

Westbrook Hall

Decarbonisation Feasibility Study

March 2026



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Executive Summary



Executive summary

This report presents the findings of the energy and Net Zero feasibility assessment conducted at Westbrook Hall.

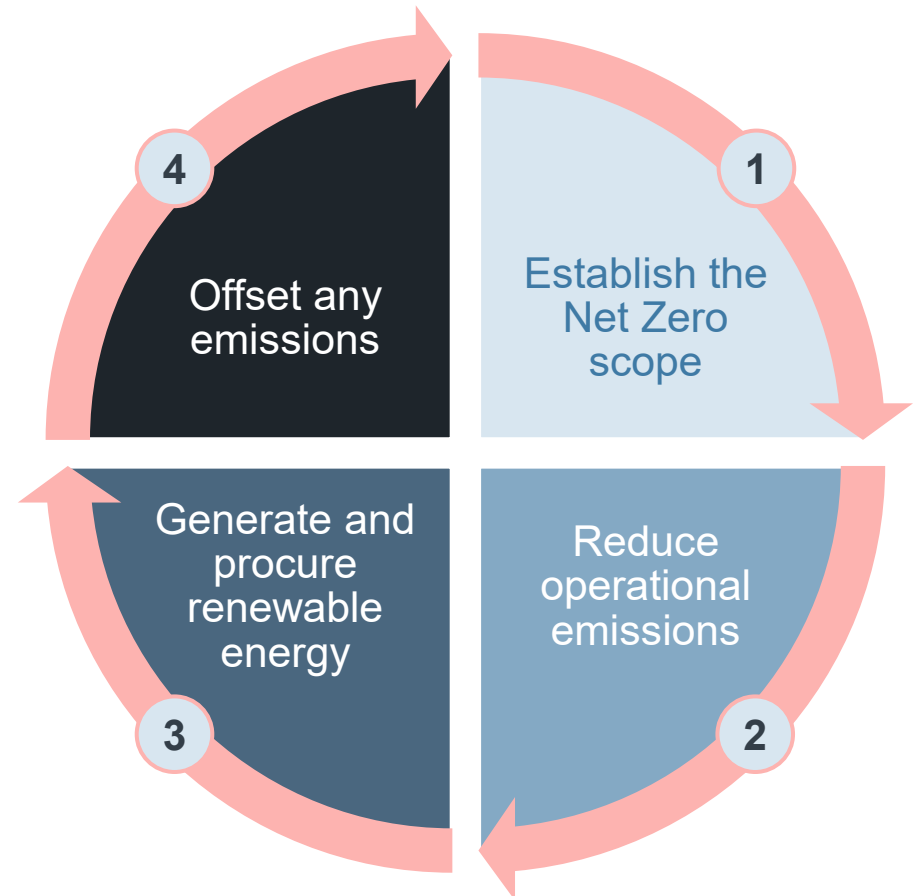
Baseline: Calendar year 2025

- ❖ Energy consumption: 22,584 kWh
- ❖ Energy costs: £2,981
- ❖ Carbon emissions: 5.0 tCO₂e
- ❖ The energy baseline includes electricity imports and natural gas.

Key findings:

- ❖ Replace gas boiler for Air Source Heat Pump (ASHP) to complete site degasification.
- ❖ Install solar Photovoltaic (PV) to generate clean energy on site.
- ❖ Opportunity exists to upgrade light fittings to LED.
- ❖ Improve space heating controls.

