL FINDINGS

03

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Enhanced monitoring has been installed across 4 pilot sites, capturing detailed electricity, gas, and water in real time

This provides:

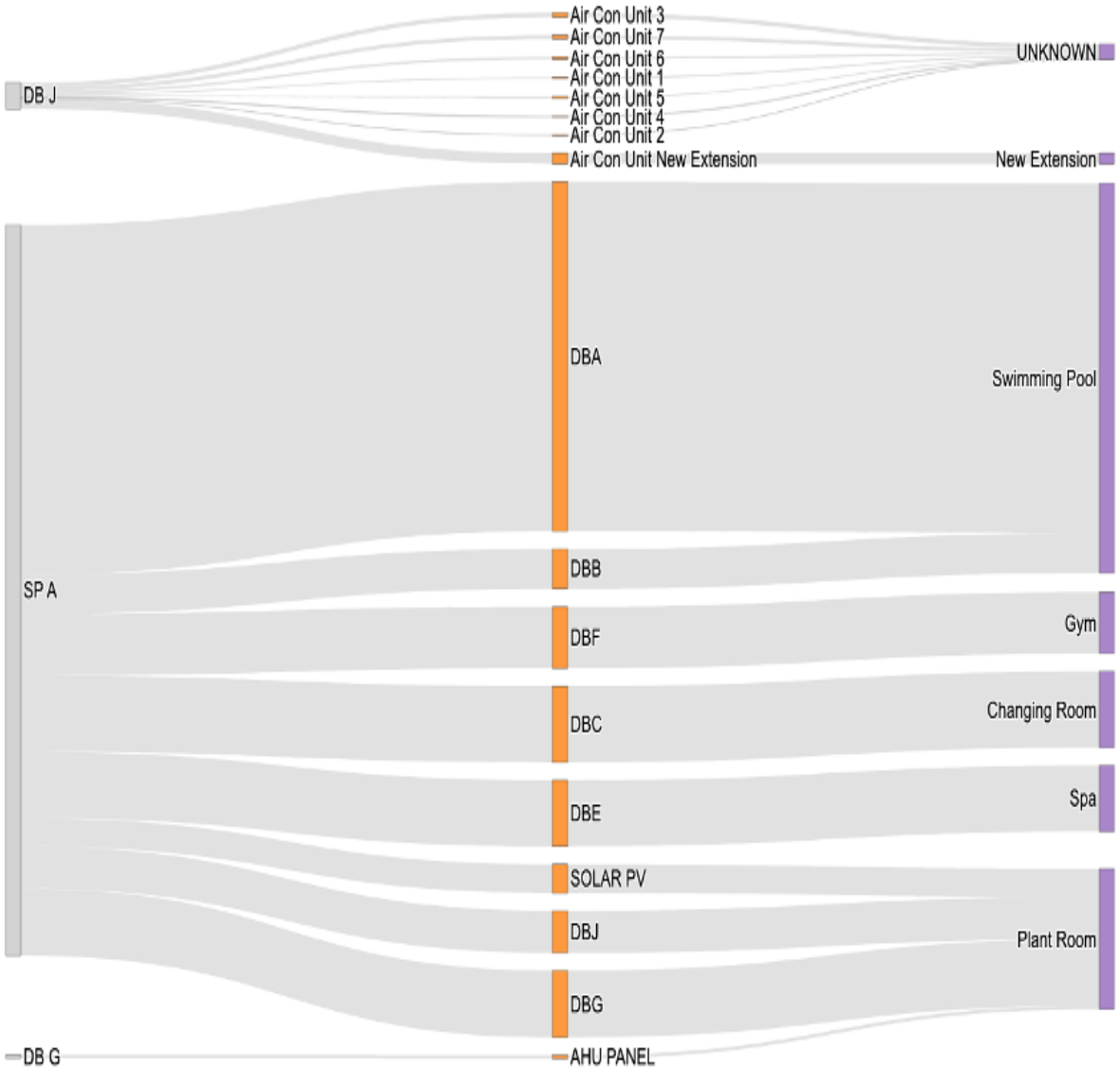
- Greater visibility than historic utility bills
- Insight into how different areas and systems use energy
- The ability to compare energy use with customer activity

The analysis presented uses a representative site example to show:

- Aligns customer activity data with energy and operational data
- Provides more accurate energy consumption data, though improved data collection technologies
- Provides visibility at department level (e.g. pool, gym, sports hall)
- Explores the possibility of smarter, demand-led operational decision making

The Key Question: Are building systems operating in line with actual demand, and where can energy be reduced without affecting service delivery?

- Although early in the process, clear and consistent opportunities are already emerging across all pilot sites, reinforcing findings from the baseline report. Individual site reports will be developed to accompany this interim summary report.



Greater visibility allows for informed targeted operational intervention

Understanding electrical load distribution

The Sankey diagram shows how electricity flows through the building, from the main supply to different systems and areas. The wider each line appears, the more energy that system or area is using.

