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Managing Rising Energy costs in Public Leisure Facilities

By Alan Barber

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Agenda

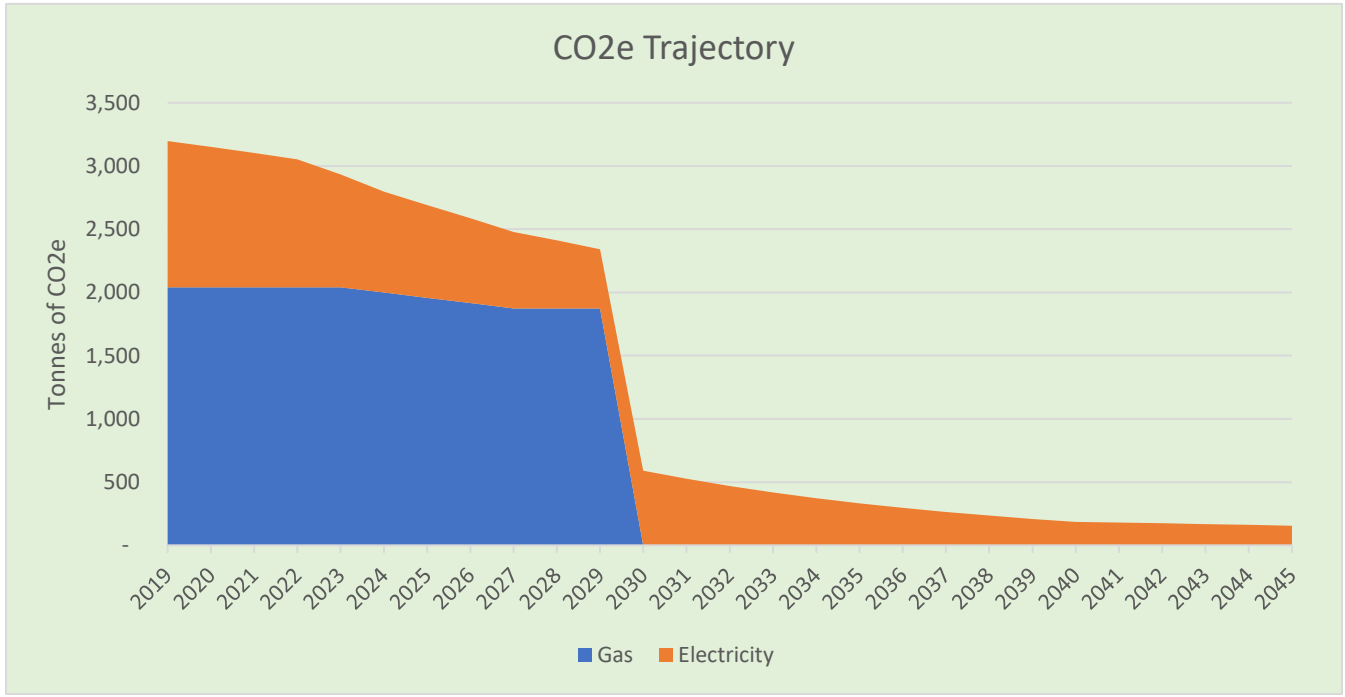
- Understanding the energy cost challenge
- Options to fund energy efficiency projects
- Operational energy costs

The energy cost challenge

- Energy costs in leisure centres are high
- High maintenance cost, particularly in ageing sites
- Gas is cheap and electricity expensive
- Net Zero Carbon challenge

Net Zero Vs. Operational Cost

- Reduce energy usage and optimise building performance (i.e. energy efficiency)
- Generate renewable local power
- Low carbon heating
- Offset



Case Study 1
Spectrum Leisure Centre, Guildford

- Guildford Spectrum is a 5 storey Leisure Centre and Sports Complex that houses swimming pools, ice rink, sports halls, gym, bowling hall, restaurants & cafes, and various changing rooms and facilities.