Net Zero Pathway



Executive summary



Summary of recommendations

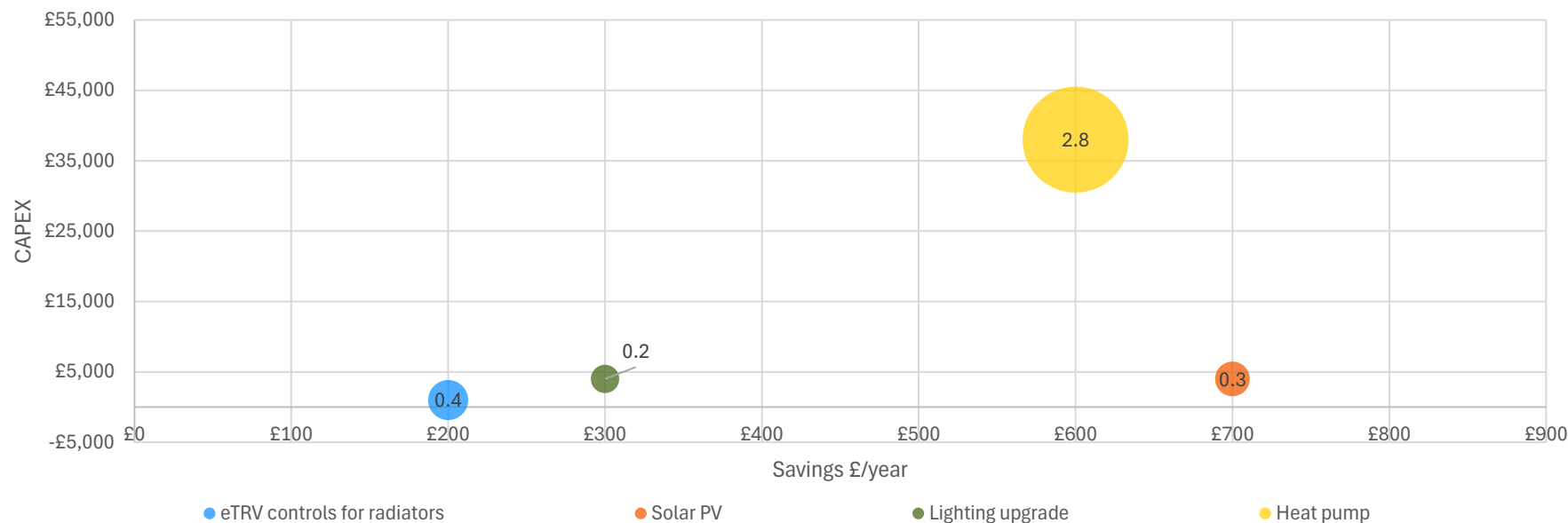
Note: The solar PV recommendation does not result in any energy savings, as the generation of renewable energy on site does not affect the overall energy consumption of the site.

#	Recommendation	Implementation year	Savings			Capital cost	Payback period	Cost to Carbon Savings Ratio	RAG rating for payback timing
			kWh	tCO ₂ e	£	£	years	£/tCO ₂ e	Quick wins
									Medium-term
									Long-term
1	eTRV controls for radiators	2026	2,000	0.4	£200	£1,000	5.0	£2,500	
2	Solar PV	2030	0	0.3	£700	£4,000	5.7	£13,300	
3	Lighting upgrade	2026	1,100	0.2	£300	£4,000	13.3	£20,000	
4	Heat pump	2030	12,200	2.8	£600	£38,000	>15 years	£13,600	
Total			15,300	3.7	£1,800	£47,000	Over 15 years		
Total - short and medium term			3,100	0.9	£1,200	£9,000	7.5		
Total - long term and carbon focused measures			12,200	2.8	£600	£38,000	Over 15 years		

The cost to carbon savings ratio (£/tCO₂e) compares upfront capital investment against annual carbon savings. This is also referred to as carbon abatement cost. Measures with low carbon abatement costs are the most cost effective in reducing carbon emissions, while higher-cost measures may still be required to achieve Net Zero.

Bubble chart of recommendations

The bubble chart below shows how the identified measures compare in terms of capital investment and energy savings. The annual carbon savings per measure is reflected by the bubble size (also given by the value within or near each bubble). Therefore a larger bubble represents a larger annual reduction in carbon emissions.



Disclaimer: Energy auditing methodology suggests assessment of life-cycle costs where possible, but this is complex to calculate and involves assessment of taxation and asset depreciation by a Qualified Accountant. However, it has been assumed that Havant Borough Council's financial investment criteria are based on simple payback time and so this has been used here. Some measures may qualify for capital allowance; however, it is recommended to take advice from an accountant to assess the individual cases. All calculations are based on average utility prices from Havant Borough Council, and payback times will reduce if prices rise in the future.