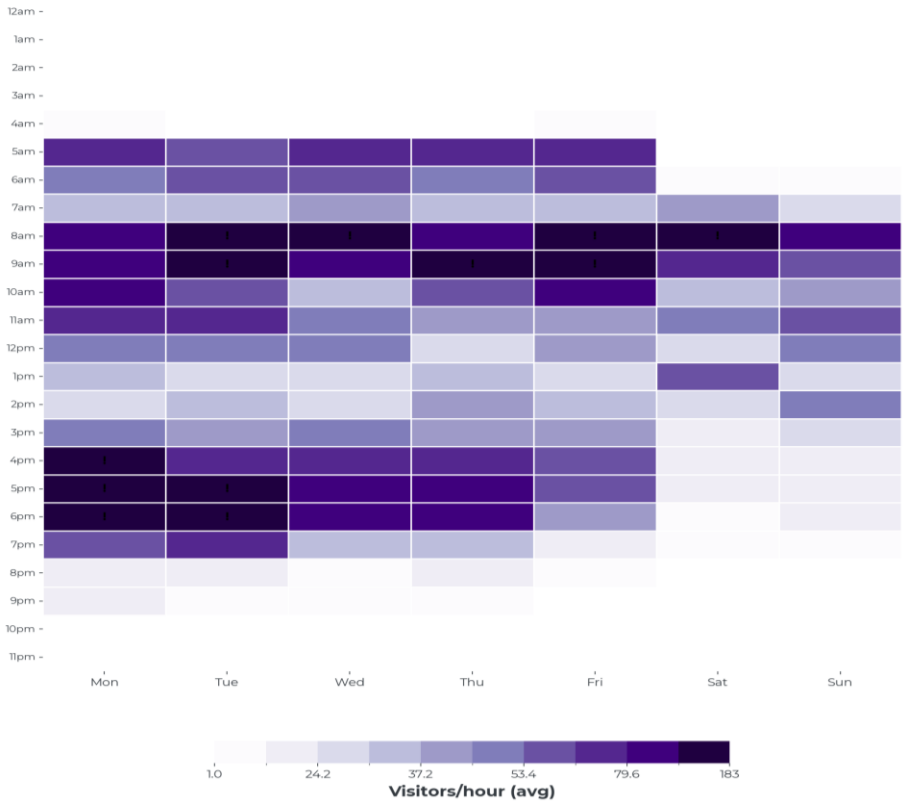
The Sankey methodology allows us to understand how major plant and individual areas are served and identify the energy consumption patterns for these. This understanding helps identify where changes to operating times or settings could deliver meaningful savings without affecting the customer experience.

Several major mechanical consumers are highlighted:

- Air handling unit (AHU) supply and extract fans supplying environmental controls for pool, studios and conditioned spaced
- Condensing units and cooling plant equipment
- Indoor mechanical units serving specialist spaces

There is a clear mismatch between energy consumption and leisure centre usage, highlighting the significant opportunities for smarter, demand-led energy management

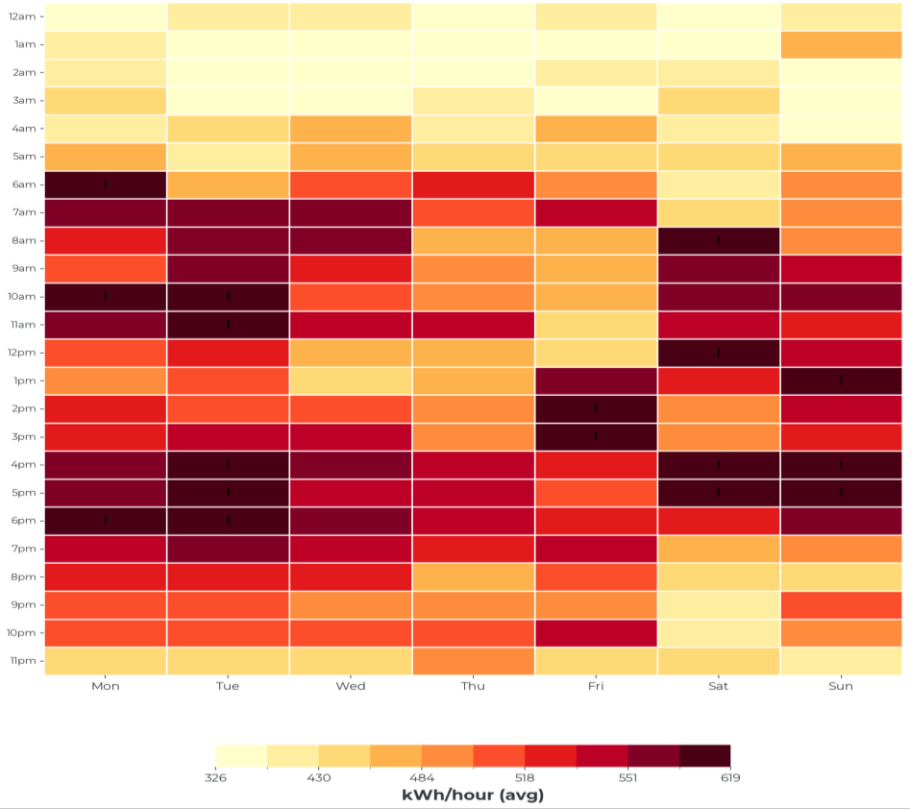
Visitor Traffic



The bookings during a typical week of operation, the dark colours clearly show the morning and evening peaks during the week, and morning peaks at weekends.

The energy consumption across the week reflects to a degree the same morning and evening peaks as shown by the darker colours but it also shows high consumption in the afternoon at weekends when the building is usage is lighter.

