



north east &
yorkshire
NET ZERO HUB

North East & Yorkshire Net Zero Hub

Heat Decarbonisation Plan and Feasibility Study Anytown Crematorium

Report

Report produced in May 2026



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1 Executive Summary

North East & Yorkshire Net Zero Hub, on behalf of Anytown Council, wish to gain a further understanding of the viability of installing low and zero carbon technologies to reduce energy consumption and carbon emissions at Anytown Crematorium.

APSE Energy were appointed to visit the site and undertake a survey of the existing installed mechanical and electrical plant and equipment and recommend energy saving opportunities. This is a feasibility study and options appraisal for the concept design (RIBA Stage 2) of energy efficiency/decarbonisation measures.

The site was visited in February 2026. The survey consisted of visual inspections of the installed plant and equipment; no operational or performance testing was undertaken. The service and breakdown history documentation were not reviewed.

The table below summarises the costs of the works and professional fees associated with the core carbon reduction recommendations. These proposals offer the potential for achieving significant carbon savings, although some measures are expected to increase annual operating costs under current fuel tariffs due to the higher cost of electricity and BioLPG relative to natural gas.

Table 1 Energy Efficiency Measures

Item	Recommendation	Elec Savings kWh/yr	Gas Savings kWh/yr	Annual Saving £	Capital Cost £	Payback Years	Carbon Savings tCO ₂ e/yr
	Anytown Office						
1a	Heating Control Optimisation	-	4,278	£201	Nil	N/A	0.78
1b	ASHP (Space Heating)	-5,427	18,312	-£101	£99,300	N/A	2.39
	Anytown Crematorium						
2	LED Lighting	10,693	-	£1,897	£21,600	11	1.89
3a	Reinstate Cremator Heat Recovery System	-	23,575	£1,110	TBC	TBC	4.31
3b	Electric Boiler (Space Heating)	-25,882	29,511	-£3,202	£173,300	N/A	0.82
4	Cremators (Natural Gas → BioLPG)	-	994,212	-£3,600	£253,000	N/A	182
	Total	-20,616	1,069,887	-£3,695	£547,200		192

It is advised to prioritise no-cost and low-cost energy efficiency measures, such as optimising heating controls, minimising unnecessary heating operation, switching off lighting and electrical appliances when not in use, and ensuring windows and doors are closed when heating is operating.

Anytown Council aims to achieve net-zero emissions by 2038¹. Decommissioning or retrofitting fossil natural gas-fired equipment is essential for the site's decarbonisation strategy and alignment with this target.

The largest carbon reduction opportunity relates to the cremation process. The existing cremators account for the majority of site energy use and emissions. As the existing FTIII cremators are not currently at end-of-life, BioLPG has been taken forward as the preferred interim retrofit pathway for detailed assessment. This is subject to confirmation of OEM compatibility, BioLPG supply, blend percentage, certification route, LPG tank siting, DSEAR/fire safety requirements and permitting implications.

Electric and hybrid-electric cremators remain the likely long-term decarbonisation pathway for end-of-life cremator replacement. These should be reassessed before any major cremator replacement, taking into account electrical capacity, structural constraints, operational continuity, capital cost, whole-life cost and supplier due diligence.

BioLPG is not the lowest-disruption option physically for a gas-grid-connected site. A lower-disruption market-based option would be biomethane/green gas procurement through the gas grid, but that is an accounting/procurement route rather than a physical change to the cremator fuel.

The existing cremator heat recovery system is reported to be non-operational or not operating as intended. This should be investigated and recommissioned as a priority, as recovered heat could reduce the operation of the space heating boilers during cremation periods and provide immediate energy, cost and carbon savings.

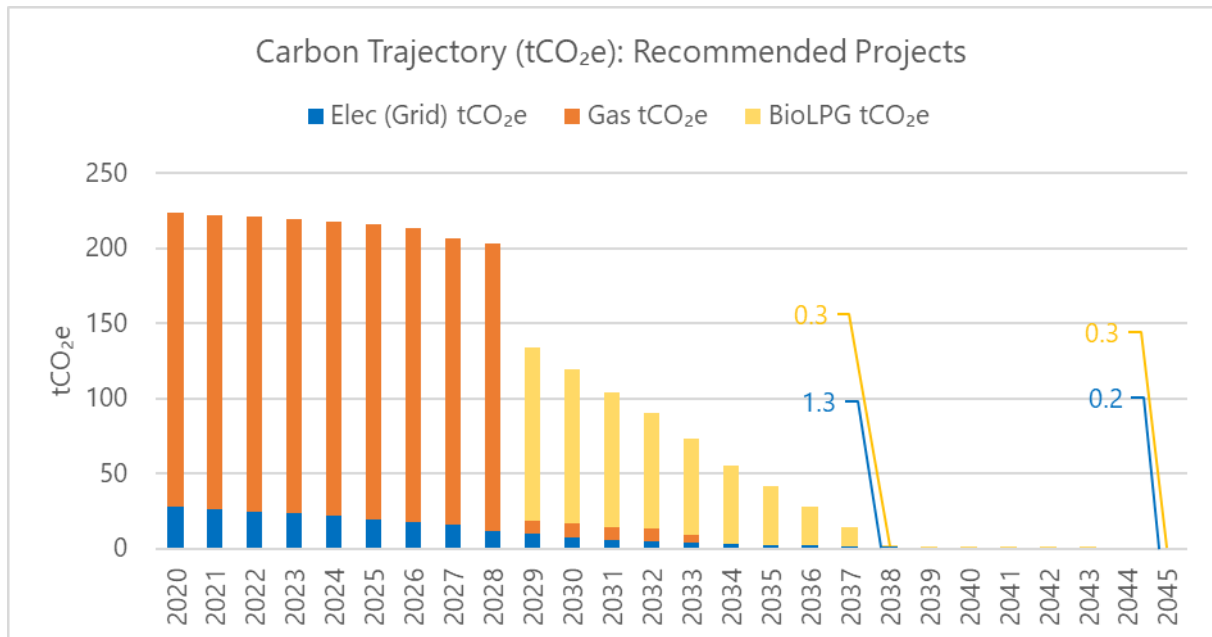
For Anytown Crematorium, the preferred space heating proposal is to repair and prioritise the cremator heat recovery system, then install an electric boiler to provide supplementary and back-up heating. This is considered more appropriate than an air source heat pump (ASHP) for the Crematorium because the restored heat recovery system is expected to reduce the residual annual space heating load and operating hours, weakening the case for higher-capital-cost heat pump plant.

For Anytown Office, the preferred space heating proposal is an air-to-water ASHP with replacement of the existing single-pipe heating distribution system and heat emitters. This approach is considered better suited than air-to-air ASHPs due to the cellular layout of the building and the need for consistent heat distribution and room-by-room control.

The site's electrical demand will increase following installation of electrically powered heating systems. The existing main incomer is reported to be rated at 400 A, but the site Maximum Import Capacity (MIC) is currently capped at 47 kVA. Early engagement with the Distribution Network Operator (DNO) and a detailed electrical capacity review are required to confirm whether MIC uplift or reinforcement works are necessary.

The carbon trajectory shows that the recommended measures can significantly reduce site emissions before the Council's 2038 net-zero target. The largest reduction is achieved through the transition away from natural gas for cremation. Residual emissions are expected to remain from grid electricity and any remaining hard-to-abate energy use, and these may need to be addressed through renewable energy procurement, verified offsets or future technology changes.

¹ [Climate emergency | Anytown Council](#)



Main Recommendations and Next Steps

1. Cremator Decarbonisation and Heat Recovery

- Investigate and recommission the existing cremator heat recovery system as a priority, including review of the LPHW circuit, pumps, controls, buffer vessels, heat dump sequence, system pressure and water quality.
- Confirm the age, condition, remaining service life, abatement status, environmental permit requirements and PG5/2(25) compliance position for the existing cremators.
- Progress BioLPG as the preferred interim cremator decarbonisation pathway, subject to confirmation from Facultatieve Technologies on burner compatibility, gas train modifications, controls, flame detection, commissioning and emissions compliance.
- Obtain BioLPG supplier quotations confirming fuel price, blend percentage, certification route, carbon intensity, minimum order quantities, delivery arrangements, tank rental, telemetry and maintenance responsibilities.
- Undertake LPG tank siting, DSEAR/fire-risk assessment, tanker access review, separation distance assessment, planning/permitting review and final compound design before progressing.
- Reassess electric and hybrid-electric cremators at the next major refurbishment or end-of-life replacement point.

2. Heating System Replacement and Design

- Install an air-to-water ASHP to serve Anytown Office, with new two-pipe heating distribution and appropriately sized low-temperature heat emitters.
- Install an electric boiler to provide supplementary/back-up space heating to Anytown Crematorium once the heat recovery system has been reinstated.

- Replace existing single-pipe radiator distribution systems where low-temperature heating systems are proposed.
- Review the existing Chapel underfloor heating circuit and confirm whether it can be retained and retrofitted with a new manifold and associated controls.
- Undertake room-by-room heat loss calculations, radiator capacity checks, zoning review and controls design before final plant selection.
- Consider heating zoning within the Crematorium so that only occupied areas are heated where operationally practical.

3. Controls and Building Management

- Review heating time schedules, temperature setpoints, local override arrangements, frost protection, setback temperatures and optimum start/stop settings.
- Align heating schedules with verified occupancy and operational periods, including review of Saturday heating operation at Anytown Office.
- Provide weather compensation to reduce heating flow temperatures where suitable.
- Install or upgrade BMS/controls to provide time scheduling, alarm monitoring, trend logging and better coordination between recovered heat and supplementary/back-up heat sources.
- Undertake an annual review of controls to ensure continued optimisation.

4. Electrical Infrastructure

- Confirm the site's main incomer rating, MIC, maximum demand and available electrical headroom.
- Undertake a detailed electrical capacity review following final equipment selection.
- Engage early with the DNO to confirm whether MIC uplift or electrical reinforcement works are required.
- Retain a provisional allowance for electrical infrastructure upgrades, noting that this remains a high-risk item for both cost and programme.
- Undertake a harmonics assessment in accordance with EREC G5/5 where final equipment includes variable speed drives.

5. Building Fabric and Distribution Losses

- Undertake a building fabric condition survey to confirm wall construction, roof insulation levels, glazing performance, air leakage paths and ventilation requirements.
- Prioritise targeted fabric improvements such as draughtproofing, local door improvements, repair of defective elements and confirmation of roof insulation continuity.
- Confirm the insulation specification of recently refurbished roof areas before proposing further roof fabric works.
- Insulate exposed pipework and fittings in plant rooms and retained distribution routes where practical.
- Review entrance draught control and consider air curtains or local draught reduction measures where appropriate.

6. Lighting and Small Power

- Replace remaining non-LED luminaires with LED equivalents.
- Undertake a dedicated lighting design for the Chapel to confirm suitable illuminance, glare control, visual comfort and appearance.
- Replace plant area, Garage and Office Store fittings with LED equivalents as part of planned or reactive maintenance where full redesign is not justified.
- Review external lighting controls and provide daylight sensors or optimised timeclock settings where not already present.
- Replace electrical appliances and equipment with more efficient models at end-of-life.

7. Solar PV and Renewable Energy

- Review existing solar PV generation data, on-site consumption and export profile.
- Confirm whether the existing PV installation benefits from Feed-in Tariff payments before progressing any PV expansion.
- Assess the feasibility of additional PV, including roof suitability, structural capacity, inverter capacity, FIT implications, SEG rates and grid connection requirements.
- Explore favourable electricity import tariffs and Smart Export Guarantee rates with the Council's energy supplier.

8. Metering and Monitoring

- Implement sub-metering for key end uses, including cremators, space heating plant, heat recovery, ASHP/electric boiler systems and PV generation.
- Record fuel and electricity use against cremation numbers to establish a robust performance benchmark.
- Use half-hourly meter data and BMS trend logs to verify savings after implementation.
- Maintain an energy monitoring process to support ongoing optimisation and future funding applications.

Cost estimates in this report reflect current market rates, industry pricing benchmarks, and budget quotations from suppliers and contractors. These figures provide a robust indication of expected capital expenditure, exclusive of VAT and inflation at the time of delivery.

Estimates assume specification by qualified professionals and installation by experienced contractors. No allowances have been made for subcontractor overheads, framework fees, or additional mark-ups.

Further investigatory works may be required to confirm the suitability of proposed solutions. No costs have been included for these investigations, nor for out-of-hours or weekend work. Handling of deleterious or hazardous materials (e.g. asbestos), where present, has also not been costed.

To ensure financial certainty and support effective procurement, updated cost validation is recommended prior to implementation. Competitive quotations should be obtained from contractors following completion of the detailed design stage to confirm pricing and inform procurement decisions.

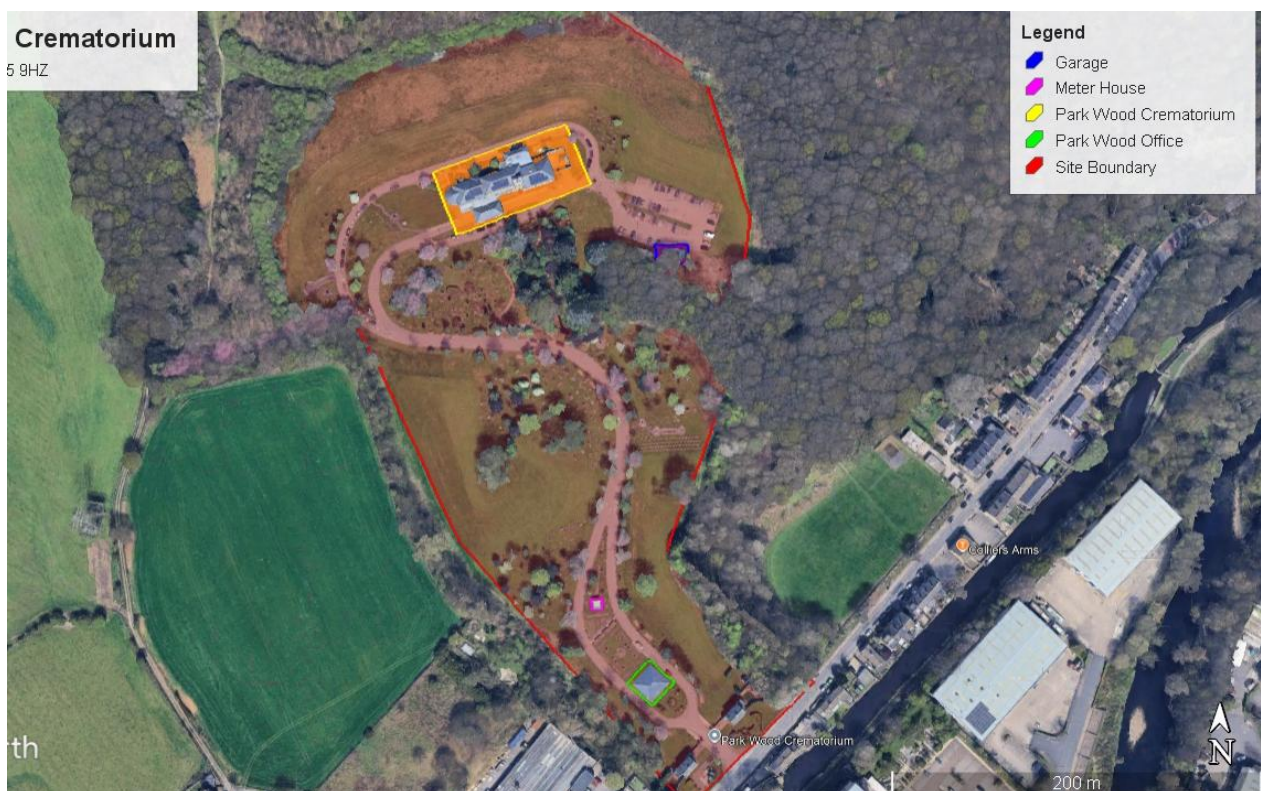
2 Survey and Observations

2.1 General

Anytown Crematorium originally opened in 1956 and is located on a sloping site, resulting in a split-level building arrangement. The Crematorium is a two-storey building, while the Anytown Office is a single-storey building.

The Crematorium has a Gross Internal Area (GIA) of approximately 925.01 m², and the Anytown Office has a GIA of approximately 156.16 m².

Figure 1 Site Layout: Anytown Crematorium



The Council has provided half-hourly electricity and gas consumption data for the site. The half-hourly electricity profile has been used as the primary indicator of operational hours, as it provides the clearest indication of general building activity. These inferred hours are expected to include normal occupancy as well as associated out-of-hours activities, such as cleaning, preparation and shutdown.