Caution: It is emphasised that these savings figures have been built up from the estimated impact of individual, discrete projects, and implementing projects in parallel may reduce the overall savings figure achievable, due to the aggregated impact of the measures. WSP recommends that Havant Borough Council checks the data, calculations and assumptions for each energy saving measure before making any investment decisions. All costs presented are estimates to allow the relative benefits of each opportunity to be assessed. Further detailed design and costing of options should be carried out by Havant Borough Council to verify payback times.

Introduction



Havant Borough Council's Net Zero Strategy



Havant Borough Council (HBC) have committed to reducing its operational greenhouse gas emissions by 68% by 2030 (baseline year 2021/22), through their Climate Change Strategy and Action Plan. It also acts as an interim target to support HBC's aim of having zero carbon associated with its own operations by 2035 and across the Borough by 2045.

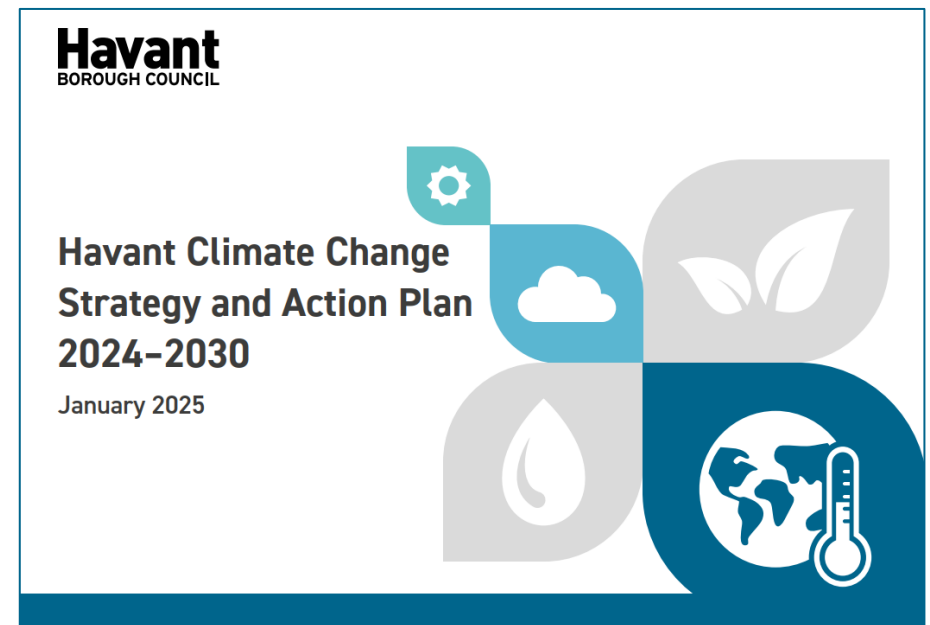
HBC reports emissions in line with the Greenhouse Gas Protocol, covering Scopes 1, 2 and 3. Due to data limitations, Scope 3 reporting is currently limited to Transmission & Distribution (T&D) losses and emissions from outsourced services and leased properties, with coverage expected to expand over time.

These commitments are set out in the Climate Change Strategy & Action Plan 2024–2030 which establishes the council's emissions baseline and a framework for ongoing monitoring, transparency, and targeted decarbonisation.

HBC have used 2021/22 as the baseline year to calculate their emissions reduction target. HBC have also set an acceptable residual emissions level for 2030 as 25 tCO₂e.

HBC are also developing a Decarbonisation Roadmap that will set out the sequenced steps, costs, carbon savings and practical measures required to decarbonise its operations and the wider Borough - providing a clear, evidence-based pathway to meet its 2030, 2035 and 2045 Net Zero targets.

To translate these strategic commitments into practical, evidence-based action, HBC is now undertaking a programme of decarbonisation feasibility studies to understand how individual sites can contribute effectively to the council's wider Net Zero pathway.



Decarbonisation Feasibility Study Project Aims and Scope

To underpin the Council's Net Zero pathway, this feasibility study delivers the site-specific technical insight necessary to inform prioritisation and investment decisions within HBC's wider decarbonisation programme. The aim is to provide HBC with a robust understanding of Westbrook Hall's current performance, including its energy consumption, carbon emissions, and alignment with Net Zero benchmarks. The report identifies practical decarbonisation and efficiency measures that would enable Westbrook Hall to contribute meaningfully to the Council's Net Zero goals. Overall, the findings will support the Council in tracking progress, planning investment, and taking coordinated action across its estate.