Total Energy Usage



Weekend energy demand remains material, particularly on Saturday, indicating continued operation of fixed services and essential plant rather than reflecting the reduced customer usage patterns.

Shifting from fixed schedules to demand-led operation can significantly reduce energy use without impacting customer experience

The energy efficiency analysis combines the visitor traffic and energy usage heatmaps to highlight areas of further investigation in red:

- Early mornings and late evenings
- Weekends during lower attendance periods
- Times when facilities are open but lightly used

Approximately 26% of weekly electrical energy, 34% of gas, and 32% of water usage coincide with no recorded bookings within the facility.

This misalignment largely reflects fixed plant operation, background services and booking reporting limitations, rather than unused or avoidable capacity.

Examples of actions that will better align energy with bookings

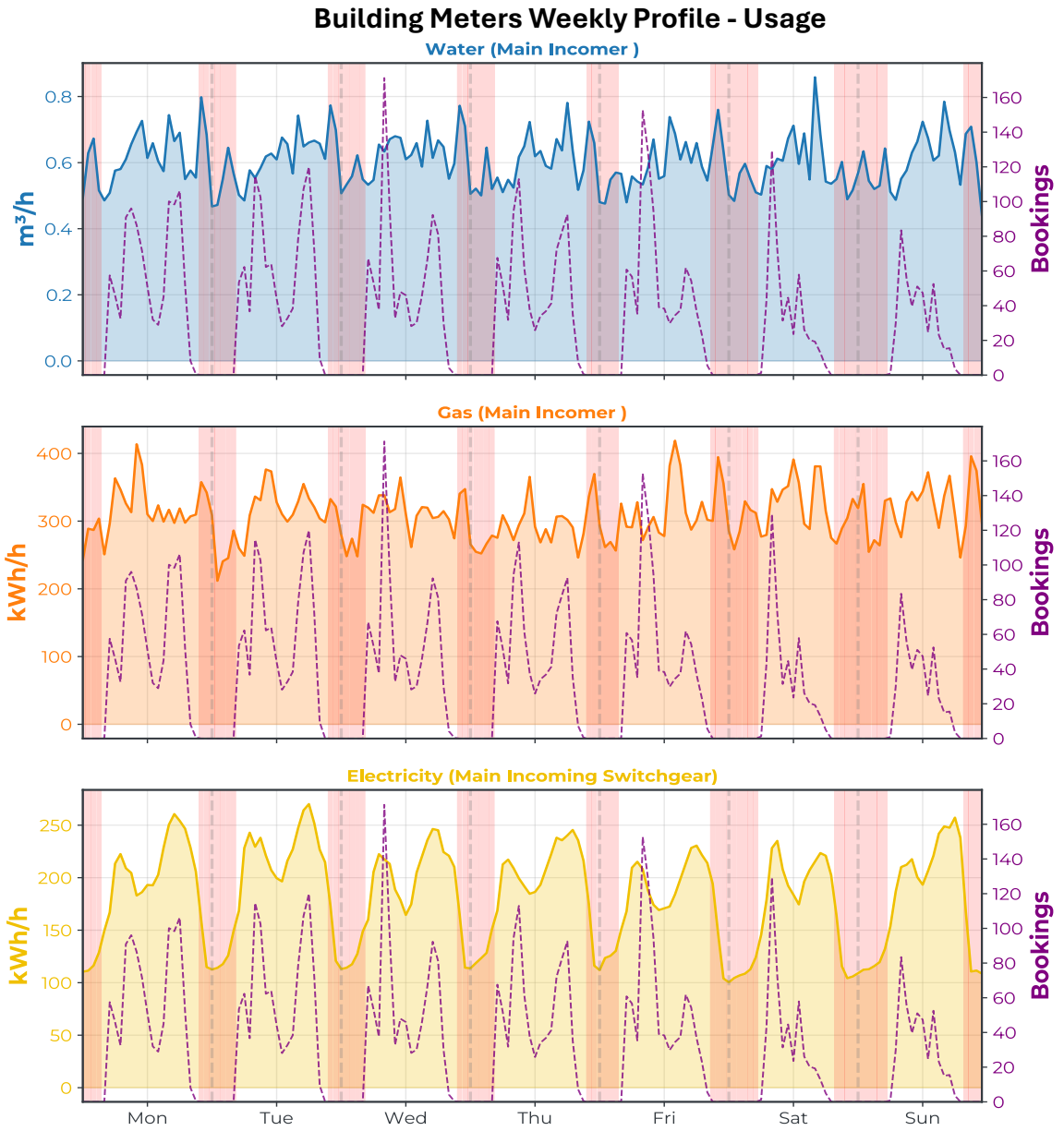
- Switch off lights and air temperature systems in unused areas
- Zoned lighting rather than full-area activation
- Adjust temperatures overnight and in low-use periods
- Align pool reheating and cleaning cycles with usage
- Ensure pool covers are consistently used

Energy usage is set to run at the same standard level in facilities regardless of the day of the week, with high overnight energy expenditure

The average 7-day water, gas and electricity usage profiles show a consistent pattern across all pilot sites:

- Significant energy consumption continues overnight, even when the buildings are unoccupied
- Electrical demand reduces after closing, but a substantial base load remains.
- Gas consumption also continues overnight, with sharp peaks suggesting plant-driven operation rather than occupancy-led demand
- Water retains a significant baseline outside peak booking periods.
- Evening peaks in gas and water may be linked to pool processes such as backwashing and reheating.