- Built in 1993

- 3600kW boilers and 486kW CHP

Condition Based Energy Audit

Prioritise to replace equipment based on age and condition

Combined Heat and Power

- Historically a low carbon technology and cost effective
- Unlikely to be a low carbon solution nor cost effective in the future

Low Carbon Heating

- Heat Pumps – High Coefficient of Performance (COP)
- Considerations for a low temperature system
- A 4-pipe multifunctional chiller is a heat pump that simultaneously provides heating and cooling. This works by recovering the heat absorbed from the cooling system to be utilised within the heating system, rather than being rejected to atmosphere. This leads to much higher COPs (4-8) compared to traditional chillers (2-4)
- Unit of electricity is around 25p/kWh and gas is 5p/kWh (elec is 5x higher than gas)
- High capital cost that will likely require external funding

Electrical Capacity

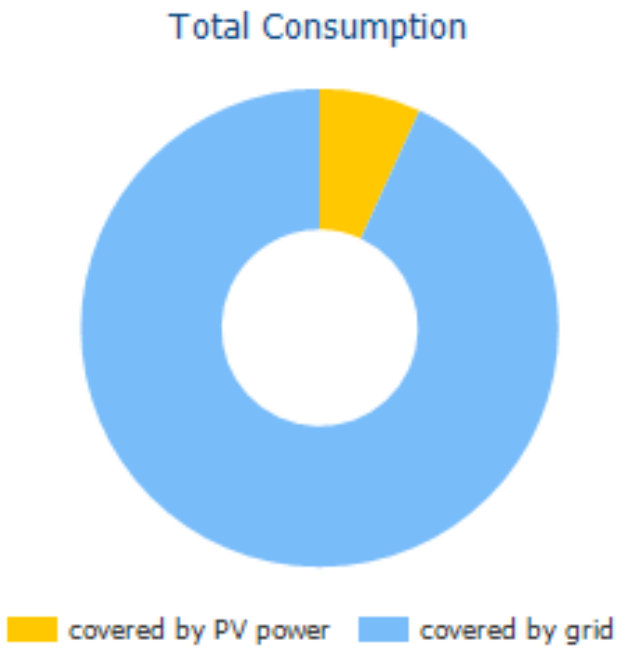
- Critical to consider at an early stage
- Can be very expensive to upgrade the network
    - Recent example cost:
        - Dry leisure centre was 400m away from substation = £350,000
        - Wet leisure centre needed large increase = £142,000

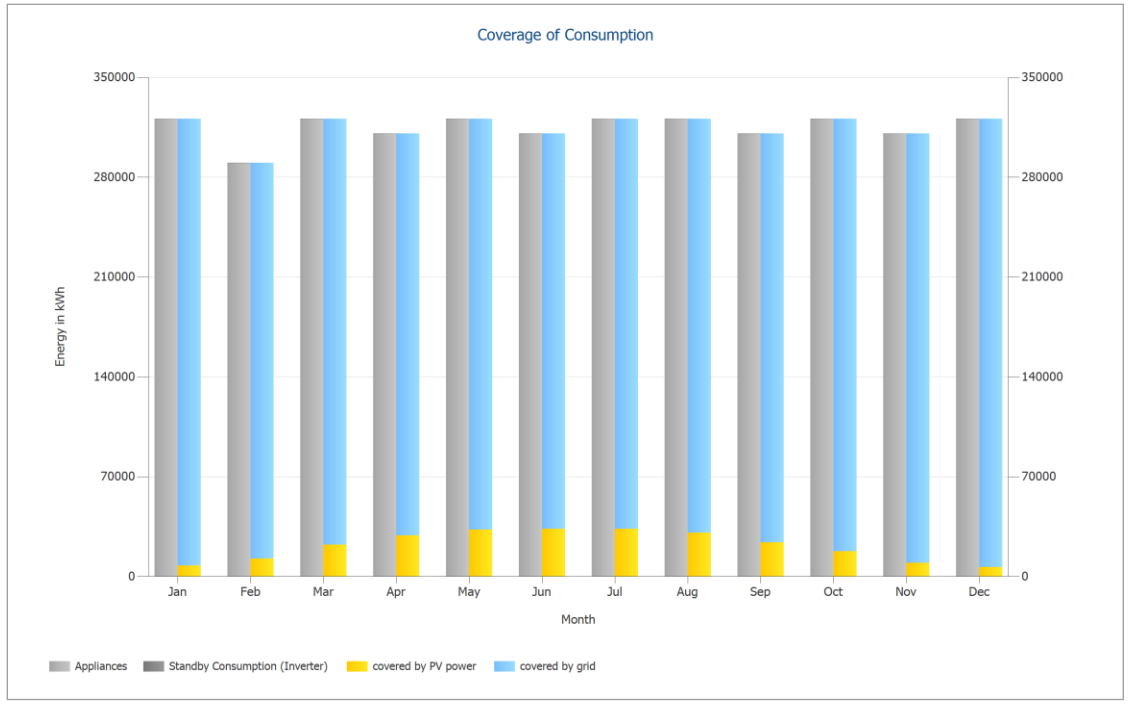
Solar Photovoltaic and Solar Thermal

- PV can help reduce costs of electrifying a building
- But will not power your whole building