Based on the 2025 half-hourly electricity data, the site's typical operational profile is estimated as:

- **Monday to Friday:** approximately **07:00 to 17:30**

The Council has also confirmed that the Crematorium operates on Sundays, and this has been adopted in the assessment where relevant.

The inferred electrical operating profile broadly aligns with the half-hourly gas consumption data during the heating season, although gas use is also influenced by cremator operation and space heating demand. The heating season gas profiles suggest the following typical operating patterns:

Crematorium

- **Monday to Friday:** approximately **04:30 to 16:30/17:00**
- **Saturday:** little or no regular heating demand observed
- **Sunday:** approximately **06:30 to 16:00**

Anytown Office

- **Monday to Saturday:** approximately **07:30 to 16:00/16:30**

The earlier start observed in the Crematorium gas profile is likely to reflect cremator pre-heating, space heating warm-up periods, or other preparatory activities before normal public-facing operating hours. The Office gas profile indicates some Saturday heating operation, which does not appear to align with the reported occupancy pattern and has therefore been identified elsewhere in this report as a potential controls optimisation opportunity.

Energy usage often correlates strongly with a building's occupancy hours, including after-hours work by cleaning and security staff, where applicable. Information/assumptions regarding occupancy periods significantly impact estimates of energy savings. Therefore, a better understanding of the occupancy profile would improve the accuracy of energy-saving estimates.

The survey of the building was carried out on 17 February 2026. The survey was non-invasive, excluding any intrusive assessments that would involve a detailed examination of the condition of the installed plant and equipment.

It should be highlighted that due to certain access limitations, not all areas at the site were subject to inspection during the audit.

2.2 Building Fabric

The buildings are generally of masonry construction, with external walls finished in coursed stone. A wall thickness of approximately 350 mm was measured at an entrance door reveal to Anytown Office. The external walls are assumed to be solid given the pattern of the masonry construction. This assumption should be confirmed before any fabric upgrade works are specified, as wall build-up can vary between original and extended areas.

The Crematorium and Office appear to have been constructed and altered over similar periods, although both buildings have been subject to later extensions and refurbishment works. Planning information for application 09/01213/LAA indicates that works undertaken between 2009 and 2011 included extensions and alterations to the Crematorium, including conversion of a flat roof to a pitched roof and an extension to the Waiting Room. The same planning phase also included an extension to the northern elevation of the Office.

Windows are generally double-glazed units and are assumed to have been replaced or upgraded as part of previous refurbishment works. External doors are of mixed construction, including partially glazed / solid uPVC, metal doors and timber doors. Door condition and draught performance vary by location and should be reviewed during any future fabric improvement works.

The buildings are predominantly naturally ventilated, with local extract ventilation provided in selected areas such as toilets and ancillary spaces. Roof construction comprises a mixture of pitched and flat roof sections. Inspection of

the accessible roof void confirmed insulation at rafter level to the Crematorium's pitched roof areas. These areas are assumed to have been insulated in line with the Building Regulations requirements applicable at the time of construction or refurbishment; however, insulation thickness and continuity should be confirmed where fabric improvements or heating system replacement works are progressed.

The Council has also confirmed that the Crematorium's remaining flat roof sections were replaced between September 2024 and April 2025. Where flat roof coverings have recently been replaced, it is likely that the opportunity for further cost-effective roof fabric improvement is limited in the short term. However, the specification of the replacement roof build-up should be reviewed to confirm insulation levels and whether the works included thermal upgrading.

For the Anytown Office, further roof improvement works are also understood to have been undertaken between April 2020 and April 2021, when the flat roof was converted to a pitched roof. This should have improved the thermal performance and weathering resilience of the building compared with the previous flat roof arrangement.

Overall, the buildings appear to have received a number of fabric-related improvements over recent years, particularly to roofs, windows and extensions. As a result, wholesale fabric upgrade works have not been treated as a primary decarbonisation measure within this appraisal. The main opportunities are likely to be targeted measures such as draught sealing, local door improvements, confirmation of roof insulation continuity, and review of any remaining poorly performing elements.

Before final low-carbon heating system design, a more detailed fabric condition survey should be undertaken to confirm external wall construction, roof insulation levels, glazing performance, air leakage paths and ventilation requirements. This will allow room-by-room heat loss calculations to be refined and ensure that proposed heat emitters and low-carbon heating systems are sized appropriately.

Anytown Crematorium

June 2009 to September 2011: flat roof converted to pitched roof and Waiting Room (0080) extension

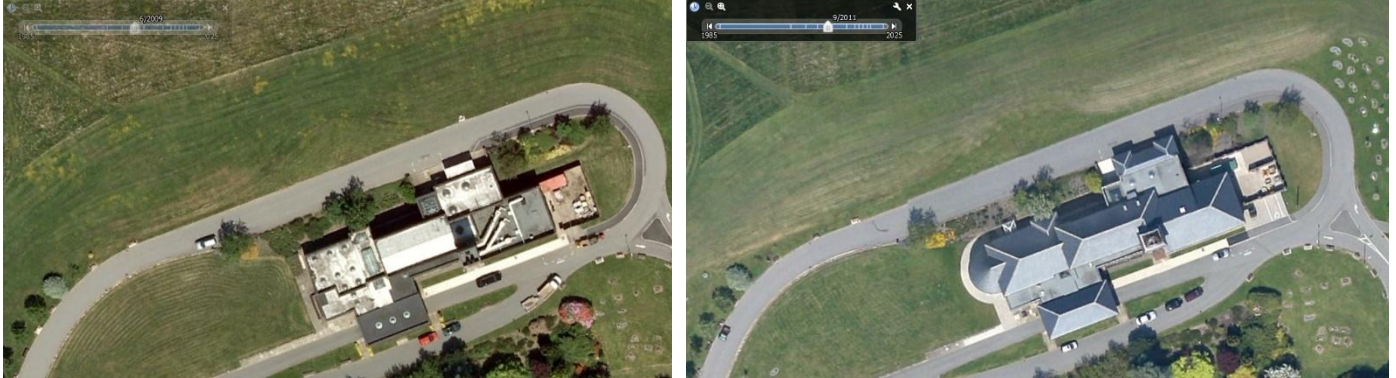
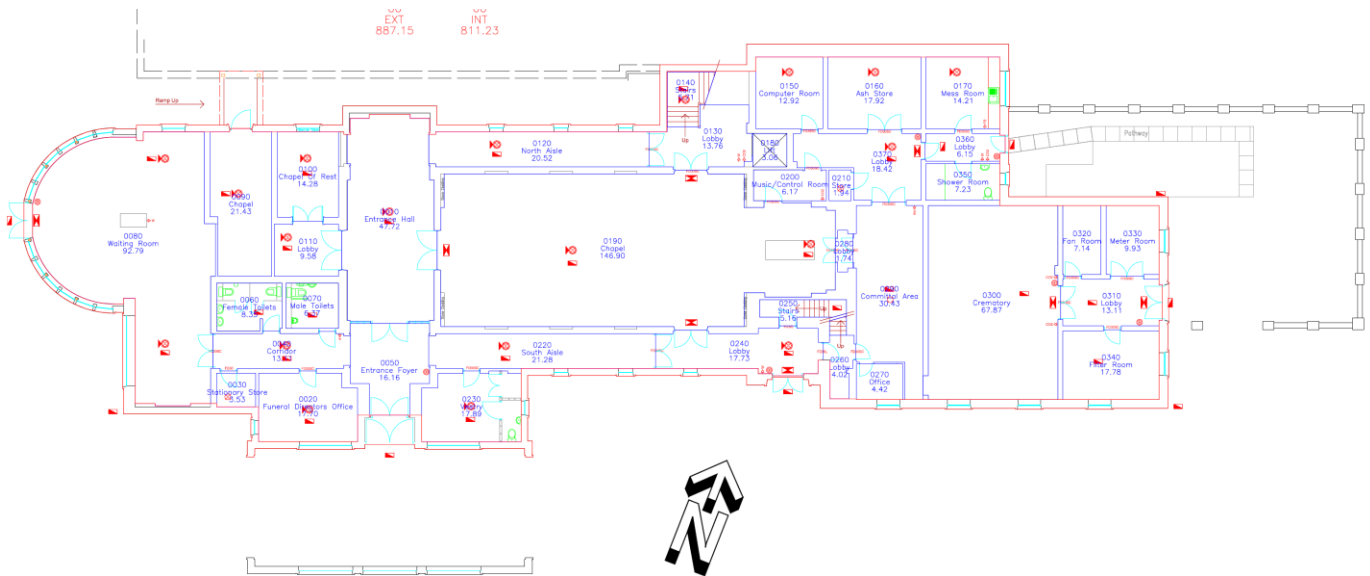


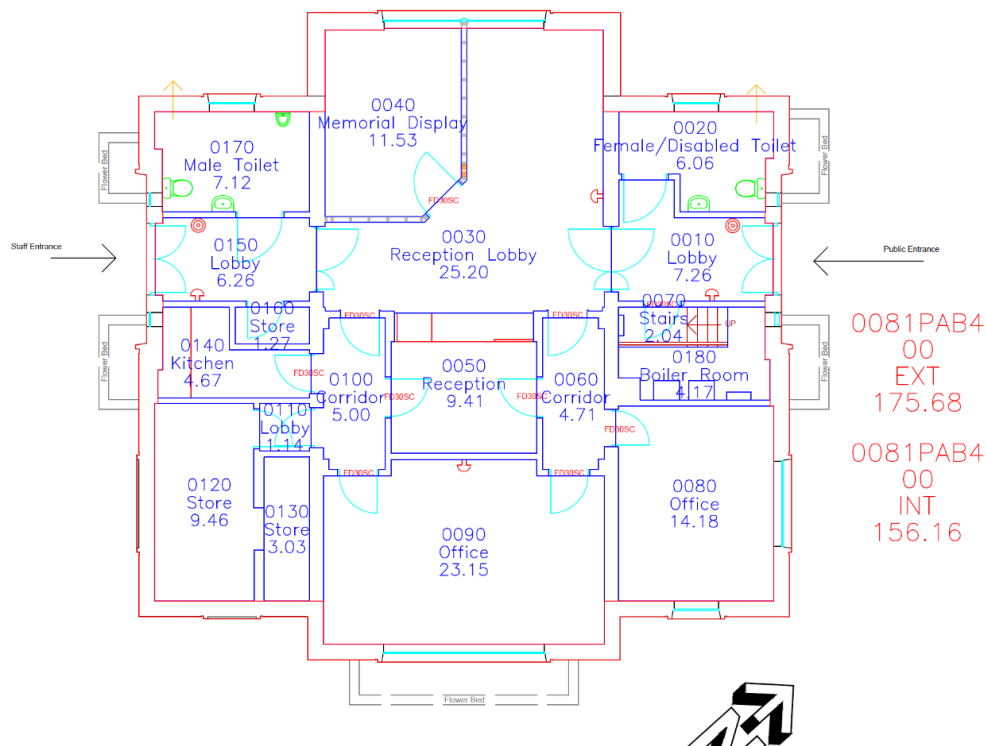
Figure 2 Ground Floor Plan: Anytown Crematorium



April 2020 to April 2021: flat roof converted to pitched roof



Figure 4 Floor Plan: Anytown Office



2.3 Lighting

2.3.1 Anytown Crematorium

The existing lighting is a mix of LED and fluorescent luminaires. Lighting control is primarily via manual switches. The table below details the quantity and type of non-LED fittings identified as candidates for upgrade to LED; existing LED luminaires should be retained.

Table 2 Non-LED Lighting Fixture Inventory

Lighting Fixture	Crematorium	Plant Areas & Garage
ES lamp	96	
Uplighter single CFL	3	
Recessed single CFL	3	
Recessed twin CFL		4
5ft T8 single batten		1
6ft T8 twin batten		5
Total	102	10

Table 2 does not account for external lighting, which appeared to be predominantly LED and presumed to be controlled via a time switch. However, it is inclusive of lighting found within the Garage to the southeast of the Crematorium.

2.3.2 Anytown Office

The existing lighting within the building is LED, excluding a single 2D fluorescent fitting within the Store (0160). Lighting control is primarily via manual switches, with passive infrared (PIR) sensors providing automatic control in certain locations.

2.4 Heating, Ventilation and Air-Conditioning Services

2.4.1 Heating plant

The heating requirement is fulfilled by the following plant within the buildings:

Table 3 Details of Existing Plant

Area Served	Space Heating	Domestic Hot Water (DHW)
Anytown Office	1 × Greenstar 35 CDi Classic System ErP gas-fired condensing boiler with a heat output of 34 kW @ 80/60°C (Gross efficiency: 87.4%); located within the Boiler Room (0180). The boiler provides low-pressure hot water (LPHW) for space heating via a single pipe heating circuit. The final heat emitters fed by the gas-fired boiler include: • Panel-type, cast-iron, and low surface temperature (LST) radiators. Some radiators are provided with thermostatic radiator valves (TRVs) for local control. • Pipe coil The boiler was installed in 2017 based on the nameplate information.	Multiple direct-electric point-of-use (POU) water heaters serving hot water outlets across the building.

Anytown Crematorium	2 × Hamworthy Purewell VariHeat 95c gas-fired condensing boiler each with a heat output of 86.3 kW @ 80/60°C (Gross efficiency: 87.7%); located within the basement level. The boilers were installed in 2018 based on the commissioning reports. Heat recovery from 2 × FTIII gas-fired cremators (installed between December 2013 to January 2014) via a ThermTech Ltd. Industrial Waste Heat Recovery System; equipment located within the Crematory (0300). - Heat is recovered from the flue/exhaust gases and transferred to LPHW via a 46-kW plate heat exchanger which charges 3 × Cordivari Puffer VC 3000 thermal buffer tanks. - There was a pool of blackish water on the floor where the buffer tanks were located; Fan Room (0320) & Meter Room (0330). Likely due to corrosion/stagnation within the system. - The thermal stores feed into the return to the gas-fired boilers preventing/minimising the boilers' input if the cremators are operational and the stores are sufficiently charged. - Excess heat is discarded to atmosphere via a Transtherm heat dump. - The heat recovery system and heat dump were installed in 2018. The heat recovery system is reported to not be functional. However, the buffer vessels appear to be charged, and a temperature of 59.4°C was noted on the FT SCADA system. - It is advised to carry out further investigation to understand and rectify the issues with the cremator heat recovery system. - During the survey, there were ongoing cremations and excess heat was being dumped to atmosphere while Boiler N° 2 was firing to meet the space heating demand within the building. An operational heat recovery system could mean savings from not operating the boilers at the basement level during periods when the cremators are operational and thus supplying heat to the building. Heat stored in the buffer tanks can also be discharged to the building even when the cremators are not operational.	Multiple direct-electric point-of-use (POU) water heaters serving hot water outlets across the building.
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Low-pressure hot water (LPHW) is circulated through a secondary heating circuit serving a single pipe heating distribution system.

The final heat emitters include:

- Underfloor heating within the Chapel (0190)
- Other areas:
 - Panel-type, cast-iron, and low surface temperature (LST) radiators. Some radiators are provided with thermostatic radiator valves (TRVs) for local control.
 - Pipe coil

A direct-electric downflow heater provides heating within the Chapel (0090).

The equipment nameplate of the surveyed gas-fired heating plant is shown below.