Buildings are not fully reducing energy levels outside operational hours, indicating clear opportunities to lower demand without affecting customer experience.

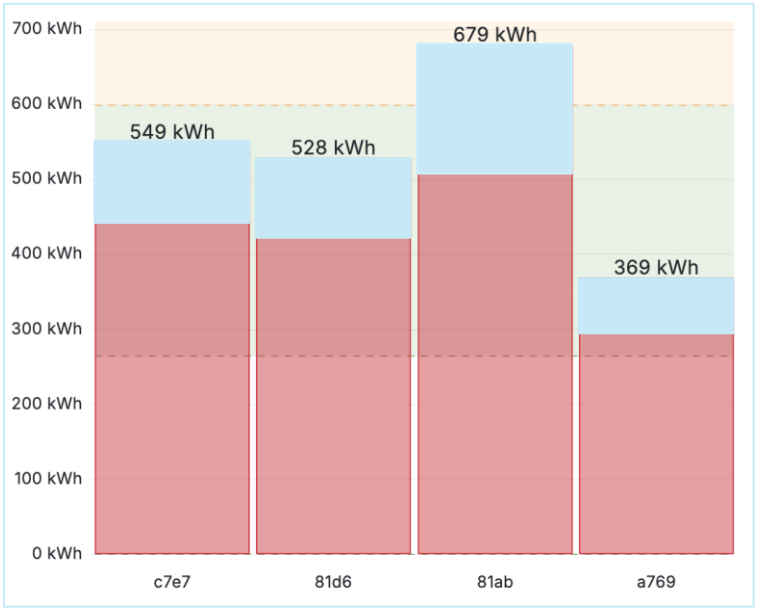


Energy consumption analysis reveals that most sites exceed typical electricity and gas benchmarks, highlighting clear opportunities for efficiency improvements through targeted interventions like submetering

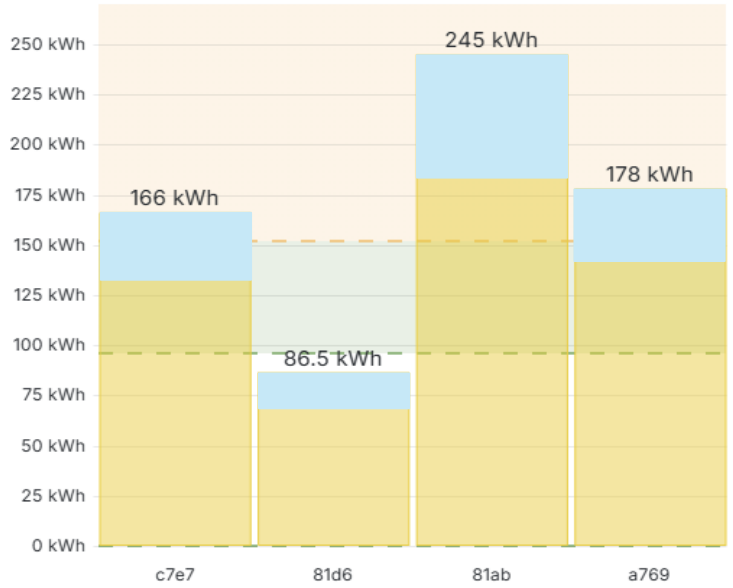
Gas and electricity data comparison between pilot sites

The charts below show 2024 electricity and gas consumption across the four sites. For electricity, three of the four sites exceed the typical usage benchmark, with site 81ab the highest at 245 kWh/yr/m² and site 81d6 consuming less than half that amount, highlighting significant variation and opportunities to optimise usage through Unify's submetering tools. Gas data for the four sites was also compared against CIBSE benchmarks. One site (81ab) exceeds the typical threshold of 598 kWh/yr/m², while none meet the good practice benchmark of 264 kWh/yr/m², indicating potential for improved energy efficiency across the portfolio.