This report presents the findings of the energy and Net Zero feasibility assessment conducted at Westbrook Hall. The report provides the following:

- Analysis of energy consumption at Westbrook Hall, including an overview of the site and its energy users,
- Recommendations to reduce Westbrook Hall's energy consumption and operational carbon emissions,
- Guidance on how Westbrook Hall can achieve Net Zero operational carbon emissions, tailored to Havant Borough Council's targets and wider decarbonisation ambitions.

The energy and Net Zero feasibility assessment follows the methodology detailed in BS EN 16247 (2012) – Energy Audits. Please refer to Appendix A for WSP's Methodology and Limitations. The Net Zero elements of this study follow best practice, using UK Green Building Council (UKGBC) guidance, The Carbon Trust, and the *UK Net Zero Carbon Buildings Standard* (UKNZCBS, Sept 2024). The Standard has been used to frame Net Zero pathways for the operational carbon emissions at Westbrook Hall, while noting that formal verification is not awarded as part of this study.



Site Context



Site overview

Site:	Westbrook Hall
Address:	Plough & Barleycorn, Tempest Ave, Waterlooville, PO7 8NU
Floor area:	250 m ²
Survey date:	26/01/2026



Westbrook Hall is a community centre in Havant which is leased out by Havant Borough Council to Westbrook Hall Association charity, with the lease expiring within the next two years. Internal maintenance is the responsibility of the charity.

The site uses electricity from the grid and natural gas. There are no other fuels.

Typical occupancy hours are from 08:00 to 15:15 (nursery) and additional activities take place during evening hours and over the weekend. Site cleaning takes place site every morning (06:00).

Site context

The site was constructed in the mid 1980s and is a single storey building with pitched roofs and brick walls. Insulation levels are expected to align with building regulations at the time of construction. Glazing throughout is double glazed PVC frame windows and in good condition.

The main energy users on site are heating, lighting and domestic hot water, as well as miscellaneous appliances.

Space heating is achieved by a gas condensing boiler from 2010 which feeds into radiators throughout. The radiators are equipped with thermostatic radiator valves (TRVs). There is also a central timer thermostat which controls space heating.

Hot water is provided via point-of-use (PoU) water heaters in the kitchen and toilets.



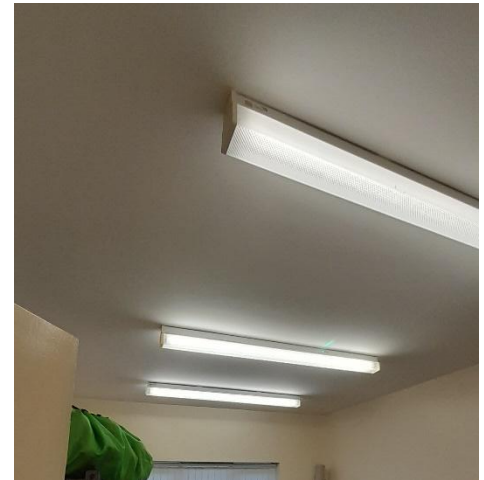
Site context

Ventilation is achieved by opening windows and there is no form of mechanical ventilation. There is no cooling on site either. Staff have expressed that the main hall is prone to overheating in the summer. There are motorised skylights in the main hall which are non-operational.

Lighting throughout is a mix of LED and fluorescent fittings which are controlled via manual switches.

Waste is separated to recyclables and non-recyclables and collected every 14 and 7 days respectively by Biffa. There are plans to begin collecting organic waste from 2026.

Toilets have single volume flushing systems and taps are manually operated with dedicated hot- and cold-water faucets.



Energy management matrix



WSP has assessed the energy management approach of the site against the matrix shown below (highlighted cells show the current status). This has been derived based on discussions with site managers and observations made during the energy survey. The higher the level, the better a site is performing in terms of the respective energy management category.