Figure 5 Existing Gas-fired Heating Plant: Anytown Office



S/N: 3730 – 817 – 368589 – 7738100236

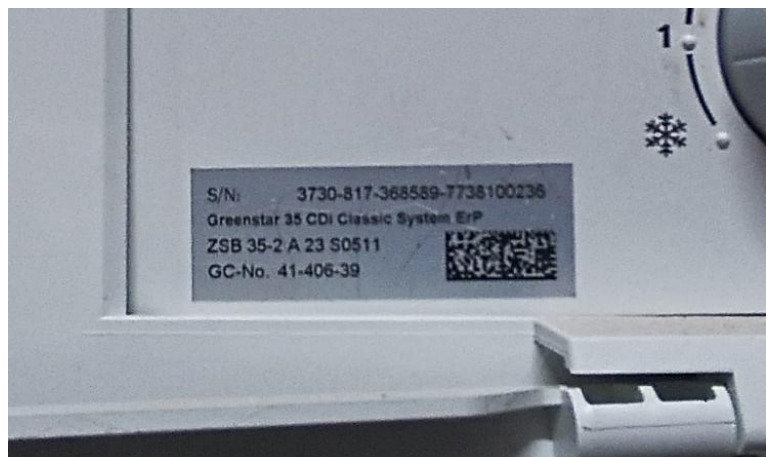


Figure 6 Existing Heating Plant Schematic: Anytown Office

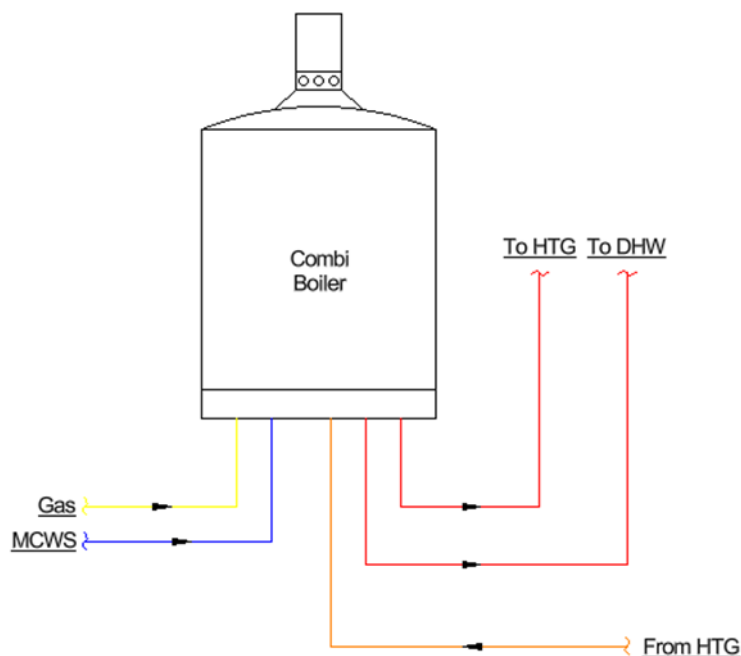


Figure 7 Existing Gas-fired Heating Plant: Anytown Crematorium



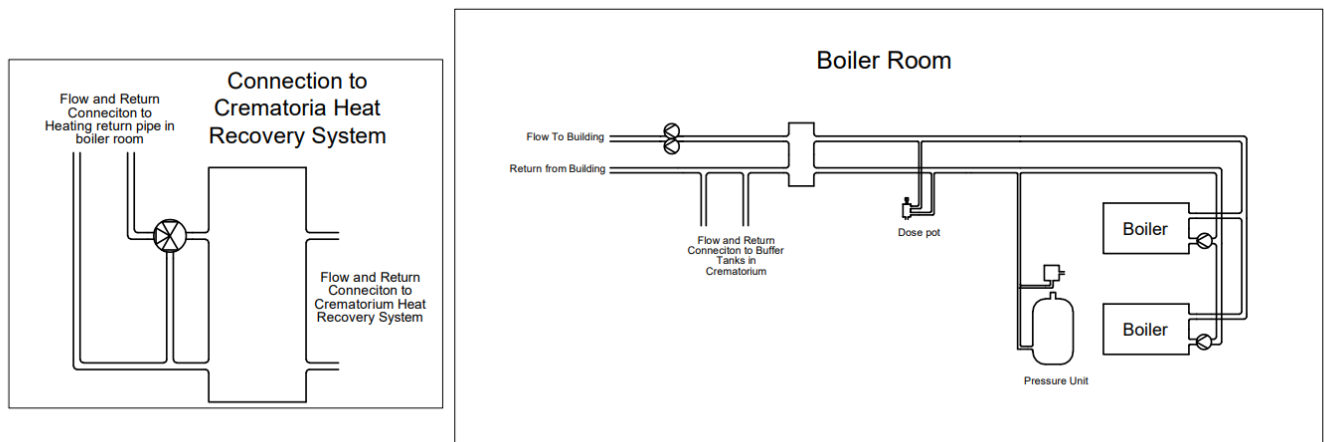
Appliance	BOILER PUREWELL VARHEAT P/96C NO GB		
Job No	73126113-1	Boiler SN	PV9E181GB-AEQ00162
Order No	PO120222	Job Type	HCOM
Visit Date	12/10/2018		
Engineer	PHIL MCKEOWN	GSN	4141022

Boiler 1 S/N: PV9E181GB – AEQ00162

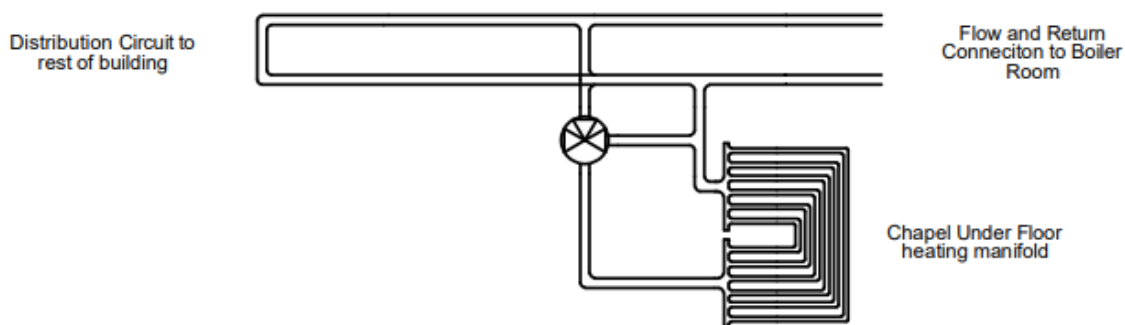
Appliance	BOILER PUREWELL VARHEAT P/96C NO GB		
Job No	73126113-1	Boiler SN	PV9E181GB-AEQ00163
Order No	PO120222	Job Type	HCOM
Visit Date	12/10/2018		
Engineer	PHIL MCKEOWN	GSN	4141022

Boiler 2 S/N: PV9E181GB – AEQ00163

Figure 8 Existing Heating Plant Schematic: Anytown Crematorium



Main aspects of heat distribution system



The main plant room contains uninsulated pipework and fittings, which contribute to heat losses within the heating system. It is recommended that appropriate thermal insulation be installed to minimise these losses and improve overall system efficiency, particularly if plant replacement is not planned in the near term.

Additionally, it is advisable to insulate the heating distribution pipework within the building to minimise uncontrolled heat losses, especially where the pipework is not scheduled for replacement in the near term or functions as the primary heat emitter in occupied spaces.

2.4.2 Controls

2.4.2.1 Anytown Crematorium

The heating controls serving the Crematorium and Anytown Office are reported to be managed remotely by the Council. The Council has advised that the normal heating setpoint for both buildings is 21°C.

The reported heating schedules are as follows:

Crematorium

- Sunday: 08:00–15:30
- Monday to Friday: 08:00–17:00
- Saturday: no regular heating schedule reported

Anytown Office

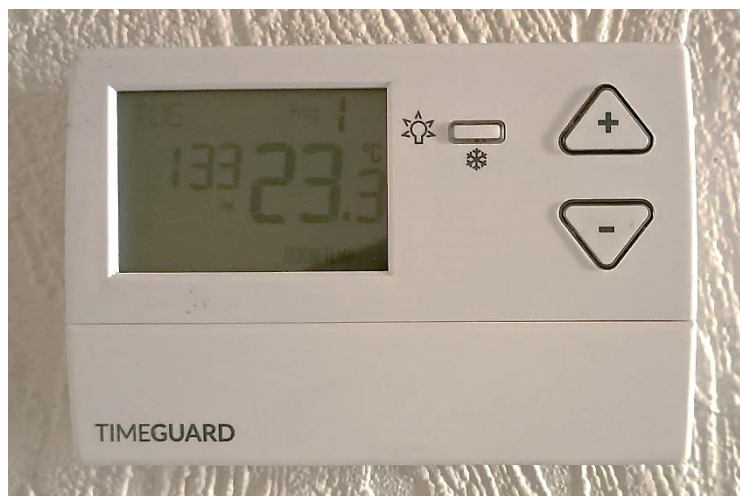
- Monday to Friday: 08:00–17:00
- Saturday and Sunday: no regular heating schedule reported

The Council has advised that site staff may have access to local office heating controls, which could explain some out-of-hours operation.

2.4.2.2 Anytown Office

The building's heating appears to be controlled by a wall-mounted Timeguard (Model: TRT035N) 7-day programmable room thermostat providing timed and temperature-based control of the LPHW heating system. The controller allows scheduling, set-point adjustment, frost protection and optimum start control (where supported).

Figure 9 Heating Controls – Anytown Office



Location: Corridor (0060)

It is recommended that the building's heating operation is aligned with verified occupancy periods to minimise unnecessary energy consumption. During unoccupied periods, the system should adopt an appropriate setback temperature rather than switching the heating off entirely.

A setback temperature, typically within the range of 12–16°C, helps maintain a stable background temperature, reduces peak heat-up times, and offers protection to the building fabric. The appropriateness of a full setback, however, depends on the building's construction, insulation levels, thermal mass, and the heating system's ability to restore comfort temperatures before occupancy. In buildings with low insulation, lightweight construction, or limited heating capacity, a more moderate setback may be required to avoid long warm-up periods or elevated reheat energy demand.

Frost protection (typically around 5°C) should operate independently of setback control and act solely as a safeguard against freezing of pipework and building components, rather than serving as an alternative to maintaining a background temperature.

NOTE: Thermostat setpoints may not represent true room temperatures due to sensor location, thermostat calibration, radiator control behaviour, and zoning configurations.

2.5 Kitchen

The various kitchens/kitchenettes contained direct-electric equipment; no gas-fired cooking is present at the site.

2.6 Incoming Gas Supplies

Table 4 Installed Gas Meters

Area served	Meter Number	S/N	Main/Sub	MPRN	Location	End-Use
Anytown Office	E016K0470817D6	002535938403	Main	51537203	Boiler Room (0180)	Space heating
Anytown Crematorium	M0250E003114R0	77002076	Main	51536908	Meter Room (0330)	Cremators & Space heating (Boilers & Heat Recovery Buffer Vessels)
Anytown Crematorium	M025K0024807D6	23132215	Sub		Basement Level	Space heating (Boilers)

The Council has provided half-hourly consumption data (kWh) for the 2 N° main meters covering most of 2025, with gaps in the dataset. Additionally, submeter data by way of meter readings has been provided for the space heating boilers covering a period of approximately 685 days between 06/12/2023 to 21/10/2025.

Gaps in the half-hourly data have been filled using the median data which is robust to outliers and accounts for variations in day of the week and seasonality.

2.7 Incoming Electrical Supplies

Table 5 Installed Electricity Meters

Area served	Meter Number	MPAN	Supply Type	Mains Incomer Rating (A)	Location	Maximum Demand	MIC
Anytown (Whole Site)	E13ML01766	2326211889010	3-Phase	400	Meter House	42.8 kVA (40.4 kW)	47 kVA

NOTE: The rating of the mains incomer, expressed in amperes, is based on an Electrical Installation Condition Report (EICR) dated 12/09/2025. The site's Maximum Import Capacity (MIC) was obtained from an electricity invoice dated 13 December 2025. The mains incomer rating and MIC serve as the basis for assessing whether an upgrade to the electrical infrastructure may be required (refer to **Section 0**). Meanwhile, the maximum demand was obtained by cycling through the meter data during the survey.

The MIC represents the contractual limit on the amount of electricity the site may draw from the grid without incurring excess-capacity charges. In contrast, the maximum demand reflects the highest level of electrical load recorded over a defined measurement period.

The Council has supplied half-hourly electricity consumption data for MPAN 2326211889010, covering the period from January 2024 and December 2025.

Analysis of the half-hourly dataset indicates that the highest recorded demand between January 2024 and December 2025 was 41.9 kW, occurring in December 2024.

2.8 Sustainable Technologies

A 21.6 kWp solar photovoltaic (PV) system was installed on the pitched roof of the Crematorium in June 2018. A solar edge inverter and generation meter are located within the roof void above the Crematory (0030) area.

The Council is advised to investigate whether the existing PV benefits from Feed-in Tariff (FIT) payments.

3 Energy Efficiency and Decarbonisation Proposals

3.1 Options Appraisal

3.1.1 Solar Thermal

A solar thermal system installed on the roof could provide renewable domestic hot water (DHW) generation. However, a detailed assessment of the current DHW consumption profile is essential to ensure proper system sizing. Understanding the actual usage patterns, including peak demand times and overall consumption, is crucial to avoid operational difficulties and efficiency losses that may arise from oversizing the system.

Currently, the DHW requirements on-site are met by decentralised direct-electric point-of-use (POU) water heaters. If these are powered by a renewable electricity source, they can be considered decarbonised. However, if powered by the grid, indirect carbon emissions would still apply depending on the carbon intensity of the electricity mix.

Introducing a solar thermal system would likely necessitate a shift to a centralised DHW system, which would also require additional distribution infrastructure.

In the UK, installing solar photovoltaic (PV) systems generally offers a better return on investment due to their ability to generate electricity for direct consumption, offset electricity utility bills, and earn revenue through Smart Export Guarantee (SEG) payments. In comparison, solar thermal systems primarily provide renewable DHW, with no direct revenue opportunities and a more limited scope for cost recovery, making them less economically attractive in many cases. Thus, while solar thermal may provide benefits in certain circumstances, it should be carefully evaluated against alternative options such as solar PV, which may offer more significant long-term financial returns.

3.1.2 Solar Photovoltaics (PV)

The site is currently served by a single electrical mains incomer, with an existing solar PV system installed on the Crematorium's south-facing roof slopes. While the site may benefit from additional PV capacity, a thorough review of the existing solar PV generation data, including both on-site usage and exported electricity, is recommended to assess the cost-benefit of expanding the system.

As the existing solar PV system was installed in 2018, it is likely still eligible for Feed-in Tariff (FIT) payments, which were closed to new applicants in 2019. However, expanding the system under the same electricity meter could void these FIT payments. Since the FIT scheme is no longer available for new installations, the site may be eligible for the Smart Export Guarantee (SEG) payments, which reward the export of electricity back to the grid.

To make an informed decision, it is advisable to review the existing solar PV generation data to understand system performance, including both on-site consumption and exported electricity. A detailed financial analysis should also consider the potential loss of FIT payments, the financial benefits of SEG payments, and the impact of system degradation over time. Additionally, assessing the cost of potential system expansion, including infrastructure upgrades and installation costs, will help determine the most cost-effective solution.

Given the existing grid connection, any system expansion would need to consider grid compatibility, which may require upgraded or additional smart inverters to ensure that the new PV system integrates effectively with the electrical infrastructure.

3.1.3 Ground Source Heat Pumps

A preliminary review suggests that there may be sufficient spatial allowance on-site for a GSHP array, either through horizontal ground loops or vertical boreholes. However, this option has not been taken forward at this stage due to the extent of intrusive works required and the associated cost, disruption and delivery risk.

A GSHP installation would require significant ground investigation and either trenching or borehole drilling across the site. This could affect landscaped areas, access routes, buried services and potentially sensitive memorial grounds, with associated disruption to site operations, reinstatement costs and stakeholder sensitivities. The works would also require specialist surveys to confirm ground conditions, thermal conductivity, borehole/loop feasibility, environmental constraints and access for drilling or excavation plant.

While GSHP systems can provide high seasonal efficiency, the capital cost is typically higher than air source heat pump or electric boiler alternatives. For this site, the existing cremator heat recovery system is expected to reduce the residual space heating demand once reinstated, which weakens the financial case for a high-capital-cost ground array. The additional efficiency benefit of a GSHP is therefore unlikely to justify the increased cost, complexity and disruption when compared with other lower-carbon heating solutions.

On this basis, GSHP has been discounted from further appraisal. The option could be reconsidered only if future surveys identify a clear, low-disruption ground array route and if the site's residual heat demand is shown to be sufficiently high to justify the additional capital investment.

3.1.4 Heat Network Connection

A review of available public information has not identified an existing operational district heat network in the immediate vicinity of Anytown Crematorium. The main identified heat network activity in Anytown relates to Anytown town centre, rather than Anytown Crematorium. Anytown's Local Plan previously identified an opportunity for a district heating scheme in Anytown, with technical work undertaken with support from the Government's Heat Network Delivery Unit. The plan also requires larger developments to consider connection to existing or future district heat networks where technically viable.

The Government's heat network project pipeline includes a Anytown town centre feasibility-stage project sponsored by Anytown Metropolitan Borough Council. The proposed network was designed around viable Council-owned buildings in the town centre, including the Town Hall, Anytown development site and Anytown Centre, with some private-sector consumers also considered. However, the project information notes that the financial case identified barriers to delivery, with deployment costs and available grants not sufficient to return a positive internal rate of return. The work is currently paused pending changes in market conditions.