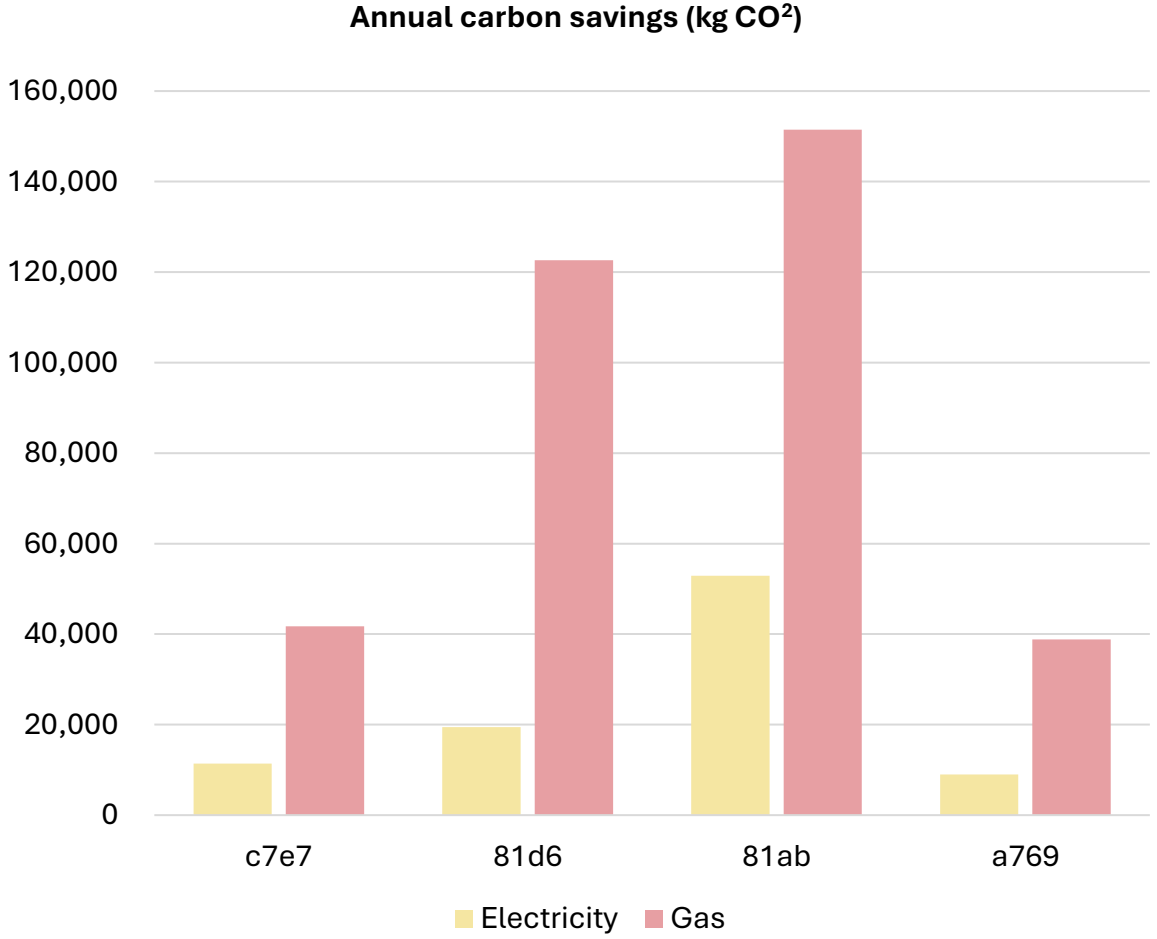
Gas (annual kWh/m²)

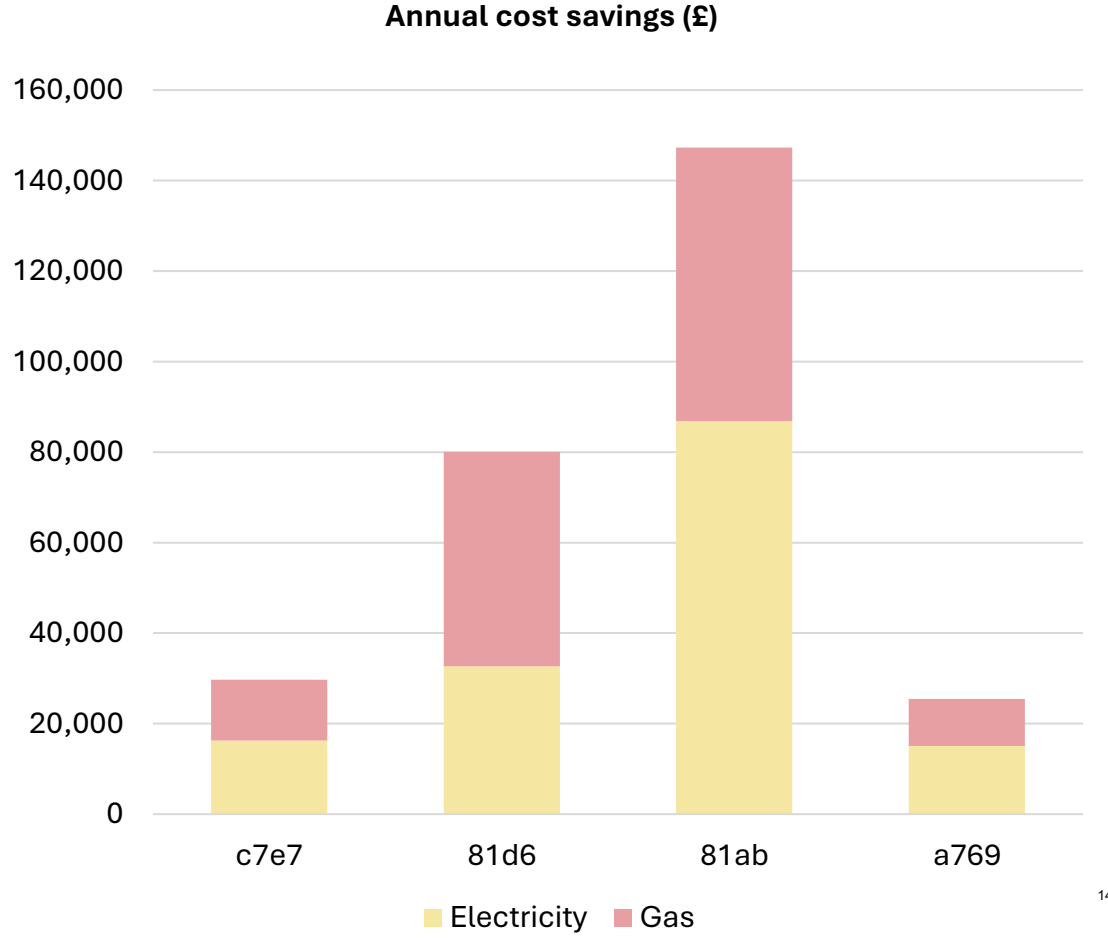


Electrical (annual kWh/m²)