Level	Energy Policy	Organising	Training	Performance Measurement	Communication	Investment
4 (excellent)	Energy policy, Action Plan and regular review have active commitment of top management	Fully integrated into management structure with clear accountability for energy consumption	Appropriate and comprehensive staff training tailored to identified needs, with evaluation	Comprehensive performance measurement against targets with effective management reporting	Extensive communication of energy issues within and outside of organisation	Resources routinely committed to energy efficiency in support of business objectives
	Formal policy but no active commitment from top management	Clear line management accountability for consumption and responsibility for improvement	Energy training targeted at major users following training needs analysis	Weekly performance measurement for each process, unit, or building	Regular staff briefings, performance reporting and energy promotion	Same appraisal criteria used as for other cost reduction projects
	Un-adopted Policy	Some delegation of responsibility but line management and responsibility unclear	Ad-Hoc internal training for selected people as required	Monthly monitoring by fuel type	Some use of company communication mechanisms to promote energy efficiency	Low or medium cost measures considered if short payback period
	An unwritten set of guidelines	Informal, mostly focused on energy supply	Technical staff occasionally attend specialist courses	Invoice checking only	Ad-Hoc informal contacts used to promote energy efficiency	Only low or no cost measures taken
	No explicit energy Policy	No delegation of responsibility for managing energy	No energy related staff training provided	No measurement of energy costs or consumptions	No communication or promotion of energy issues	No investment in improving energy efficiency
3						
2						
1						
0 (poor)						

Energy Analysis



Energy baseline

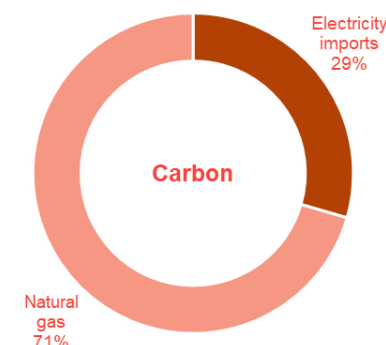
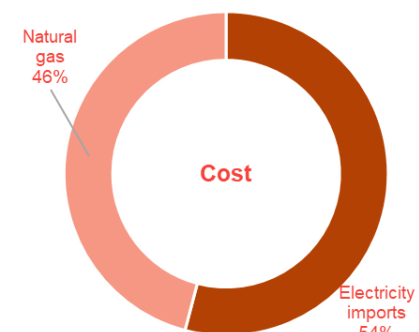
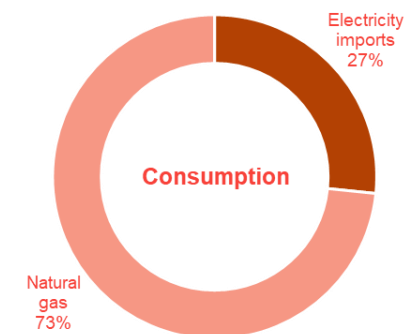
Havant Borough Council has provided energy consumption and cost data for the **calendar year 2025 period**, and the analysis in the following pages is based on this data. Annual consumption for the site is shown in the table below, which represents energy usage from the 1st of January 2025 to the 31st of December 2025. Unit costs and carbon factors are detailed in the below as well. Unit costs are sourced from the provided utility bills. The carbon factor is sourced from DESNZ Greenhouse Gas Conversion Factors 2025.

** Note: The sum of the costs does not add up due to rounding of figures.*

Fuel type	Consumption		Costs		Emissions	
	kWh	%	£	%	tCO ₂ e	%
Electricity imports	6,018	26.6%	£1,612	54.1%	1.5	29.5%
Natural gas	16,566	73.4%	£1,368	45.9%	3.5	70.5%
Total	22,584	100%	£2,981*	100%	5.0	100%

Energy tariffs	£/kWh
Electricity	£0.27
Natural gas	£0.08

Carbon factors	kgCO ₂ e/kWh
Electricity imports	0.245
Natural gas	0.213



* <https://assets.publishing.service.gov.uk/media/6846a4f55e92539572806125/ghg-conversion-factors-2025-full-set.xlsx>

Energy benchmarks and targets

To assess the site's performance, the energy intensity was compared to benchmarks and targets for similar buildings. The site's energy intensity as captured on its energy performance certificate (EPC) has been included to the bar chart. It should be noted however, that it reflects historic measured energy use based on a different baseline year to this decarbonisation feasibility study.