More recent Anytown Local Area Energy Planning work has identified five indicative district heating zones. The A zone is considered to have potential because of the river as a possible low-carbon heat source, nearby industrial buildings that could act as anchor loads or waste heat sources, and a high proportion of solid stone properties that may be harder to decarbonise individually. However, these zones are explicitly described as indicative only and would require further detailed feasibility and linear heat demand density analysis before they could form the basis of a deliverable heat network.

On this basis, connection to an existing heat network has been discounted as a current decarbonisation option for Anytown Crematorium. While A has been identified as a potential future heat network zone, there is no evidence that an operational network is available for connection at or near the crematorium at present. In addition, a future low-temperature heat network would primarily be relevant to space heating and domestic hot water loads; it would not directly decarbonise the high-temperature cremation process unless a specialist process heat solution were developed. The Council should continue to monitor the development of the A heat network opportunity and any future Anytown heat network zoning work, but it is not considered a viable near-term pathway for site decarbonisation.

3.1.5 Anytown Office: Air Source Heat Pump (Air-to-Air)

An air-to-air air source heat pump (ASHP) could be installed to serve selected occupied areas of the Anytown Office. However, this option has been discounted at this stage due to the cellular layout of the building and the practical limitations associated with distributing warm air effectively between multiple rooms.

The Office has a GIA of approximately 156 m² and is divided into several separate spaces. Air-to-air systems are generally most effective where indoor units can serve open-plan areas or clearly defined zones. In this case, providing adequate heating coverage would likely require multiple indoor fan coil units, with associated refrigerant pipework routed through the building. Alternatively, if only the main occupied areas were served, ancillary areas such as toilets, stores and circulation spaces would require supplementary direct-electric heating.

This would reduce the overall effectiveness of the decarbonisation measure, as direct-electric panel heaters operate at a coefficient of performance (COP) of approximately 1.0, compared with the higher seasonal efficiency expected from a heat pump. It may also result in uneven comfort conditions, particularly where doors are closed or where heat transfer between rooms is limited.

An air-to-air system may offer a lower capital cost than an air-to-water ASHP, as it does not require replacement of the existing wet heating distribution system. However, this saving would need to be weighed against the requirement for multiple indoor units, refrigerant pipework routes, condensate drainage, internal making good, acoustic considerations and potential visual impact within occupied spaces. In addition, most air-to-air systems are capable of cooling as well as heating. While this may provide a comfort benefit in summer, it would require appropriate controls to prevent unnecessary cooling energy use.

By comparison, an air-to-water ASHP connected to a new two-pipe radiator distribution system is considered better suited to the building layout. This approach allows individual rooms and ancillary spaces to be served by appropriately sized low-temperature heat emitters, providing more consistent heat distribution and better room-by-room control. It also aligns more closely with the building's existing wet heating strategy, while addressing the limitations of the current single-pipe radiator system.

On this basis, air-to-air ASHPs have not been taken forward as the preferred option for the Anytown Office. The preferred approach is to replace the existing gas-fired boiler with an air-to-water ASHP, alongside replacement of the existing single-pipe distribution system with a two-pipe system and new heat emitters sized for low-temperature operation.

3.1.6 Anytown Office: Heat Connection to Crematorium Heat Recovery

A local heat connection between the Crematorium and the Anytown Office has been considered as a potential option to utilise recovered heat from the cremation process. However, this option has not been taken forward due to the distance between the buildings (see **Figure 1**), the extent of below-ground distribution pipework required, and the relatively small heating demand of the Office.

A heat connection would require a buried flow and return pipework route across the site. This would involve significant groundworks through landscaped areas, access routes and potentially sensitive memorial grounds, with associated disruption, reinstatement costs and operational constraints.

The Office has an estimated peak space heating load of approximately **33 kW** (see **Section 3.2.2**), which is relatively modest. Given this small heat demand, the capital cost of trenching, buried insulated pipework, controls, pumping arrangements, heat interface equipment and making good is unlikely to be proportionate when compared with a dedicated low-carbon heating solution for the Office.

There are also operational limitations. Heat recovered from the cremation process would be intermittent and dependent on cremator operation. During periods with no cremations, or where any associated thermal storage is depleted, the Office would still require an independent heat source to maintain internal comfort conditions and provide frost protection. As a result, a heat connection would not remove the need for standalone heating plant, reducing the value of the investment.

3.2 Building Loads

3.2.1 Anytown Crematorium

The Council provided half-hourly gas consumption data for **MPRN 51536908**, which serves the Crematorium, covering the period from **1 January 2025 to 1 November 2025**. Gas consumption at the Crematorium is understood to serve two principal end uses:

- Cremation process load, via 2 × FTIII gas-fired cremators; and
- Space heating, via 2 × Hamworthy Purewell VariHeat gas-fired boilers.

Table 7 Monthly Peak Gas Consumption and HDD Data: Office

Month	Peak (kWh) [30-min]	Peak (kWh) [1-hour]	HDD 15.5°C
1	16	32	399.3
2	16	32	322.6
3	17	33	271.9
4	16	31	192.4
5	16	32	131
6	15	30	49.2
7	14	29	22.6
8	15	29	28.7
9	15	30	96.7
10	15	31	163.4
11	16	31	254.3
12	16	31	292.3

Because the gas supply is understood to serve space heating only, no allowance has been required to separate process or other baseloads from the metered gas profile. The observed peak heating demand can therefore be taken directly from the gas data, subject to the usual limitations associated with using historical consumption data rather than a full heat loss calculation.

The highest observed rolling 1-hour gas consumption was approximately **33 kWh/h**, equivalent to **33 kW**, which occurred in **March 2025**. This is only marginally higher than the equivalent **32 kW** peak observed in **January 2025**, which was the coldest month in the year based on HDD data. On this basis, the Office's preliminary peak space heating load is estimated to be **33 kW** for appraisal purposes.

It should also be noted that appreciable gas consumption is evident during warmer months and on some weekend periods. While this does not materially affect the preliminary appraisal load, it does suggest that there may be an opportunity to reduce gas consumption through improved control settings and operating schedules.

Assumptions

- The gas supply serves space heating only.
- The metered data is representative of typical building operation.
- No significant unidentified gas loads are present.
- The observed peak demand is reasonably representative of the building's true peak heat requirement.

3.2.3 Heating Plant Loads

The table below shows the estimated space heating loads for the current building fabric and is based on the Council-provided half-hourly gas data. Additionally, the table includes the existing heating plant capacity for reference.

The estimates are based on metered gas input rather than useful heat output. Boiler efficiencies have not been deducted at this stage, meaning the resulting figures are conservative for preliminary low-carbon heating system sizing.

Table 8 Heating Loads

Location	GIA m ²	Installed Boiler Capacity kW W/m ²		Space Heating Load	
				Existing	
				kW	W/m ²
Anytown Crematorium	925.01	172.6	187	96	104
Anytown Office	156.16	34.0	218	33.4	214
Total		206.6		129.2	

Oversizing heat-generating equipment is a common issue in building services design and often results in excessive on/off cycling, reduced seasonal efficiencies, and increased operational costs. This issue is particularly significant for low-carbon technologies such as heat pumps, which operate most efficiently under steady-state conditions and can experience a substantial drop in performance when subject to frequent cycling.

Final plant selection should be confirmed during detailed design through detailed thermal modelling. This should account for the building envelope, internal comfort set-points, occupancy patterns, ventilation rates, and local climatic conditions. Robust modelling will confirm the building's peak and part heat loads and support the selection of an appropriately sized heating system, maximising performance, energy efficiency, and occupant comfort.

Where practicable, review of boiler operating data and temporary sub-metering or plant-level monitoring should also be carried out.

3.3 Cremator Decarbonisation

A range of decarbonisation pathways has been considered for the cremation process (see **Appendix A**). Under the current English regulatory framework, gas-fired, LPG-fired and electric cremators are viable permitted cremation technologies subject to compliance with PG5/2(25) and the site's environmental permit. Alkaline hydrolysis is not currently regulated as cremation in England and Wales and has therefore been treated as a future funerary method rather than a current cremator replacement option.

Hydrogen-fired cremation is technically promising but remains a future option due to fuel supply, cost, safety and infrastructure constraints. Biomethane or green gas certificates may be useful as an interim procurement measure but should be reported transparently as a market-based accounting mechanism rather than a physical change to the cremation process.

For new or end-of-life cremator replacement, electric or hybrid-electric cremators should be prioritised for detailed feasibility because they offer the clearest long-term route away from fossil fuel combustion and are now recognised within the UK crematoria guidance.

Appendix A also highlights some case studies where electric cremators have been implemented.

Table 9 Cremator Decarbonisation Technology Hierarchy

Option	Current status for England	Recommendation
Operational optimisation, metering and scheduling	Fully viable now	Include as no-regret measure

Heat recovery	Fully viable where there is a useful heat sink	Repair existing heat recovery system
Electric cremators	Viable and increasingly mainstream	Prioritise for end-of-life replacement feasibility
Hybrid gas/electric cremators	Viable transitional option	Consider where full electrification risk is high
BioLPG	Viable but supply/storage dependent	Consider as interim retrofit option
Biomethane / green gas certificates	Viable as procurement/accounting route	Use only with clear carbon-accounting caveats
Hydrogen	Future option	Do not rely on for current decarbonisation
Microwave cremation	Emerging / insufficient evidence	Watching brief only
Alkaline hydrolysis / water cremation	Not currently regulated as cremation in England and Wales	Future option only

3.3.1 BioLPG

The Crematorium is served by two Facultatieve Technologies FTIII natural-gas-fired cremators installed in December 2013 and January 2014.

A design life of 25 years has been assumed for new cremators, consistent with typical UK local-authority practice and service-contract durations². Manufacturers do not generally publish a fixed design life³, and actual life will depend on annual cremation load, maintenance regime, refractory relining strategy and any major upgrades (e.g. abatement retrofits). The existing cremators are therefore presumed to remain serviceable until 2039.

As the units are not currently at end-of-life, and unless there are condition issues, full replacement with electric or hybrid-electric cremators solely for decarbonisation would represent a major capital intervention and would require manufacturer-led feasibility, DNO capacity assessment, structural review, layout assessment and operational downtime planning. Electric and hybrid-electric cremators are therefore retained as long-term replacement options but have not been selected as the preferred immediate retrofit pathway.

BioLPG has been selected for detailed appraisal as a transitional decarbonisation option because it allows the existing combustion-based cremation process to be retained while reducing fossil-fuel dependence, subject to confirmed supply and certification. However, the existing cremators are natural-gas-fired and BioLPG is only a drop-in replacement for LPG-compatible equipment⁴. Conversion to BioLPG is therefore subject to confirmation from

² Sheffield's IFZW servicing contract (September 2024) "for the remainder of the cremators' active lifespan (...up to 16 years)" for 2011-installed units. [Decision - Cremator Servicing Contract Approval | Sheffield City Council](#)

³ FT describes FT III as having an average lifespan exceeding 20 years, although refractory and maintenance cycles matter significantly. [Facultatieve Technologies | Leading with Integrity, Innovating with Purpose, Prioritising Sustainability](#)

⁴ Calor states that BioLPG is chemically identical to LPG and compatible with LPG-fuelled equipment. [calor-manufacturing brochure web_june24.pdf](#)

Facultatieve Technologies regarding burner compatibility, gas train modifications, controls, flame detection, commissioning requirements and emissions compliance. The option is also subject to LPG tank siting, tanker access, safety separation distances, DSEAR/fire-risk assessment, planning/permitting review and confirmation of the contracted BioLPG blend or certificate basis.

On this basis, BioLPG is considered a defensible interim decarbonisation pathway, while electric and hybrid-electric cremators should be reassessed at the next major refurbishment or cremator replacement point.

Based on the estimated annual BioLPG demand of 137,913 litres/year, the proposed storage arrangement is 3 × 8,000 litre above-ground BioLPG tanks, providing a total nominal storage capacity of 24,000 litres.

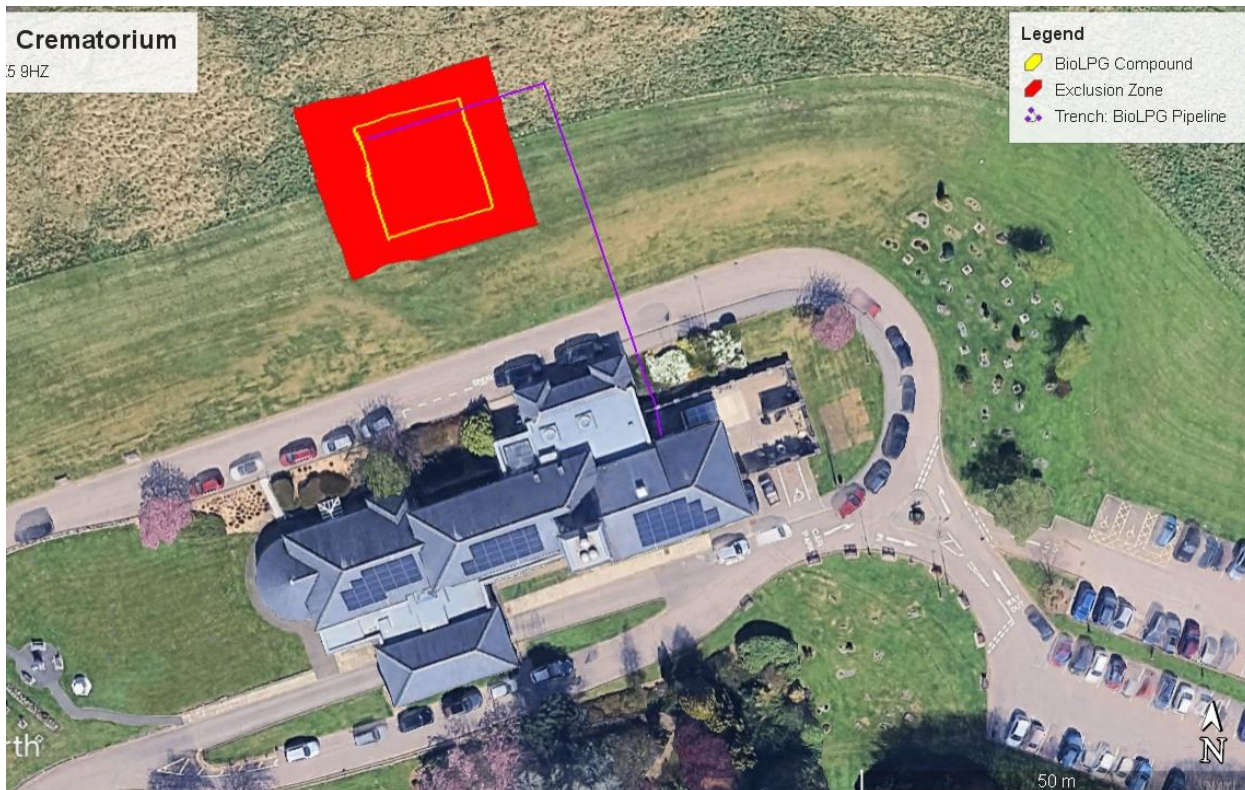
LPG tanks are not filled to their full nominal capacity. Assuming a typical maximum fill level of 87%, the proposed arrangement would provide approximately 20,880 litres of stored BioLPG at full delivery. Allowing for a normal re-order level of 30%, the usable volume would be approximately 13,680 litres, equivalent to around 5.2 weeks of average demand. If the tanks are operated down to a lower reserve level of 20%, the usable volume increases to approximately 16,080 litres, equivalent to around 6.1 weeks of average demand.

This level of storage is considered appropriate for a site with a relatively steady cremation schedule, subject to confirmation of delivery frequency, supplier availability and telemetry-based top-up arrangements. The use of three smaller tanks also provides a higher combined vapour off-take capacity than a single vessel of equivalent nominal storage volume. This is important because the site has two gas-fired cremators, with a potential combined auxiliary heat input of approximately 1,250 kW. Final confirmation of the available vapour off-take rate, and whether any supplementary vapourisation equipment is required, should be provided by the LPG supplier based on tank arrangement, ambient design conditions, minimum tank level and cremator firing profile.

The tank installation should be developed by a specialist LPG supplier. For preliminary planning, the installation should allow for separation distances of approximately 7.5m from buildings, fixed sources of ignition and open boundaries, with 1m spacing between tanks. These distances are indicative only and must be confirmed during detailed design in accordance with the relevant LPG codes of practice, supplier requirements, DSEAR assessment and fire-risk review.