Analysis shows that there is large savings potential for the pilot sites, with the usage demand savings ranging between 20-25%. Converted into carbon and GBP savings, the commercial and environmental benefit is significant.





POTENTIAL OPPORTUNTIES

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There are 4 clear areas of opportunity for cost savings, with initial analysis indicating saving potentials of up to 20% of total existing energy costs

Align heating, ventilation, lighting and other systems to user demand and activity levels	• Reduce heating, lighting, and ventilation in low-demand periods • Turn off systems when space is not booked or in use • Ensure facility controls are updated regularly to match activity programmes
Staff engagement and ownership of energy reduction actions	• Raise awareness of how everyday actions affect energy cost • Encourage switching off lights and equipment when not needed • Provide clear guidance on adjusting heating and ventilation systems • Share performance data so teams can see impact of their actions
Improve day-to-day systems and maintenance	• Avoid running equipment at full levels when areas are unused • Improved record keeping of settings changes • Identify and fix faults early • Ensure systems reflect current usage rather than historic patterns
Review pool system operations	• What are backwashing processes and timings: are they scheduled or driven only by water quality readings? • Why is reheating carried out at night when energy costs are at their highest? • Are nighttime setpoints being reduced when pool covers are deployed? • Are pool settings and operations assuming full capacity rather than being adjusted for actual usage?

NEXT STEPS

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The findings to date are very encouraging and should lead to final recommendations that can produce immediate energy reductions. The work leading to the final report will include:

Issue individual site Requests For Information and arrange follow up meetings to progress to final report

Work with site teams to **identify "unknown" circuits** in the Sankey diagrams

Address any remaining connection issues with monitoring equipment to ensure full data capture

Further analysis of areas identified from the findings to date

Detailed **exploration** of current **pool plant operating procedures**

Develop benchmarking comparisons to identify for areas for investigation and best practice

Experiment and measure results from adjusted **pool reheating timings**

Investigate plant controls and settings where long running periods have been identified

Finalise projected **energy savings in financial and carbon terms** as well as percentages