246kWp Solar Canopy provided 9% of total electricity

Solar Photovoltaic Energy Generation





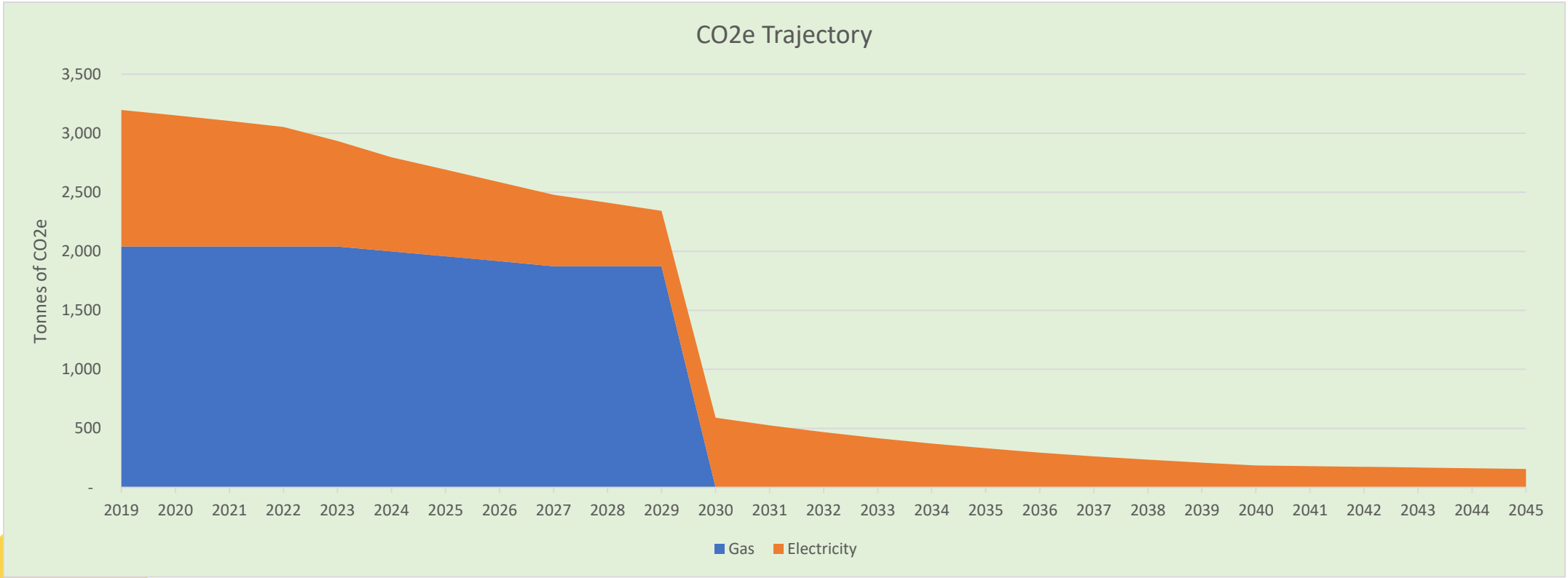
Building Fabric

- Reducing heat loads can reduce capital cost of replacement heating system
- Can be very expensive