The tank compound itself is not the same as the wider separation or exclusion zone. For example, the fenced compound may be in the order of 12m × 14m, but buildings, boundaries, ignition sources, drains, parked vehicles, EV charging points, air intakes, overhanging trees and other hazards must still be kept outside the required separation distances. The final arrangement must also provide suitable tanker access, a safe hose route, line of sight between the tanker and tank fill points, vehicle impact protection, emergency isolation, ventilation, security fencing, signage and firefighting access.

Figure 12 Location of BioLPG Tanks and Wider Exclusion Zone



3.3.1.1 Budget Cost Estimate

The budget estimate for the proposed BioLPG cremator conversion is approximately **£253,000**. This should be treated as an early-stage budget allowance only, as final costs will depend on the LPG supplier design, tank location, pipework route, civil works, OEM conversion requirements and statutory approvals.

Table 10 BioLPG Cremation

Item	Description	Cost
1	Preliminaries	£6,000
2	LPG supplier site survey, DSEAR/fire-risk input and statutory review	£10,000
	Reinforced concrete base for 3 × 8,000 L tanks	£28,000
	External ventilated security compound, gates, signage and impact protection	£20,000
3	Installation of LPG tanks, manifold, telemetry, pressure regulation and emergency isolation	£38,000
	Vapourisation / pressure regulation allowance	£12,000
	Trenching, backfilling and resurfacing	£19,000

	External pipework and connection to cremator plantroom	£14,000
	Cremator OEM burner/gas train conversion and commissioning allowance	£45,000
4	Contingency	£29,000
5	Works Budget Total	£221,000
6	Design Fees	£20,000
	Project Management Fees	£12,000
7	Project Budget Total	£253,000
8	Tank rental / standing charge ¹	

¹Supplier quote required; allow £1,000–£2,500/year provisionally

The above cost allowance includes both the external BioLPG storage infrastructure and an allowance for cremator conversion works. The cremator conversion cost is a key uncertainty and should be confirmed with the cremator OEM. If the OEM confirms that only minor burner and gas train modifications are required, the final cost may reduce. Conversely, costs may increase if additional vapourisation equipment, extended pipework routes, planning constraints, structural works, fire safety measures or permit variations are required.

3.3.1.2 Fuel Supply

Calor states that Futuria Liquid Gas / BioLPG is available in limited quantities, with suitable businesses receiving allocations depending on requirement and at a cost premium. AvantiGas also presents BioLPG as a blendable, mass-balanced solution, with blend options from low percentages up to 100%.

Commercial BioLPG may be supplied as a blend or on a mass-balance/certificate basis, rather than as physically segregated 100% biopropane⁵.

Tank ownership, maintenance and rental arrangements vary by supplier. The storage vessels may be provided on a rental basis, with standing charges applied separately to the capital installation cost. Supplier quotations should therefore confirm the tank rental charge, minimum fuel order quantities, delivery costs, telemetry provision, maintenance responsibility and BioLPG blend/certification basis.

Heating Plant Replacement

3.3.2 Cremator Heat Recovery

The Crematorium operates a bivalent heating strategy, with heat recovered from the cremation process intended to act as the lead heat source and gas-fired boilers providing supplementary/back-up heating.

During normal operation, high-temperature exhaust gases from the cremators pass through the ThermTech heat recovery system. Recovered heat is stored in 3 × Cordivari Puffer VC 3000 buffer vessels, providing approximately

⁵ BioLPG is commonly described as **biopropane** or renewable LPG. AvantiGas explicitly states that BioLPG is also known as BioPropane. www.avantigas.com

9,000 litres of thermal storage. Where recovered heat exceeds building demand and available storage capacity, excess heat is rejected via the Transtherm heat dump to prevent system overheating.

At the time of the survey, site staff reported that the heat recovery system was not operating as intended. Visual observations identified blackened water around the buffer vessels and LPHW pumps in the Fan Room (0320) and Meter Room (0330), which may indicate leakage, pressure loss, or contamination within the heating circuit. If the system has experienced low pressure or flow failure, it is possible that pumps or controls have locked out to protect the plant.

With the heat recovery system unavailable or operating below design intent, useful recovered heat may not be effectively transferred to the building heating system. This could result in a greater proportion of available heat being rejected via the heat dump, while the gas-fired boilers provide space heating. During the survey, Boiler No. 2 was observed firing at approximately 69°C, indicating that the back-up boiler plant was serving the building heat demand.

It is recommended that a mechanical heating engineer investigates the heat recovery system, including the LPHW circuit condition, system pressure, pump operation, controls status, buffer vessel operation and heat dump control sequence. Subject to the findings, remedial works may include leak repair, system flushing or water treatment, re-pressurisation, pump/control reset and recommissioning. Restoring the heat recovery system should reduce boiler operation during cremation hours and may allow stored recovered heat to contribute to space heating outside cremator operating periods.

3.3.3 Anytown Crematorium: ASHP

An ASHP was considered as a low-carbon replacement for the Crematorium's gas-fired space heating boilers. However, following review of the site operation and the existing cremator heat recovery system, an electric boiler is considered the more appropriate option for this building.

The Crematorium already has an existing heat recovery system. Once repaired and recommissioned, this system is expected to provide a significant proportion of the building's space heating demand during periods when cremations are taking place. As a result, the residual heat demand to be met by a supplementary boiler is expected to be relatively low and intermittent. This materially weakens the case for installing an ASHP, as heat pumps are most cost-effective where they serve a consistent and meaningful annual heat load.

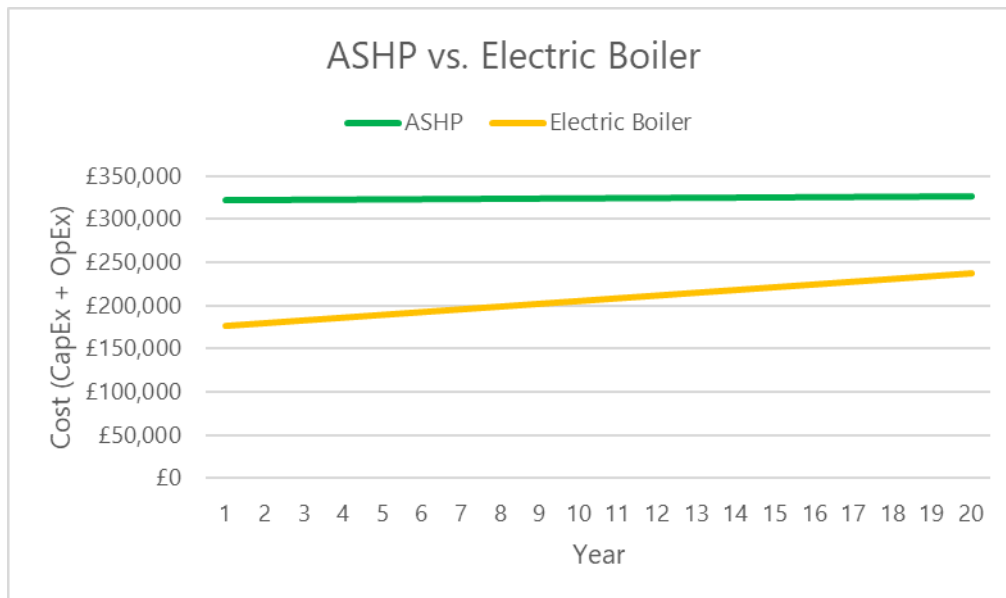
Although an ASHP would operate more efficiently than an electric boiler, the benefit of this higher efficiency is limited where the annual operating hours and residual heat demand are reduced by the restored heat recovery system. In this context, the higher capital cost of the ASHP is not sufficiently offset by operational energy savings over the appraisal period. The ASHP option would also introduce additional plant complexity, including external unit siting, acoustic considerations, refrigerant systems, hydraulic integration, controls coordination and maintenance requirements.

By comparison, an electric boiler offers a simpler and lower-capital-cost solution for meeting the remaining space heating demand. It is well suited to a supplementary or back-up heating role, particularly where the primary heat contribution is expected to come from recovered cremator heat. While an electric boiler has a lower efficiency than an ASHP, its lower capital cost and reduced complexity make it more appropriate where annual run hours are expected to be limited.

A 20-year lifecycle comparison has been undertaken, based on current electricity costs and modelled energy consumption, with no allowance for future energy price escalation or equipment degradation. This indicates that

the electric boiler remains lower cost than the ASHP. The ASHP's lower annual running cost is insufficient to recover its higher initial capital investment.

Figure 13 20-Year Lifecycle Cost Comparison: ASHP vs Electric Boiler



On this basis, the ASHP has been discounted for the Crematorium space heating system. The preferred approach is to repair and recommission the existing cremator heat recovery system and install an electric boiler to provide supplementary and back-up heat when recovered heat is unavailable or insufficient.

This recommendation should be reviewed if the cremator heat recovery system cannot be restored, if the building heat demand materially increases, or if future electricity tariffs significantly improve the economics of heat pump operation.

Figure 14 Proposed Location of ASHP System (Green Fill): Anytown Crematorium



3.3.3.1 Budget Cost Estimate

The heating decarbonisation proposal is based on 2 N° Daikin EWYT064CZPBA2 (Refrigerant: R-32), with a total heating capacity of 123.8 kW. The units operating at a seasonal coefficient of performance (SCOP) of 2.87 will generate LPHW at around 55°C for space heating.

Table 11 ASHP System Cost: Anytown Crematorium

Item	Description	Cost
1	Preliminaries	£4,900
2	External Compound and Plant Room(s)	
	Construction of External Compound	£19,100
	Air Source Heat Pump(s) (ASHP)	£54,200
	Acoustic Attenuation	£9,300
	ASHP Buffer Vessel(s)	£3,900
	Heating Secondary Pump(s)	£3,000
	Pressurisation Unit(s) & Expansion Vessel(s)	£2,300
	Plant Room Pipework, Valves, & Ancillaries	£12,400
	Automatic Controls, Control Panel & BMS	£16,000
	Electrical Works	£9,300
	Pre-insulated Pipework [External Compound to Plant Room(s)]	£6,100

	Glycol Antifreeze	£1,700
	Civil Works	£13,000
3	Heating Distribution	
	Removal of Existing Building Plant & Equipment	£3,800
	Heat Emitters (Radiators & Pipe Coil)	£46,700
	Distribution Pipework	£27,800
	Builders' Work	£6,500
4	Electrical Infrastructure Upgrade	£5,000
5	Testing & Commissioning	£500
	Demonstration & Training	£500
	Record Information	£500
6	Contingency Sum	£37,000
7	Works Budget Total	£283,500
8	Design Fees	£25,600
	Project Management Fees	£12,800
9	Project Budget Total	£321,900

3.3.4 Anytown Crematorium: Electric Boiler

Anytown Crematorium is currently served by a single-pipe LPHW heating distribution system. As part of the proposed decarbonisation works, the existing gas-fired boiler provision would be replaced with 1 × Advenco Ardent S100 electric boiler, generating LPHW for space heating at approximately 55°C.

Figure 15 Single-pipe Heating System: Anytown Crematorium



The existing single-pipe distribution system is not considered suitable for retention as part of the heating system retrofit without further investigation. Single-pipe systems are typically less effective at lower flow temperatures, as water temperature progressively reduces around the circuit. This can result in uneven heat distribution, poor controllability and reduced comfort, particularly in areas located further along the heating circuit.

It is therefore recommended that the existing single-pipe radiator distribution system is replaced with a two-pipe system, with new heat emitters sized for operation at the proposed lower flow temperature. This would allow each radiator to receive a more consistent flow temperature, improve hydraulic balancing, and provide better room-by-room control.

The existing underfloor heating circuit serving the Chapel may be suitable for retention, subject to condition survey and confirmation of its design temperatures, flow rates and hydraulic arrangement. If retained, it should be reviewed and retrofitted with an appropriate manifold, controls and mixing arrangement where required.

Final plant, pipework and heat emitter sizing should be confirmed during detailed design through room-by-room heat loss calculations, radiator output selection at the proposed flow and return temperatures, and confirmation of pipe routes, zoning and controls. The control strategy should also be coordinated with the cremator heat recovery system to ensure recovered heat is prioritised where available, with the electric boiler operating as supplementary/back-up heat.

3.3.4.1 Budget Cost Estimate

The budgetary estimate for implementing the proposed electric boiler system is approximately **£173,300** and is broken down as:

Table 12 *Electric Boiler Cost: Anytown Crematorium*

Item	Description	Cost
1	Preliminaries	£2,800
2	Plant Room(s)	
	Removal of Existing Building Plant & Equipment	£3,800
	Electric Boiler(s)	£11,000
	Heating Primary Pump(s)	£2,700
	Heating Secondary Pump(s)	£3,000
	Pressurisation Unit(s) & Expansion Vessel(s)	£2,100
	Plant Room Pipework, Valves, & Ancillaries	£5,000
	Automatic Controls, Control Panel & BMS	£9,600
	Electrical Works	£9,300
	Glycol Antifreeze	£800
	Civil Works	£1,100
3	Heating Distribution	
	Heat Emitters (Radiators)	£46,700
	Distribution Pipework	£27,800
	Builders' Work	£6,500
4	Electrical Infrastructure Upgrade	£5,000
5	Testing & Commissioning	£500
	Demonstration & Training	£500
	Record Information	£500
6	Contingency Sum	£13,900
7	Works Budget Total	£152,600
8	Design Fees	£13,800
	Project Management Fees	£6,900
9	Project Budget Total	£173,300

The proposed electric boiler system lacks N + 1 system redundancy, meaning there is no additional heat-generating set for backup heating in case of system failure.

The cost estimate includes new pipework and heat emitters sized for the proposed low-temperature heating system. The existing Chapel underfloor heating circuit has been assumed to be retained and retrofitted with a new manifold and associated controls where required.

3.3.5 Anytown Office: ASHP (Air-to-Water)

The installed gas-fired heating plant and equipment at the site are proposed to be decommissioned, disconnected and removed from the site. In its place, we propose installing an air source heat pump (ASHP) system to produce low-pressure hot water (LPHW) to meet the building's heating requirements.

For optimal performance, ASHPs require unrestricted airflow around the unit. Consequently, the current enclosed plant room is not ideal for ASHP installation. Therefore, we recommend mounting the ASHP system externally on a level surface and providing a secure perimeter for access control and protection against vandalism.

A noise impact assessment would be undertaken during the detailed design stage. If required, the ASHP system will be installed behind an acoustic barrier for noise attenuation. This barrier, typically made of sound-absorbing materials, is expected to significantly lower the noise level and limit the sound exposure in the surrounding environment.

The final location of the proposed installation will be determined during the detailed design stage, considering existing infrastructure, such as mains water supply and incoming electrical supply, spatial requirements of the installation, and optimisation of associated costs of distribution pipework to the plant room.

The proposed location is depicted in **Figure 16**, as it is presumed to offer good airflow, essential for the optimal performance of the ASHP units.

Figure 16 Proposed Location of ASHP System (Green Fill): Anytown Office



The heating decarbonisation proposal is based on 1 N° Daikin EWYT040CZPBA1 (Refrigerant: R-32), with a total heating capacity of 39.01 kW. The unit operating at a seasonal coefficient of performance (SCOP) of 2.95 will generate LPHW at around 55°C for space heating. New pre-insulated primary circuit pipework will extend from the air source heat pump(s) to the plant room, connecting to a heating buffer vessel. The plant room will be outfitted with all necessary ancillary plant room pipework and equipment.

The proposed system will operate at a reduced flow temperature compared with the existing gas-fired boiler and the current emitters may not be adequately sized to deliver the required heat output. Lower flow temperatures reduce emitter capacity, and under-sized radiators could lead to insufficient heating performance, increased run times, or inability to reach design room temperatures.

Given the building is currently served by a single-pipe heating system, it is advised to replace the entire distribution system and heat emitters for a 2-pipe heating system and appropriately sized radiators with TRVs. This would allow for better heat distribution, zoning and temperature control which is crucial for maintaining comfort when running at lower temperatures.

During the detailed design stage, due consideration should be given to usage of the various areas within the building to appropriately define the various heating zones and the required number of space heating zones.

All heating systems will be unvented and new expansion vessels and pressurisation units provided. All ancillary plant room equipment and pipework will be sized and optimised for the new low-carbon heating system.