Moving Communities

SWIMMING POOL SUPPORT FUND

INITIAL FINDINGS

SPORT ENGLAND

UNITING THE MOVEMENT

SPSF OVERVIEW

Phase I: Revenue support

£20.3 million covering period 1 April 2023 – 31 March 2024

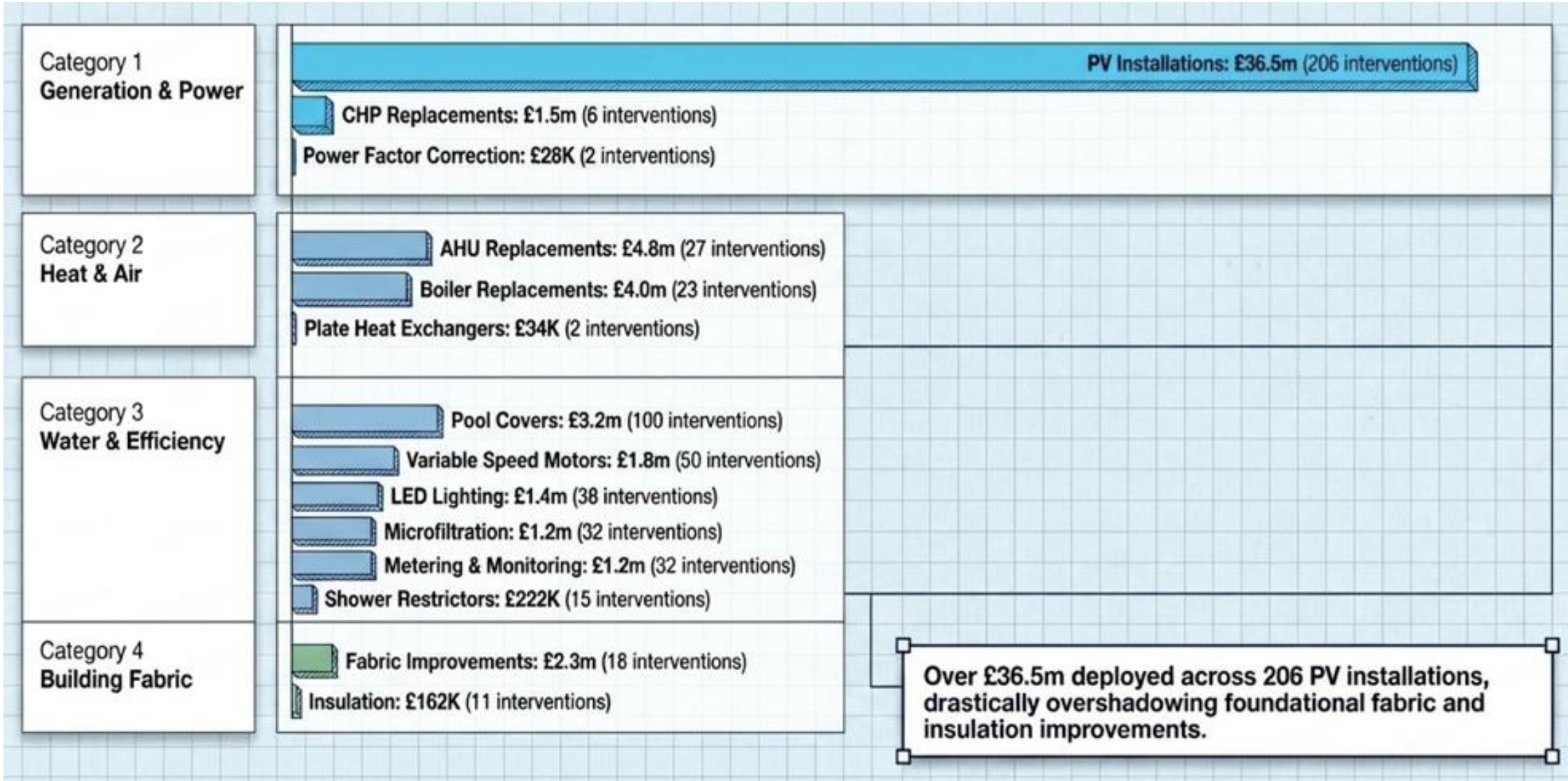
Phase II: Capital support

£40 million covering period 1 April 2023 – 31 March 2025
(£20 million of additional Lottery fundin

Funded by DCMS, administered by Sport England, distributed to Local Authorities

Phase I		Phase II
102/221	Local Authorities applications awarded /received	**254/**276
199/622	swimming pool facilities awarded/applied for	**362/**726
N/A	interventions awarded/applied for	**579/**2,256
£20.3m/£80.8m	total funding awarded/requested	**£60m/**£172.2m

PHASE II PORTFOLIO



INTERVENTIONS

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SWIMMING POOL SUPPORT FUND

SPORT ENGLAND

Department for Energy Security & Net Zero

desco

Photo Voltaic Panels

INSTALLATIONS
206

ANNUAL RUNNING COST SAVING
£15k (Typical)

SPSF FUNDING
£36.5m

AVERAGE INSTALL COST
£75k (Typical)

ANNUAL CARBON REDUCTION
8 Tonnes (Typical)

PAYBACK
5 - 6 YEARS

Technical Appraisal

- ✓ Match generation to load
- ✓ Battery Storage possible, insurance concerns

Smart Because...

- Direct Generation
- Buildings are electrifying

INTERVENTIONS

SPORT ENGLAND

SWIMMING POOL SUPPORT FUND

Department for Energy Security & Net Zero

Pool Covers

INSTALLATIONS
100

ANNUAL RUNNING COST SAVING
£10k (Typical)

SPSF FUNDING
£3.2m

AVERAGE INSTALL COST
£40k (Typical)

ANNUAL CARBON REDUCTION
25 Tonnes (Typical)

PAYBACK
4 - 5 YEARS

Technical Appraisal

- ✓ Reduce pool heat loss
- ✓ Reduced Evaporation
- ✓ Allows reduced ventilation and pool water filtration rates

Smart Because...

- One element, multiple savings, gas, water and heat

INTERVENTIONS

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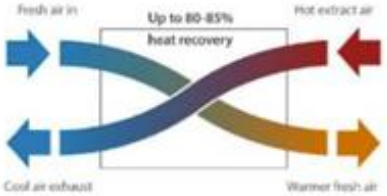
SWIMMING POOL SUPPORT FUND

Heat Recovery Air Handling Units



INSTALLATIONS
27

ANNUAL RUNNING COST SAVING
£8k (Typical)

SPSF FUNDING
£4.8m

AVERAGE INSTALL COST
£175k (Typical)

ANNUAL CARBON REDUCTION
30 Tonnes (Typical)

PAYBACK
25 YEARS

Technical Appraisal

- ✓ Without Heat Recovery, literally throwing money away
- ✓ 90%+ heat recovery achievable

Smart Because...

- Maybe biggest energy load in building

FACILITY CASE STUDY

LeisureEnergy
Sustainable savings
Leading the transition to net zero carbon leisure facilities