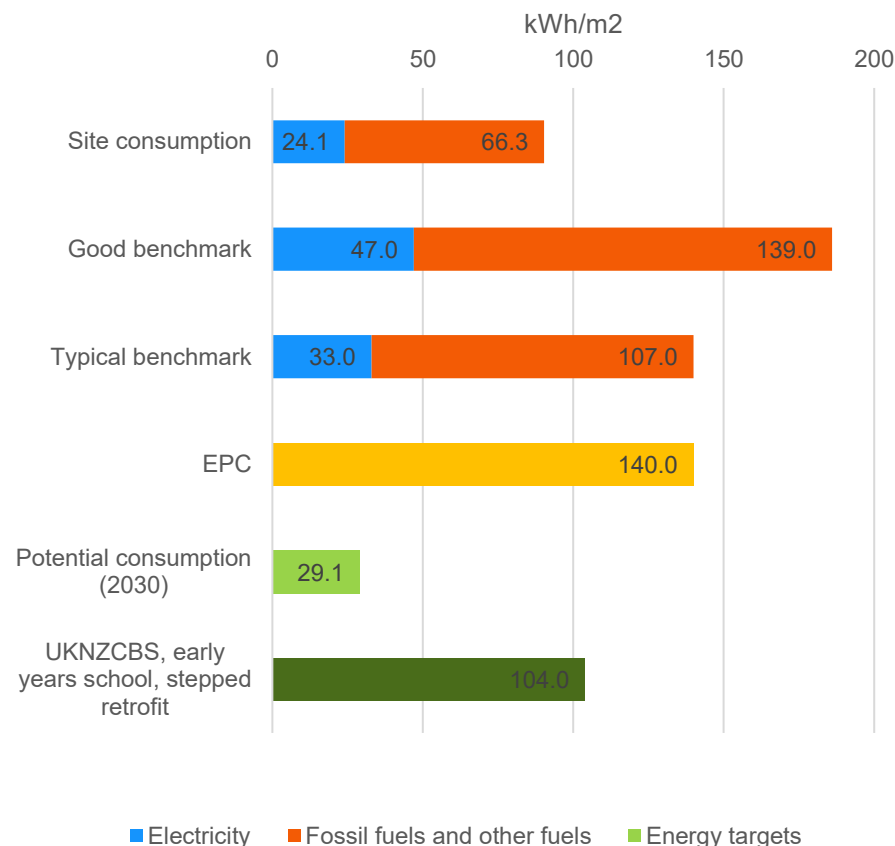
The CIBSE benchmark¹ for local authority community centres was used to assess the current energy performance of the site. This benchmark uses data from DEC's from 2021. This gives the typical energy consumption per square meter per year for community centres and are derived from actual operational buildings.

The site is performing better than both the good and typical benchmarks for these building types. This is likely due to the low utilisation of the site, with most of the energy consumption attributed to lighting and heating, both of which are dependent on operating hours.

The site's potential energy intensity, based on current baseline energy consumption and the identified energy saving opportunities, is 29.1 kWh/m², about 68% lower than the current performance (90.3 kWh/m²).

This outperforms the UKNZCBS, early years school 2030 target² of 104kWh/m².

Energy Use Intensity



- <https://www.cibse.org/knowledge-research/knowledge-portal/guide-f-energy-efficiency-in-buildings-2012>
- https://8f2d86b0-7c72-4129-a02b-72f5adfae419.filesusr.com/ugd/790941_f53e6b4b6dc04fd3aeb4b122a1b95b15.pdf