3.3.5.1 Budget Cost Estimate

The budget estimate for implementing the proposed ASHP system is approximately **£99,300** as follows:

Table 13 ASHP System Cost: Anytown Office

Item	Description	Cost
1	Preliminaries	£1,500
2	External Compound and Plant Room(s)	
	Construction of External Compound	£5,000
	Air Source Heat Pump(s) (ASHP)	£18,800
	Acoustic Attenuation	£6,700
	ASHP Buffer Vessel(s)	£1,700
	Heating Secondary Pump(s)	£3,000
	Pressurisation Unit(s) & Expansion Vessel(s)	£2,100
	Plant Room Pipework, Valves, & Ancillaries	£4,000
	Automatic Controls, Control Panel & BMS	£2,700
	Electrical Works	£1,600
	Pre-insulated Pipework [External Compound to Plant Room(s)]	£1,800
	Glycol Antifreeze	£800
	Civil Works	£3,900
3	Heating Distribution	
	Removal of Existing Building Plant & Equipment	£700
	Heat Emitters (Radiators & Pipe Coil)	£9,400

	Distribution Pipework	£4,700
	Builders' Work	£1,100
4	Electrical Infrastructure Upgrade	£5,000
5	Testing & Commissioning	£500
	Demonstration & Training	£500
	Record Information	£500
6	Contingency Sum	£11,400
7	Works Budget Total	£87,400
8	Design Fees	£7,900
	Project Management Fees	£4,000
9	Project Budget Total	£99,300

The proposed ASHP system lacks N + 1 system redundancy, meaning there is no additional heat-generating set for backup heating in case of system failure.

The cost estimate is based on the installation of new heating distribution and final heat emitters (radiators).

3.3.6 Automatic Controls

Control Equipment

It is advised to install a new Building Management System (BMS) to optimise energy performance and automate control of the heating plant. The BMS will provide time-scheduling, supervisory control, alarms/fault diagnostics, and trend-logging to support data-driven operational decisions.

Core control functions

- **Time schedules** aligned to verified occupancy periods for all heating circuits.
- **Pump run-on** to dissipate residual heat after plant shutdown.
- **Two-stage frost protection:** (1) enable pumps at low internal temperature; (2) enable heat source if temperature falls further.
- **Pressurisation interlock:** shut plant on low pressure and raise alarm/fault indication.
- **Plantroom safety interlocks:** hard-wired trips to shut down plant on fire-alarm signal or emergency stop activation.

Energy-saving strategies

Weather compensation: automatically adjust heating flow-temperature setpoint to outside air temperature to minimise energy use and improve comfort.

Optimum start/stop: learn the building's thermal response and pre-heat/pre-cool only as needed; allow temperature to drift within limits before end of occupancy.

High outside-air lockout: inhibit heating when outdoor temperature exceeds a setpoint (e.g., 18 °C) during occupancy.

Remote monitoring and integration

Remote access via secure network connection for Estates staff to view trends, receive alarms, and adjust settings.

Server/BMS head-end integration for portfolio-level oversight and rapid fault response. (Network configuration and cybersecurity to be coordinated with IT.)

NOTE: Detailed setpoints, time schedules, and control diagrams should be finalised at design stage and verified during commissioning with seasonal performance review.

3.3.7 Electrical Capacity

When incorporating electrically powered low-carbon heating systems in a building, it is crucial to acknowledge the increased electrical load. Thus, evaluating the site's current electrical capacity and determining any additional capacity requirements is essential.

The breakdown of the existing building loads and forecast loads following the implementation of the proposed low-carbon heating solution(s) is presented below.

Table 14 *Electrical Capacity Review*

Supply Capacity	Max Demand Existing ²	LED Replacement Reduction (-)	ASHP Demand: Office Increase (+)	EB Demand: Crematorium Increase (+)	Max Demand Forecast	Resultant Capacity
261	42	-4	25	100	63	98

NOTE: All figures are in "kW". To convert to "kVA" the site's power factor (PF) should be applied.

¹ The supply capacity is based on the mains incomer rating from the supplied EICR (see **Section 2.7**).

² The existing maximum demand is based on the supplied half-hourly electricity data (see **Section 2.7**).

The site's existing main electrical incomer is reported to be rated at 400 A. However, the site's Maximum Import Capacity (MIC) is currently capped at 47 kVA, based on the electricity invoice dated 13 December 2025. The MIC represents the agreed import capacity with the electricity supplier/network operator and may not reflect the full physical capacity of the incoming supply or local network.

The current MIC may have been reduced as a cost-saving measure, as the site is charged for agreed capacity at approximately 3.67 p/kVA per month. This would reduce capacity-related charges where the site's historic demand has not required the full available capacity. However, any previous spare capacity should not be assumed to remain available. Increasing the MIC to accommodate the proposed low-carbon heating systems would require engagement with the Distribution Network Operator (DNO) and may trigger network assessment, upgrade costs and programme lead-in time. It is advised that an electrical capacity review be carried out at the detailed design stage following the final equipment selection to ensure that the building's electrical import from the grid does not exceed the MIC and that the existing infrastructure at the site can support the proposed low-carbon heating systems.

Ancillary electrical loads associated with pumps, controls, fans and any associated hydraulic equipment have not been included at this stage and should be confirmed during detailed design.

The cost of an electrical capacity upgrade could vary considerably depending on factors such as available capacity in the area and the scope of required work. The Council is advised to consult with the local DNO and qualified electrical engineers to assess the required works and associated costs for the infrastructure upgrades.

We have allowed a provisional sum of **£10,000** for electrical infrastructure upgrades at the site (split between the Office and the Crematorium). **The electrical infrastructure upgrade work is a high-risk item that affects both the budget and the project timeline.**

Electrically powered low-carbon heat sources such as heat pumps typically contain variable speed drives (VSDs), which could contribute to harmonic disturbances within the electricity network. Where issues persist, it could lead to a decision by the network operator to disconnect the supply to the site until it is rectified.

Therefore, we recommend that a harmonics assessment be carried out at the site in line with EREC G5/5, which would provide evidence of compliance with the harmonics limits set by the network operator. We have also allowed for the cost of harmonic filtration equipment, if required, within the contingency. The applicable cost would be confirmed during the detailed design stage following equipment selection.

3.3.8 Boiler Like-for-Like Replacement

The table below shows a comparable estimate to replace the gas-fired heating plant like-for-like:

Table 15 Gas-fired Like-for-Like Cost: Anytown Crematorium

Item	Cost
Removal of Existing Equipment	£1,000
Main Equipment Including Controls	£18,900
Plinth, Pipework Connections, Insulation	£1,900
Installation	£3,800
Commission	£500
Total	£26,100

Table 16 Gas-fired Like-for-Like Cost: Anytown Office

Item	Cost
Removal of Existing Equipment	£500
Main Equipment Including Controls	£6,300
Plinth, Pipework Connections, Insulation	£700
Installation	£700
Commission	£500
Total	£8,700

The costs account for replacing the gas-fired boilers which currently provide solely space heating within the buildings.

3.4 Lighting Replacement

3.4.1 Lighting Installation

It is recommended to replace all existing fluorescent lighting with more energy efficient LED luminaires. The quantity of fluorescent lighting is shown in **Section 2.3**.

Incorporating lighting control systems with absence detection and daylight dimming features can contribute to additional energy and carbon emission reductions. The extent of these savings could vary, depending on the existing and proposed configurations. For this case, we have assumed a saving of 15%, considering that sensors would be fitted to 10% of the new LED light fixtures. It is important to note that implementing comprehensive lighting control across all areas could necessitate significant rewiring of the lighting power and switch circuits.

The energy savings from implementing LED luminaries have been approximated based on the methodology of replacing the existing light fittings with LED alternatives based on luminance output. However, this is not ideal as it could result in mismatched lux levels compared to recommendations.

Consequently, we strongly recommend conducting a comprehensive lighting design study. This would aim to model and implement lighting levels aligned with recommended guidelines. Such an approach can yield multiple advantages, including potential energy and cost savings, the assurance of appropriate lighting levels, optimal distribution of fixtures and a comprehensive assessment of the retrofit's impact on the environment and users. Additionally, the study can assist in identifying the most suitable LED lights and their optimal installation orientations to maximise benefits and assess any potential limitations or issues related to the existing electrical system.

To optimise visual perception for all users, the lighting design will consider factors such as recommended colour index, lighting levels and avoidance of light spill and glare. Further energy savings could be realised across the entire facility if all utilised spaces are matched to the recommended lux levels with the implementation of lighting controls.

All new lighting would be designed to meet the requirements of the applicable CIBSE Lighting Guide.

3.4.2 Budget Cost Estimate

The budgetary estimate for replacing fluorescent lighting with LED fittings is as follows:

Table 17 *Lighting Replacement Cost*

Item	Description	Cost
1	Prelims	£800
2a	Access for works	£300
2b	Installation	£4,700
2c	Removal and Disposal	£1,300
3a	Lighting	£6,400
3b	Controls	£400
3c	Emergency	£1,600
4a	Record Information	£500
4b	Testing & Commissioning	£1,000
5	Contingency costs	£1,700
6	Works Budget Total	£18,700
7a	Design and Engineering Fee	£1,900
7b	Project Management Fee	£1,000
8	Total Project Costs	£21,600

The cost estimate includes all non-LED luminaires identified during the site survey.

The Chapel (0190) would benefit from a dedicated lighting design to ensure appropriate illuminance, comfort and visual appearance. In plant areas and the Garage, fittings can be replaced with LED equivalents on a reactive basis as existing lamps or fittings fail. Similarly, the fitting within the Office Store (0160) should be replaced as part of routine maintenance.

4 Energy & Carbon Savings

4.1 Energy Consumption

The table below summarises the site's annual energy consumption, based on the average consumption derived from Council-provided half-hourly meter and sub-metering data for the period December 2023 to December 2025. This data has been assumed to represent typical annual energy use at the site and forms the baseline for the energy, cost and carbon savings calculations.

Energy costs have been calculated using site-specific electricity and gas tariff rates taken from invoices provided by the Council. The unit rates used in the appraisal are inclusive of Climate Change Levy (CCL), where applicable, but exclude standing charges, VAT and other fixed or non-consumption-related charges.

It is important to note that higher rates result in increased operational costs and faster payback periods, strengthening the business case for delivering energy efficiency projects.

Carbon emissions have been calculated using the 2025 UK Government emission conversion factors for greenhouse gas (GHG) reporting published by the Department for Energy Security and Net Zero (DESNZ).

Table 18 Building Energy Consumption, Cost and Carbon Emissions

Energy Source	Energy Consumption (kWh)	Unit Rate (p/kWh)	Total Cost (£)	CO ₂ e (tonnes)
Electricity (Whole Site)	96,168	17.74	£17,057	17.0
Gas (Cremators)	994,212	4.71	£46,792	182
Gas (Crematorium Boilers)	53,085	4.71	£2,498	10
Gas (Office)	22,590	4.71	£1,063	4
Total	1,166,055		£67,410	213

A Display Energy Certificate (DEC) is currently the primary indicator of operational energy performance for buildings that are regularly accessed by the public and have a total useful floor area (i.e., GIA) greater than 250 m². The operational rating from the most recent DEC is as follows:

Table 19 DEC Information

	Anytown Crematorium
Source	available DEC
Total Floor Area (m ²)	937.44
Energy rating	G
Score	586

NOTE: Although Anytown Office may be visited by members of the public, it is not expected to require a DEC because its GIA is approximately 156 m², which is below the applicable floor area threshold.

Further clarification is required to ascertain the exact breakdown of energy consumption at the site. Obtaining accurate and comprehensive data regarding both electricity and gas consumption is crucial for monitoring energy usage and assessing the performance of energy efficiency programmes. It is recommended that a submetering programme be implemented to account for all key end-uses in the interim to obtain a comprehensive understanding of usage and benchmarking baseline for future comparisons.

4.2 Energy Savings

The table below details the estimated energy and carbon emission reductions achievable through the proposed energy efficiency measures (EEMs).

Table 20 *Impact of Energy Efficiency Measures on Energy Usage, Cost and Carbon*

Item	Recommendation	Elec Savings kWh/yr	Gas Savings kWh/yr	Annual Saving £	Capital Cost £	Payback Years	Carbon Savings tCO ₂ e/yr
	Anytown Office						
1a	Heating Control Optimisation	-	4,278	£201	Nil	N/A	0.78
1b	ASHP (Space Heating)	-5,427	18,312	-£101	£99,300	N/A	2.39
	Anytown Crematorium						
2	LED Lighting	10,693	-	£1,897	£21,600	11	1.89
3a	Reinstate Cremator Heat Recovery System	-	23,575	£1,110	TBC	TBC	4.31
3b	Electric Boiler (Space Heating)	-25,882	29,511	-£3,202	£173,300	N/A	0.82
4	Cremators (Natural Gas → BioLPG)	-	994,212	-£3,600	£253,000	N/A	182
	Total	-20,616	1,069,887	-£3,695	£547,200		192

An ASHP solution has also been explored for decarbonising heating demand at the Crematorium. The savings from implementing this measure alongside all other EEMs from

Table 20 excluding Item 3b are shown below:

Table 21 *Impact of Alternative Energy Efficiency Measures on Energy Usage, Cost and Carbon*

Item	Alternative Proposal	Elec Savings kWh/yr	Gas Savings kWh/yr	Annual Saving £	Capital Cost £	Payback Years	Carbon Savings tCO ₂ e/yr
	Anytown Crematorium						
3b	ASHP (Space Heating)	-9,018	29,511	-£211	£321,900	N/A	3.80
	Total	-3,752	1,069,887	-£704	£695,800		195

The solutions, systems and equipment identified in this report are intended to demonstrate practical routes for reducing on-site carbon emissions, taking into account the existing installed systems, site operations, physical

constraints and likely financial viability. Final system selection, sizing and specification should be confirmed during the detailed design stage, as alternative technologies, manufacturers or combinations of measures may provide an improved technical or financial outcome once intrusive surveys and design developments are complete.

The projected annual carbon and cost savings are based on the same carbon emission factors and energy tariff rates outlined in **Section 4.1**.

Negative figures represent an increase in energy consumption or annual operating cost. This is particularly relevant where gas-fired systems are replaced with electric alternatives. Although these measures reduce or remove on-site fossil fuel combustion, they may increase annual operating costs under current tariff conditions due to the higher unit cost of electricity relative to gas (approx. 4 times).

The savings are based on the current site operating profile and the metered energy data available at the time of the assessment. Actual savings will vary if occupancy, cremation throughput, operating hours, heating setpoints, control strategies or building use change in future.

The carbon savings associated with conversion from natural gas to BioLPG have been calculated using the UK Government carbon factor for biopropane. However, the actual carbon intensity of BioLPG will depend on the feedstock, production pathway, blend percentage, certification route and supplier allocation method. Supplier-specific lifecycle data and certified fuel documentation should therefore be requested during procurement and used to update the savings calculation where available.

The BioLPG savings shown in the table are based on an assumed transition to 100% biopropane. This represents the potential end-state carbon saving from the measure. **Section 4.3** separately presents the phased emissions position associated with an initial 40% BioLPG / 60% fossil LPG blend, progressing towards 100% BioLPG by 2038. This distinction is important because the near-term carbon saving will be lower where blended BioLPG is supplied.

The cost savings for BioLPG have been calculated using current public-sector LPG pricing, from the GCA/CCS National Fuels framework⁶, with a 22% premium applied for BioLPG. This provides a reasonable appraisal assumption; however, BioLPG pricing remains supplier- and contract-specific, and higher premiums may apply depending on availability, blend percentage, delivery arrangements and certification requirements. Updated supplier quotations should therefore be obtained before proceeding.

No- and low-cost measures should be prioritised before major capital works, as they can deliver early savings.

For Anytown Office, estimated savings from heating control optimisation are based on aligning the heating schedule more closely with the reported occupancy pattern. The half-hourly gas data indicates heating use during periods when the building is understood to be unoccupied, including weekends. The savings estimate therefore assumes that heating is reduced or disabled outside normal occupancy periods during the heating season, while still allowing for appropriate pre-heating, frost protection and protection of the building fabric and contents. Heating operation outside the heating season should also be reviewed and minimised where not required.

For the Crematorium, savings associated with repairing or recommissioning the heat recovery system are based on the period when the cremators are operational, and heat recovery could contribute to the building's space heating demand. Based on the half-hourly gas profile, this typically aligns with operation between approximately 07:00 and 15:30. The estimate is considered conservative because the thermal stores may continue to provide useful heat after cremations cease for the day. The actual saving will depend on cremator operation, external weather conditions,

⁶ [National Fuels 3 - GCA](#)

thermal store performance, heating controls and the extent to which recovered heat can be usefully matched to building heat demand.

The savings associated with the proposed low-carbon heating options have been calculated on a sequenced basis. This means that the relevant no- and low-cost measures are assumed to be implemented first, before assessing the benefit of replacement heating plant.