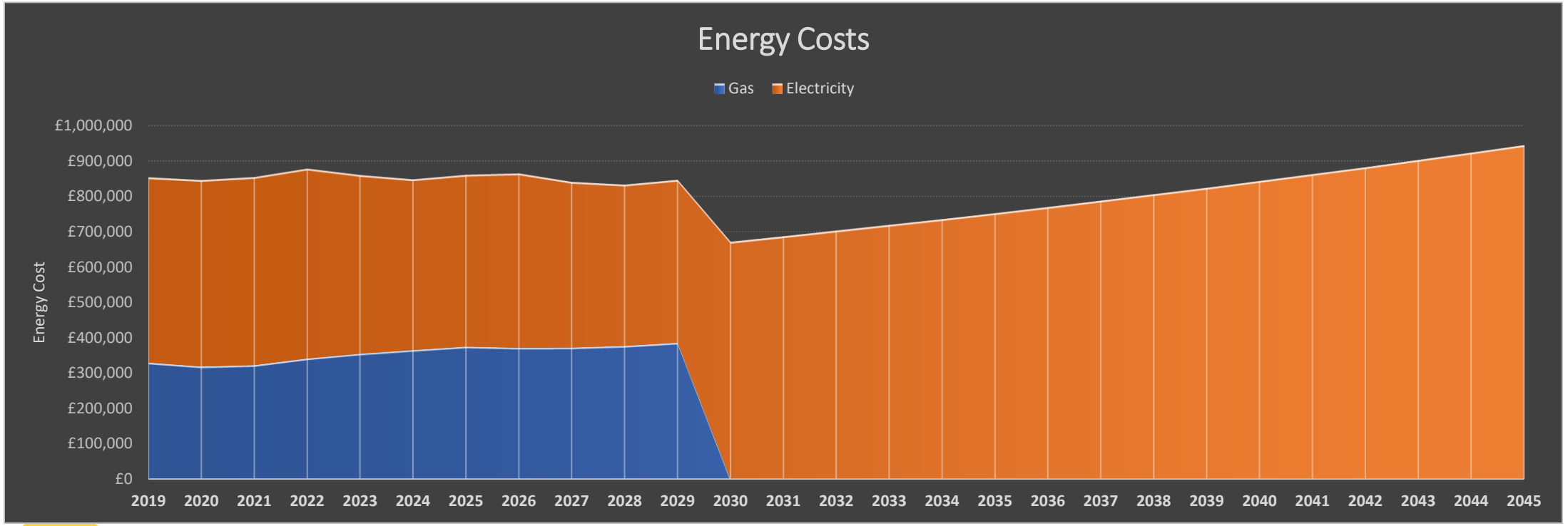
Capital Cost

Main Large AHU	Other AHU	4-Pipe Multifunctional Chillers	Glycol ChW System to Ice Rink AHU	General ChW System	Low Temperature LPHW System	High Temperature LPHW System & DHW	Heat Emitters	LED Lighting	Solar PV	Equipment	Other	Total
£947,000	£410,000	£1,174,000	£33,000	£193,000	£580,000	£242,000	£450,000	£27,900	£223,000	£158,700	£83,200	£4,521,800