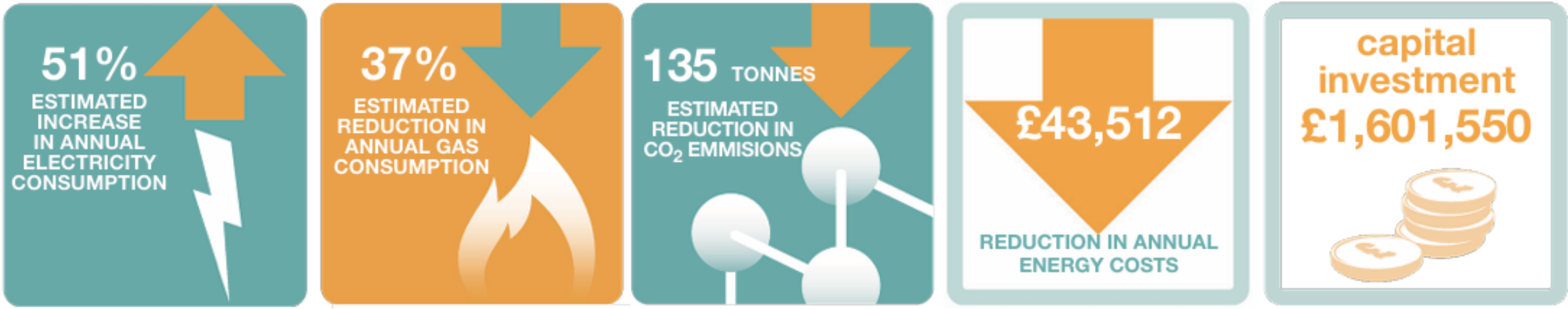
UK active — More people More active More often

Department for Energy Security & Net Zero

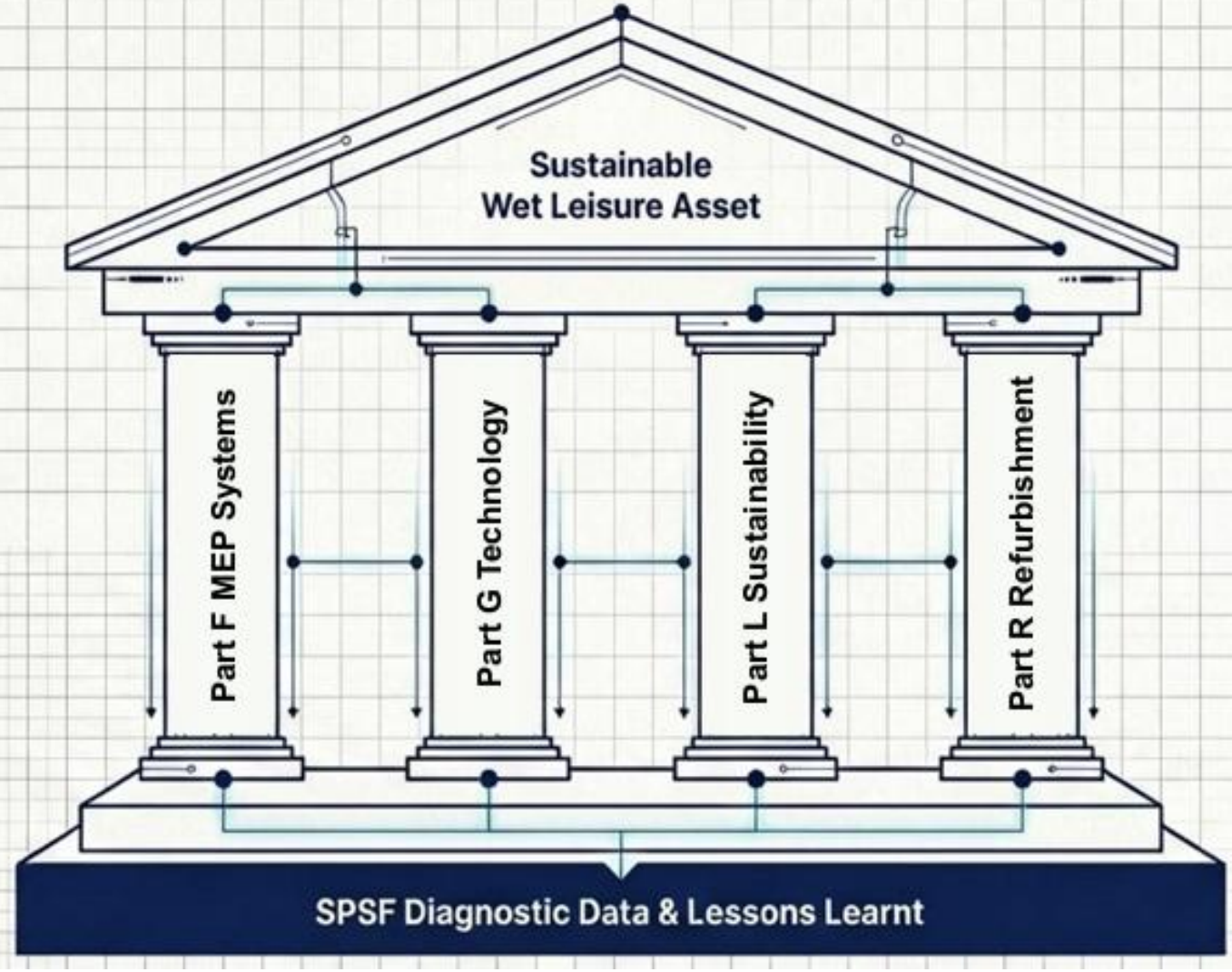
MIDLANDS NET ZERO HUB

North West Leicestershire District Council

CLIENT	NORTH WEST LEICESTERSHIRE DISTRICT COUNCIL	DATE	AUGUST 2024
PROJECT TITLE	ASHBY LEISURE CENTRE & LIDO - ALL TECHNOLOGIES	PREPARED BY	JAMIE HARRIS



DESIGN GUIDANCE NOTES




Moving Communities
QUESTIONS?
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UNITING THE MOVEMENT