The proposed low-carbon heating alternatives outperform the existing gas-fired systems in terms of efficiency. However, the financial saving is strongly influenced by the relative price of electricity and gas. Under the current tariffs, electricity is significantly more expensive than gas on a p/kWh basis, which can result in increased annual operating costs despite carbon savings.

The projected lighting savings are based on a like-for-like replacement of the existing fittings with an equivalent number of LED units. A detailed lighting design may identify opportunities to reduce the number of fittings while maintaining appropriate illuminance levels, which could result in further energy and maintenance savings. Final savings should therefore be confirmed following lighting design, controls review and specification of the proposed LED fittings.

4.3 Carbon Trajectory

To decarbonise the site in line with the Council's 2038 net-zero target, the use of fossil natural gas will need to cease. This will require gas-fired equipment to either be replaced with electrically powered low-carbon systems or converted to operate on a verified low-carbon fuel.

The future emissions assessment reflects the expected decarbonisation of UK grid electricity over time. As the electricity grid decarbonises, electrically powered heating systems are expected to result in progressively lower operational carbon emissions. By contrast, continued use of fossil natural gas would retain a significant carbon liability. Therefore, the recommended strategy prioritises electrification where practical, supplemented by BioLPG for the cremators where this provides a more deliverable near-term route to reducing emissions from the cremation process.

The carbon trajectory shown in **Figure 17** illustrates the projected emissions profile if the recommended projects are implemented before the Council's net-zero target date. The BioLPG trajectory assumes an initial blended supply, progressing towards 100% BioLPG by 2038. This is subject to verified supply availability, blend percentage, certification route, supplier allocation method and OEM approval.

The recommended programme of works has been sequenced to prioritise no- and low-cost measures first, followed by capital works aligned with plant condition, expected end-of-life and the Council's 2038 target. The proposed programme is as follows:

Anytown Office

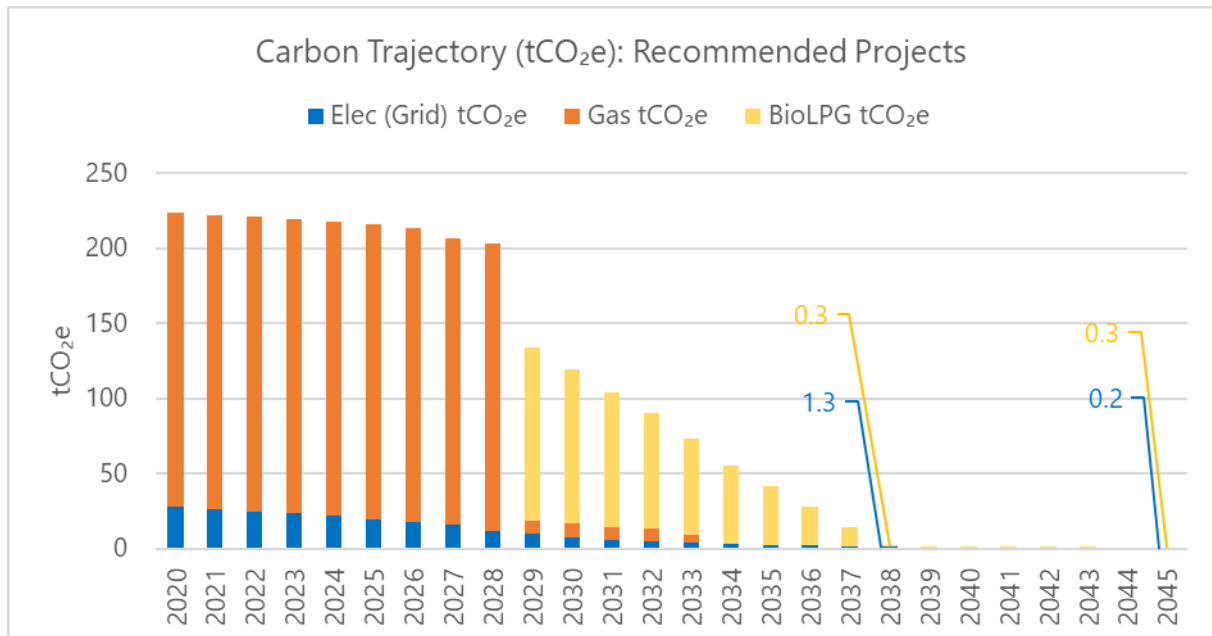
- 2026: Optimise heating controls
- 2031 - 2032: Install low-carbon heating system (ASHP)

Anytown Crematorium

- 2027: Install LED lighting
- 2026 – 2027: Reinstate existing cremator heat recovery system
- 2027 – 2028: Transition cremators from natural gas to BioLPG, subject to verified BioLPG supply, blend, certification, OEM approval and tank siting feasibility.

- 2032 – 2033: Install low-carbon heating system (Electric boiler)

Figure 17 Carbon Trajectory: Recommended Projects



The trajectory demonstrates that the largest reduction in site emissions is achieved through the removal of natural gas from the cremation process, as this represents the dominant site energy load. Earlier measures, such as lighting upgrades, heating control optimisation and reinstatement of the cremator heat recovery system, provide relatively smaller carbon savings but remain important because they reduce avoidable energy use and improve operational efficiency.

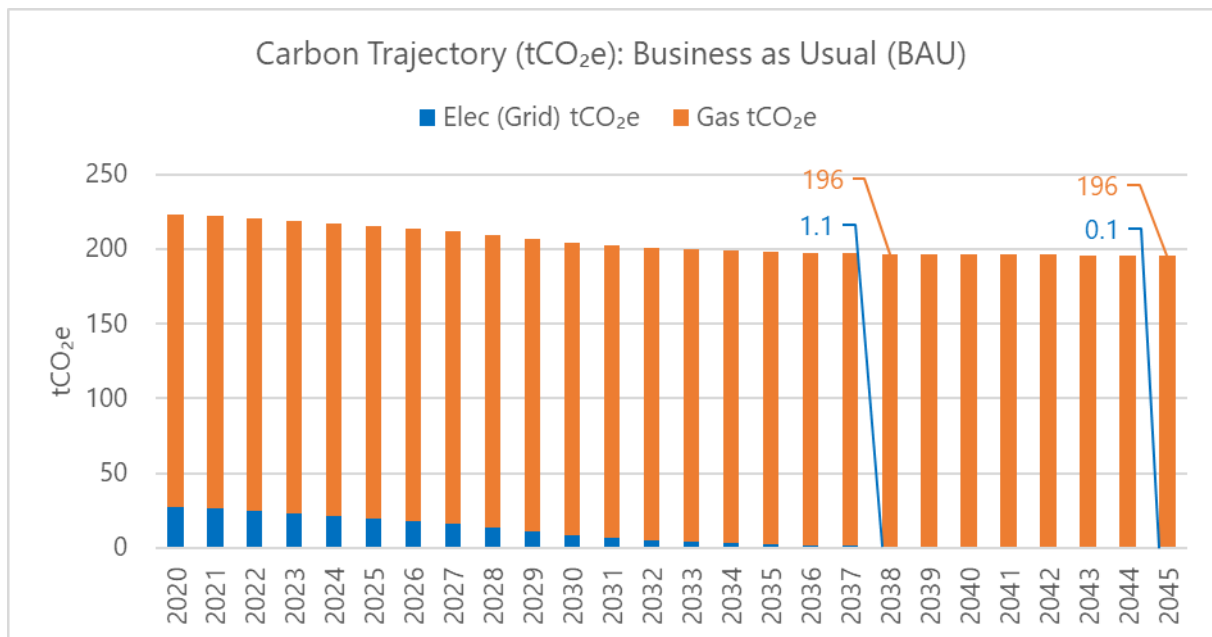
Achieving net-zero carbon emissions requires a strategy that focuses on reducing emissions as much as possible through energy efficiency/conservation measures and low-carbon projects, alongside generating energy onsite from renewable sources. After these carbon reduction initiatives, the remaining emissions are often hard to mitigate and require offsetting strategies to reach a net-zero carbon footprint. Consistent with the Council's net-zero objectives, some plausible strategies to fully offset these hard-to-reduce emissions (1.6 tCO₂e) by the year 2038 and in the years following include:

- Investing in renewable energy projects to replace fossil fuel energy;
- Planting trees or other vegetation to absorb carbon dioxide through photosynthesis;
- Supporting projects that reduce emissions in other sectors, such as the production of low-carbon products;
- Purchasing carbon credits from verified carbon offset programmes.

The electricity usage within the site is modelled as being static after the projects have been delivered. However, related CO₂e emissions continue to fall as the electricity grid continues to decarbonise.

Figure 18 visualises the carbon trajectory where no projects are implemented to reduce energy usage or carbon emissions at the site. In this scenario, business continues as usual, and the energy consumption at the site is modelled as being constant through the years.

Figure 18 Carbon Trajectory: Business as Usual (BAU)

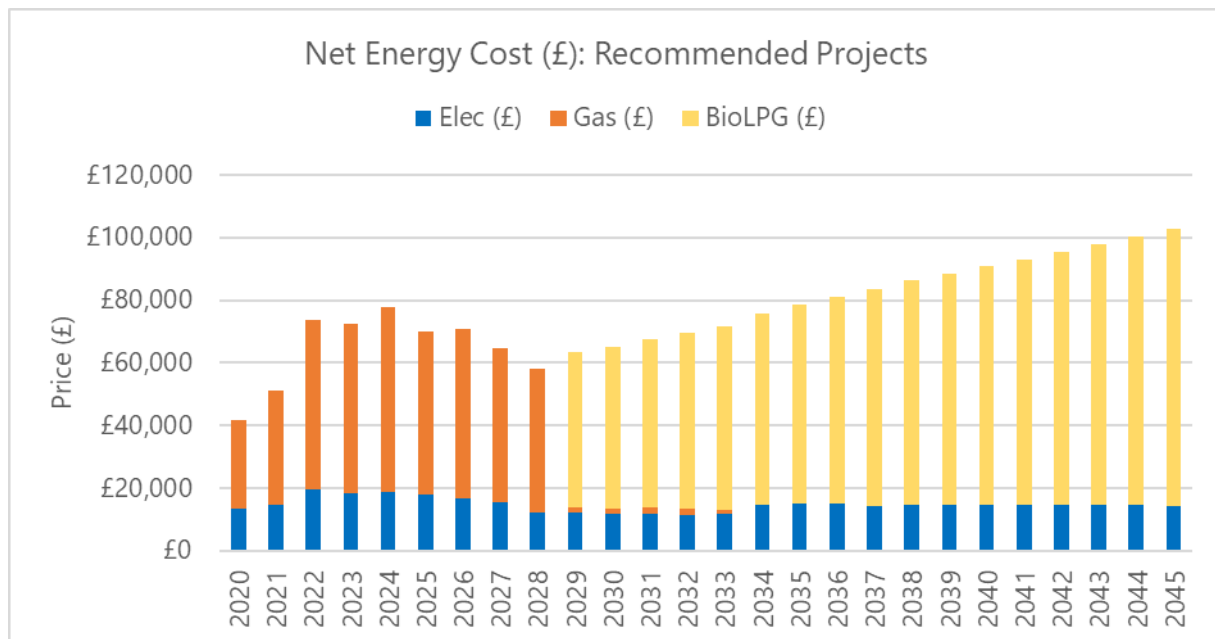


4.4 Forecast Energy Costs

Future retail electricity and gas price assumptions have been adopted from the DESNZ Green Book supplementary guidance for valuing energy use and greenhouse gas emissions. This guidance provides long-run appraisal assumptions for energy prices and should be treated as a forecasting basis for option appraisal, rather than a prediction of future site-specific contract rates.

The forecast BioLPG costs have been developed separately, as long-term public-sector BioLPG price projections are not available in the same format as electricity and gas. The BioLPG trajectory is therefore based on current market LPG pricing, with an assumed BioLPG premium applied and a 3% year-on-year inflation rate.

Figure 19 Year-to-Year Net Energy Running Costs: Recommended Projects



The DESNZ future retail price assumptions indicate that electricity and gas prices may reduce below current market rates in future years. By contrast, the BioLPG cost profile has been escalated annually to reflect the higher uncertainty and potential supply constraints associated with renewable fuel markets.

The forecast cost trajectory shows that the recommended decarbonisation pathway may increase annual energy costs over time, principally due to the transition from natural gas to BioLPG for the cremators. This is because the cremation process represents the dominant site energy load, and BioLPG is assumed to remain more expensive than fossil natural gas on a delivered-energy basis. However, this measure provides the most practical identified route to materially reducing emissions from the cremation process without full cremator replacement.

No- and low-cost measures, such as optimising the Anytown Office heating controls and reinstating the Crematorium heat recovery system, should be prioritised because they reduce avoidable energy use before higher-cost fuel switching or plant replacement measures are implemented. This reduces the site's underlying energy demand and helps limit the operating cost impact of subsequent low-carbon measures.

Potential reductions in BioLPG prices could arise if production capacity, supply chains and market adoption improve over time. Conversely, higher BioLPG premiums may apply if supply remains constrained or if certified low-carbon fuel commands a higher market price.

The graph should therefore be interpreted as an indicative energy cost trajectory based on the stated assumptions, rather than a fixed prediction of future expenditure.

5 Recommendations

It is advised that no-cost and low-cost energy efficiency measures are prioritised before major capital works. These should include switching off electrical appliances and lighting when not in use, ensuring windows and external doors are closed when heating is operating, and reviewing heating schedules to avoid unnecessary out-of-hours operation.

It is recommended that the existing heating control settings for both Anytown Crematorium and Anytown Office are reviewed and rationalised. This should include programmed schedules, local overrides, room temperature setpoints, setback temperatures, frost protection, optimum start/stop settings and any background heating requirements. Heating schedules should be aligned with verified occupancy and operational periods, while allowing for pre-heating and protection of the building fabric and contents.

The Saturday heating operation observed at Anytown Office should be reviewed, as the building is not understood to be normally occupied at weekends. Where heating is not required, controls should be adjusted to minimise avoidable gas consumption while retaining appropriate frost protection and fabric protection.

It is recommended that a mechanical heating engineer investigates the existing cremator heat recovery system as a priority. The investigation should include the LPHW circuit condition, system pressure, water quality, pump operation, controls status, buffer vessel operation and heat dump control sequence. Subject to the findings, remedial works may include leak repair, system flushing or water treatment, re-pressurisation, pump/control reset and recommissioning.

The cremator heat recovery system should be configured so that recovered heat is used as the lead heat source for the Crematorium space heating system wherever available. The supplementary boiler or future electric boiler should only operate when recovered heat is unavailable or insufficient.

Cremator operation should be reviewed to minimise avoidable fuel consumption. Where operationally practical, cremations should be scheduled consecutively, idling should be minimised, and cremator insulation, dampers, burners and controls should be maintained in good condition. Fuel and electricity use should be recorded against cremation numbers to create a robust benchmark for future performance monitoring.

- Industry data shows gas consumption can fall from around 10 m³ per cremation for two cremations to less than 5 m³ per cremation for six or more consecutive cremations in the same operating period.⁷
- Confirm cremation permit conditions, PG5/2(25) compliance gap and whether future works trigger a permit variation. All permits are to be reviewed under the new guidance, and replacement or substantial changes should be designed to meet the new standards.

BioLPG should be progressed as the preferred interim decarbonisation pathway for the existing FTIII cremators, subject to technical and commercial validation. Before proceeding, the Council should obtain confirmation from Facultatieve Technologies on burner compatibility, gas train modifications, pressure regulation, controls, flame detection, commissioning requirements and emissions compliance.

BioLPG supplier quotations should be obtained before the business case is finalised. Quotations should confirm the fuel price, BioLPG blend percentage, carbon intensity, certification route, minimum order quantities, delivery costs, telemetry, tank rental, maintenance responsibilities and long-term supply availability.

- Historic Government evidence estimated BioLPG at approximately 22% above fossil LPG, while more recent industry evidence suggests substantially higher premiums (i.e., approx. 3 times) may apply in some cases. Supplier quotations from Calor, AvantiGas, Flogas or equivalent should therefore be obtained before finalising the business case to confirm pricing and carbon intensity.

A detailed LPG tank siting and safety review should be undertaken before progressing the BioLPG option. This should include separation distances, tanker access, hose route, vehicle impact protection, ventilation, DSEAR/fire-risk assessment, planning requirements, permitting implications and final compound arrangement.

⁷ [Crematoria: best available techniques \(BAT\) - GOV.UK](#)

Biomethane or green gas certificates could be considered as an interim procurement measure if accepted by the Council's carbon accounting policy. This should be reported transparently as a market-based accounting route rather than a physical change to the cremator fuel.