Carbon Trajectory

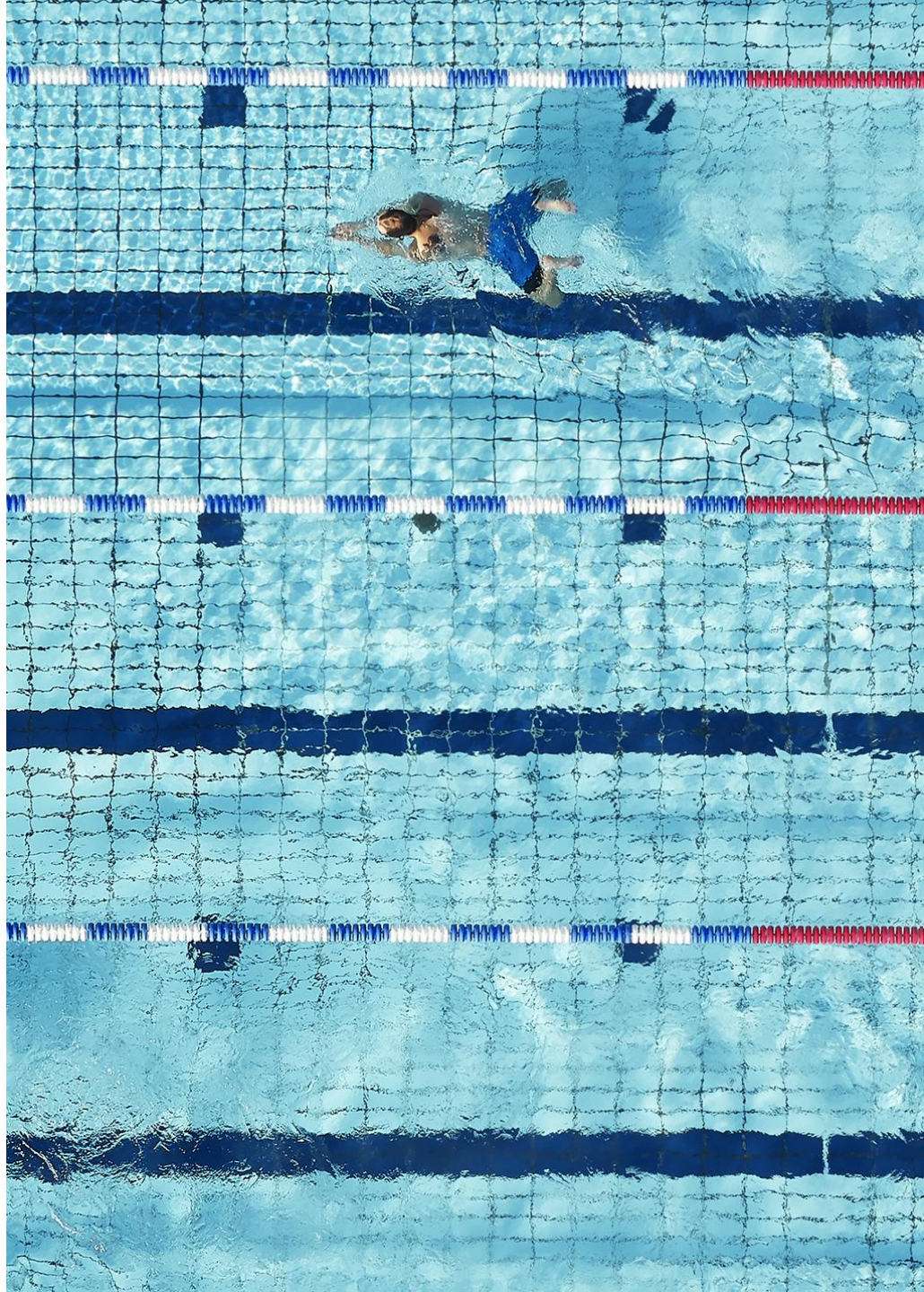


Energy Costs



Case Study 2
Pendle Wavelengths

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**

Public Sector Decarbonisation Scheme
(PSDS Phase 4)

- Technical application
- Pre and post peak heat loss and system sizing
- Like for like costs
- Age of plant
- Detailed cost breakdown
- Electrical capacity
- £510 tCO_2LT
- Minimum 12% contribution

Different funding streams are released regularly so keep an eye out for opportunities

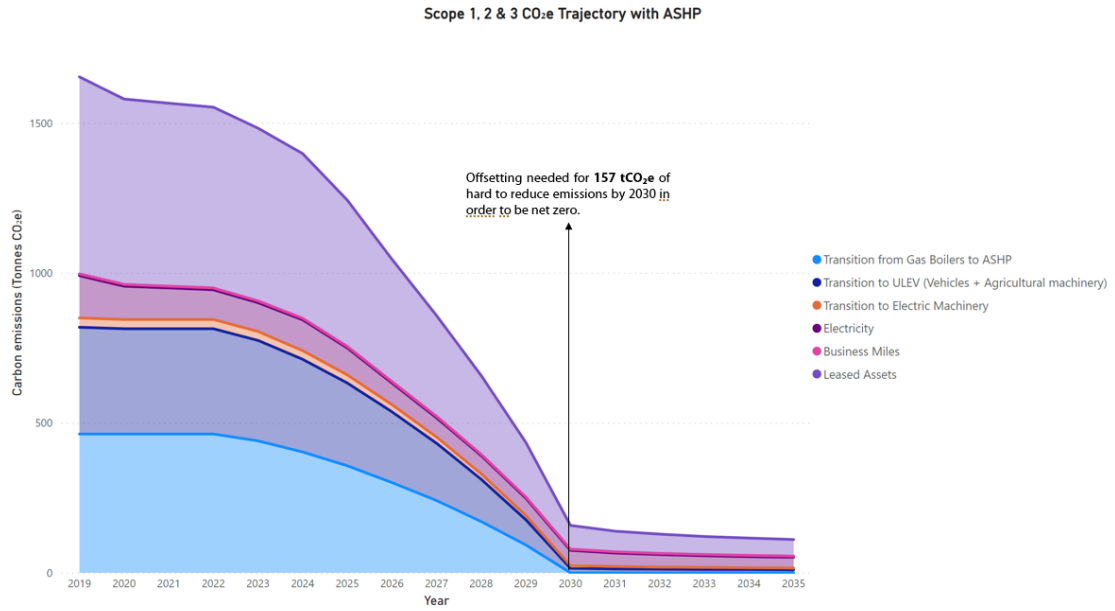
Project Stages

Public Sector Decarbonisation Scheme (PSDS)
Low Carbon Skills Fund (LCSF)

Process	Available Funding
Site wide strategy to identify high priority buildings	LCSF
Feasibility studies	LCSF
Detailed design	LCSF & PSDS
Installation of works on site	PSDS
Post project monitoring	Not currently funded

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*



Next Steps

Ready to take action?

Contact Phil Brennan for further details on delivery of projects

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