Electric and hybrid-electric cremators should be reassessed at the next major cremator refurbishment or end-of-life replacement point. Future assessment should consider electrical capacity, structural requirements, plant space, service continuity, operational downtime, capital cost, whole-life cost, maintenance requirements and supplier track record.

For Anytown Office, it is recommended to replace the existing gas-fired boiler with an air-to-water ASHP. The existing single-pipe heating distribution system should be replaced with a two-pipe system and new heat emitters sized for low-temperature operation.

For Anytown Crematorium, it is recommended to install an electric boiler as the supplementary/back-up heat source once the heat recovery system has been reinstated. This approach is preferred because the repaired heat recovery system is expected to reduce the annual heat demand that the boiler must serve.

The existing single-pipe radiator distribution system within the Crematorium should be replaced with a two-pipe system where the heating system is being upgraded. This will improve flow temperature consistency, hydraulic balancing, controllability and comfort.

The existing Chapel underfloor heating circuit may be retained, subject to condition survey and confirmation of its design temperatures, flow rates and hydraulic arrangement. If retained, it should be retrofitted with an appropriate manifold, controls and mixing arrangement where required.

Room-by-room heat loss calculations should be undertaken before final heating plant and heat emitter selection. This should include confirmation of radiator sizes, pipe routes, zoning, flow and return temperatures, occupancy patterns and ventilation requirements.

Heating zoning should be reviewed for the Crematorium. Where operationally practical, only occupied areas should be heated, for example heating the Chapel and associated spaces on Sundays rather than the whole building.

The existing direct-electric point-of-use water heaters serving domestic hot water should be retained where serviceable and replaced with efficient modern equivalents at end-of-life. Domestic hot water demand is expected to be relatively low and does not justify centralised hot water generation at this stage.

A detailed condition survey of the existing mechanical and electrical services should be undertaken before any major plant replacement. This should include heating distribution pipework, heat emitters, pumps, valves, controls, plant room equipment and electrical infrastructure.

A building fabric condition survey should be commissioned to confirm wall construction, roof insulation levels, glazing condition, draught paths, air leakage and ventilation requirements. This should inform final heat loss calculations and detailed heating design.

Wholesale fabric upgrades have not been treated as a primary decarbonisation measure at this stage because the buildings appear to have received previous roof, glazing and extension works. However, targeted fabric improvements such as draughtproofing, local door repairs and repair of defective elements should be undertaken where identified.

The insulation specification of recently replaced or refurbished roof areas should be confirmed. If roof insulation was upgraded as part of recent works, further roof fabric improvement is unlikely to be a priority in the short term.

Exposed pipework and fittings in plant rooms and retained distribution routes should be insulated where practical, particularly where plant replacement is not planned immediately. This will reduce uncontrolled heat losses and improve system efficiency.

The site's electrical capacity should be reviewed in detail once final equipment selections have been made. The review should confirm the mains incomer rating, Maximum Import Capacity, existing maximum demand, proposed electrical loads and available headroom.

Early engagement with the Distribution Network Operator should be undertaken to confirm whether the site's Maximum Import Capacity can be increased and whether reinforcement works are required. Electrical capacity remains a high-risk item for both project cost and programme.

A harmonics assessment should be undertaken in accordance with EREC G5/5 where final equipment includes variable speed drives or other plant that may introduce harmonic distortion.

It is recommended to install or upgrade automatic controls/BMS to provide time scheduling, weather compensation, alarms, fault diagnostics, trend logging and remote monitoring. The controls strategy should coordinate recovered cremator heat, thermal storage and supplementary/back-up heating.

An annual controls review should be carried out to ensure schedules, setpoints and control strategies remain aligned with actual site use.

Remaining non-LED luminaires should be replaced with LED equivalents. The Chapel should be subject to a dedicated lighting design to confirm appropriate illuminance, visual comfort, glare control and appearance.

In plant areas, the Garage and the Office Store, remaining non-LED fittings can be replaced with LED equivalents as part of planned or reactive maintenance.

External lighting controls should be reviewed. Where daylight sensors are not present, timeclock settings should be checked and adjusted to suit daylight hours throughout the year.

The existing solar PV system should be reviewed before any expansion is considered. The Council should confirm whether the system receives Feed-in Tariff payments, as expansion connected to the same meter may affect existing revenue arrangements.

A solar PV expansion feasibility review should consider existing generation data, on-site usage, export profile, inverter capacity, roof condition, structural capacity, grid connection requirements, Smart Export Guarantee rates and the future electrical demand from low-carbon heating systems.

Ground source heat pumps should not be progressed further at this stage. Although there may be spatial allowance on-site, the required groundworks, disruption, cost, memorial sensitivities and expected reduced residual heat demand make this option unlikely to be proportionate.

A local heat connection between the Crematorium and Anytown Office should not be progressed at this stage. The distance between buildings, buried pipework requirements, disruption and modest Office heat demand make a dedicated low-carbon heating system for the Office more practical.

The Council should implement a metering and monitoring strategy for the site. This should include sub-metering of key end uses such as cremators, space heating plant, heat recovery, ASHP/electric boiler plant and PV generation.

Energy data should be reviewed at least annually to confirm savings, identify control issues and support future funding applications. Half-hourly data and BMS trend logs should be used wherever possible.

The Council should consider refrigerant selection, refrigerant phase-down risk and long-term maintenance requirements when procuring heat pump equipment.

Embodied carbon should be considered during detailed design and procurement, particularly for major plant replacement, new pipework, heat emitters, electrical infrastructure and external compounds.

All capital costs should be validated through competitive quotations following detailed design. Updated pricing should be obtained before procurement to account for market changes, inflation, supplier availability and project-specific constraints.

Further surveys should be undertaken before works are procured, including asbestos/hazardous materials checks where relevant, structural checks for any roof-mounted equipment, noise assessments for external ASHP plant, fire safety reviews and access assessments.

The recommendations in this report should be treated as a feasibility-stage pathway. Detailed design is required before implementation to confirm technical suitability, final system sizing, cost certainty, programme implications and operational impacts.

Appendix A

A range of decarbonisation pathways has been considered for the cremation process.

Table 22 *Crematorium Decarbonisation Pathways*

Option	Status in England	Carbon impact	Main advantages	Main constraints	Suitability
Operational optimisation and metering	Fully viable now	Low to moderate, but often cost-effective	Low CapEx, improves evidence base, reduces fuel wastage	Dependent on booking patterns and service model	Should be included in all scenarios
Heat recovery from cremators/abatement cooling	Fully viable now	Reduces building or third-party heat demand rather than cremation emissions	Recognised BAT opportunity; can serve chapel, offices, nearby heat loads or ORC	Needs a consistent heat sink; mismatch between cremation heat and demand	Strong option where there is nearby heat demand
Natural gas cremator refurbishment with abatement and controls	Fully viable now	Limited carbon reduction	Retains familiar technology, lower operational risk	Does not materially decarbonise fuel; future carbon exposure	Suitable where cremators are mid-life and grid/electric constraints are severe
BioLPG conversion	Viable subject to OEM approval, storage, permit and supply contract	Potentially high on a certified renewable/mass-balance basis; low if only conventional LPG	Retains combustion process; useful for off-grid or hard-to-electrify sites; lower disruption than full cremator replacement	Tank space, tanker access, DSEAR/fire safety, supply premium, blend uncertainty; not a simple switch from natural gas	Good interim option where electric replacement is not feasible before cremator end-of-life
Biomethane / green gas certificates	Viable as procurement/accounting route	Market-based reduction, but no local fuel change	Minimal CapEx; no cremator modification	Certificate/additionality caveats; no air-quality or combustion change; availability and price risk	Useful interim measure if accepted by Council's carbon accounting policy
Electric cremators	Viable and recognised in PG5/2(25)	High, especially as grid decarbonises or with robust renewable procurement	Removes fossil fuel combustion at point of use; aligns with long-term net zero; increasingly procured by councils	DNO capacity, substation upgrades, space/weight, downtime, supplier base, potential cycle-time impacts	Preferred long-term option for new-build or end-of-life replacement where electrical capacity is feasible
Hybrid gas/electric cremators	Emerging/viable supplier offering	Moderate to high depending on operating mode	Provides resilience and fuel-price flexibility; can operate electrically where capacity allows	More complex; still retains combustion fuel infrastructure	Strong transitional option where full electrification risk is high
Hydrogen-fired cremation	Technically demonstrated but not yet mainstream	High if genuinely green hydrogen; poor if grey hydrogen	Retains burner-based process; potential future retrofit route	No normal supply infrastructure, high fuel cost, storage/safety, NOx/permitting, limited evidence base	Future option; do not rely on it for current decarbonisation unless funded pilot
Liquid biofuels / HVO-type fuels	Possible only for compatible liquid-fuel cremators	Potentially high lifecycle reduction	May suit temporary or specialist units	Few cremators use liquid fuels; storage/safety; fuel sustainability evidence	Niche option only
Alkaline hydrolysis / water cremation	Not currently a regulated cremation route in England	Potentially low energy and no flue emissions	Could become important future funerary method	Legal uncertainty in England/Wales; wastewater/trade effluent consents; public acceptance; not a cremator replacement under PG5/2	Future watch item, not a current English cremator decarbonisation recommendation
Human composting / recomposition / other methods	Not currently regulated as a mainstream English funerary method	Potentially low, but unproven in UK regulatory context	Could reduce energy use	No current English regulatory framework	Exclude from current options appraisal except as horizon scanning

Appendix B

Electric Cremator Case Studies

Astwood Crematorium, Worcester City Council

Worcester City Council is progressing the replacement of **three 1997 gas cremators** at Astwood Crematorium with **two electric cremators**, including abatement and heat recovery technology. The project was driven by the age of the existing cremators, the need for resilience and environmental compliance, and the Council's decarbonisation objectives. The Council reported that electric cremator technology had advanced significantly since its first UK operation around 2020, with recent projects using third- and fourth-generation equipment.

The initial PSDS bid estimated the total cost of replacing three gas cremators with two electric cremators at approximately **£2.985 million**, including design, equipment, installation, project delivery, contingency, enabling works and ancillaries. The main equipment cost was estimated at **£825,000 per electric cremator**. The Council secured a **£1.497 million Salix Public Sector Decarbonisation Scheme grant**, reducing the estimated net cost at bid stage to approximately **£1.488 million**.

Subsequent cost review and soft market testing increased the project estimate. The report states that gas cremators, including installation costs but excluding wider building works, were estimated at **£4.551 million including VAT**, while electric cremators were estimated at **£5.490 million**. After the Salix grant, the electric option reduced to approximately **£3.992 million including VAT**, making the electric option lower-cost in capital terms than the like-for-like gas alternative once grant funding was applied.

A later Contracts Finder award notice records a contract value of **£1,857,400** for the "Astwood Crematorium Electric Cremator Procurement", awarded to **DFW Europe BV**. This appears to relate to the cremator manufacturer contract rather than the full project cost, so it should not be interpreted as the whole scheme budget.

From a system perspective, the Astwood project highlights several key considerations for other councils. The electric cremators are expected to have longer average cremation times than gas units, with the report using **110 minutes per electric cremation** compared with **90 minutes for gas**, although two electric cremators were still considered sufficient to meet normal and peak demand. Space was also retained for a third cremator if future demand required it.

Energy savings were a key driver. The Council estimated around **£20,000 per year** in energy cost savings from switching to electric cremators and using an electric heat exchange mechanism. The report also notes that the space heating boiler must be replaced under Salix grant conditions, with heat supplied via a heat exchanger from the electric cremators, meaning gas use at the crematorium was expected to cease after the project.

The report also identifies important technical and programme risks. Electrical supply reinforcement was required because the existing supply would not support the electric cremators, and early specification of cremator requirements to National Grid was considered essential to avoid delays. The project also required the cremator manufacturer to be involved early in the design team to manage infrastructure, layout and structural implications.

Source

[Astwood Crematorium Final PR.pdf](#)

[Astwood Crematorium Electric Cremator Procurement - Contracts Finder](#)

Grimsby Crematorium, North East Lincolnshire Council

North East Lincolnshire Council is progressing replacement of **two end-of-life gas cremators** at Grimsby Crematorium with **new electric cremators**, supported by the Public Sector Decarbonisation Scheme. The existing cremators were described as being at the end of their mandated lifespan, with increasing maintenance issues and costs. Failure of either unit was identified as a risk to service continuity, income and reputation.

The electric cremator option was reported to cost approximately **£4.7 million**, including a **30% contingency**, with approximately **£1.5 million** funded by PSDS and the remainder funded through Council borrowing. By comparison, replacing the cremators with new gas units was estimated at **£5.7 million**, potentially increasing to **£6.6 million** if emergency temporary provision was required. PSDS funding could not be used for the gas replacement option.

The reason the electric option appeared financially preferable was not simply that electric cremators were cheaper on a gross equipment basis. The business case was improved by three factors: PSDS grant support, avoided temporary cremator costs, and the ability to install electric cremators while keeping the existing gas cremators operational. The report states that a gas replacement could require around **12 weeks of downtime**, with temporary cremators and lost income costing approximately **£40,000 per week**.

The project required building works, primarily an extension to accommodate the electric cremators. A RIBA Stage 3 design and cost plan had been completed, with a 30% contingency included due to the remaining technical design and construction procurement risk. The report also notes an approximately **12-month lead-in time** for electric cremator supply, meaning early ordering was required to align equipment delivery with building works.

The expected operational benefit was material. North East Lincolnshire Council reported that replacement with electric cremators would offer energy savings of approximately **£55,000 per year**, while also supporting the Council's net-zero 2030 priority.

Source

[9-Replacement-of-Cremators-at-Grimsby-Crematorium-Report.pdf](#)

Key Lessons for Other Councils

These two examples suggest that electric cremators can be viable where cremators are already at end-of-life or where major refurbishment is unavoidable. However, they are not a simple like-for-like plant swap. Councils should expect early-stage feasibility to include electrical capacity assessment, DNO engagement, structural review, layout planning, abatement requirements, heat recovery integration, planning implications, service continuity planning and cremator manufacturer involvement during design.

PSDS funding materially changes the financial comparison. In both examples, the electric option became more attractive because grant funding reduced the Council-funded capital requirement, while gas replacement did not qualify for the same decarbonisation support. Without grant funding, electric cremators may have higher gross capital costs than gas replacement, particularly where electrical reinforcement, building extensions, abatement and

enabling works are required. PSDS funding is no longer available but alternative grant schemes may be an option, for example via GB Energy.

Service continuity is a major cost and operational issue. Where electric cremators can be installed in a new extension while existing gas cremators remain operational, the project may avoid temporary cremator hire and lost income. Where the existing cremator hall must be vacated, councils should explicitly cost temporary cremators, alternative cremation arrangements, revenue loss and reputational impacts.

Expected energy savings appear to come from several sources: reduced or eliminated gas combustion, improved thermal retention from electric refractory heating, potential use of recovered heat for building space heating, and lower average energy consumption where cremators are used consistently. However, electric cremators may be kept hot for extended periods, so energy use per cremation is highly dependent on throughput, scheduling and standby strategy. This makes accurate modelling dependent on cremation numbers, daily operating pattern and manufacturer-specific performance data.

Councils should also treat electric cremators as a developing technology. The UK operational evidence base is growing, but is still less mature than conventional gas-fired cremators. Before procurement, councils should investigate supplier track record, installed UK references, maintenance schedules, refractory life, heating element replacement frequency, warranty terms, critical spares availability, response times, lifecycle cost, software/control support and performance guarantees.

Electric and hybrid-electric cremators should be compared not only against new gas cremators, but also against lower-disruption interim pathways such as burner optimisation, heat recovery, biomethane procurement, or conversion to certified low-carbon fuels where technically feasible. However, long-term availability, price, certification and sustainability of clean fuels such as BioLPG or biomethane should be tested carefully before relying on them as a long-term strategy.

NOTE

Local authorities should undertake their own due diligence where appropriate rather than relying on this report. This is a feasibility study and detailed design is required prior to undertaking any works. APSE does not provide financial or investment advice and is not registered with the Financial Conduct Authority.

The options and recommendations contained within this report provide a reasonable forecast for the pre-tender capital cost and cost/carbon savings for selected projects. Further detailed design is required to determine more cost certainty and to ensure that appropriate systems are installed that optimise energy usage and provide a healthy working environment.

Products referred to in this report do not constitute a recommendation. They are for example purposes only and alternatives are available unless stated.

The current military situation impacting the supply of oil and gas from the Middle East has not been taken into account within this report. Although it is likely to have a short term impact on fuel prices the extent of this is unknown and cannot be accurately predicted.

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