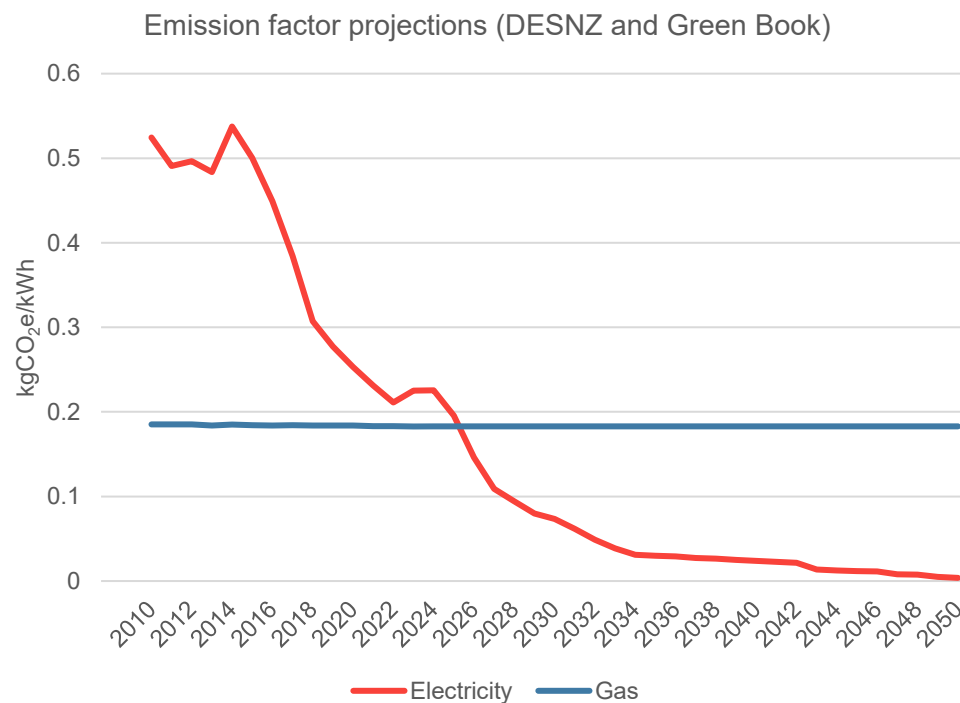
Energy carbon emission projections



Carbon factor projections have been developed using the Green Book published by HM Treasury (November 2023 update), following the methodology detailed by DESNZ on energy carbon projections*.

To model carbon factor projections, DESNZ carbon factors up to 2025 have been used alongside the Green Book projections*.

Carbon factor projections are used in the Net Zero assessment to calculate emissions for interim and final targets.



As can be observed on the graph, the electricity carbon factor is decreasing, and is set to continue decreasing until it reaches near zero emissions. However, the gas carbon factor will remain stable as natural gas is a fossil fuel and is not generated by renewables. Therefore, the removal of gas and electrification of operational processes will allow for Net Zero to be achieved.

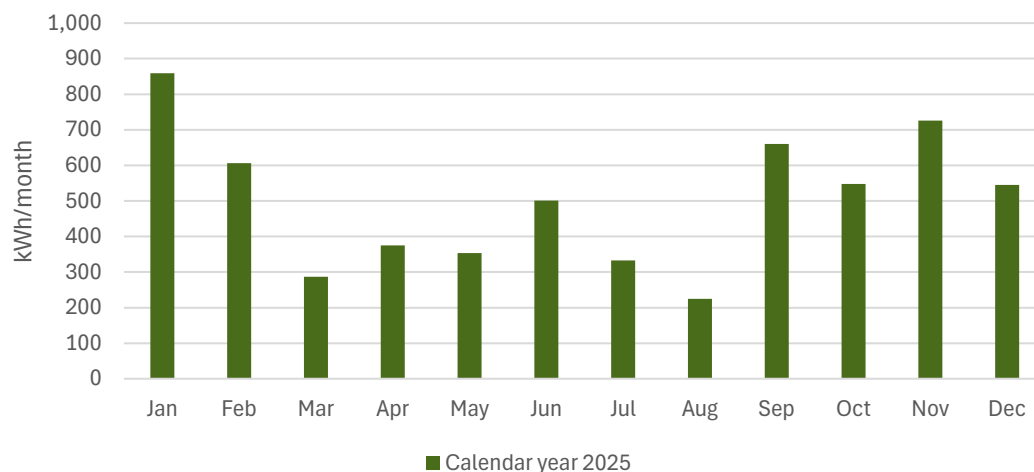
It is expected that the electricity generation in the UK will decarbonise by 2050. The UK's energy mix has changed substantially in recent years, becoming noticeably more reliant on clean energy sources and much less reliant on polluting and carbon emitting fuels such as coal.

* <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>

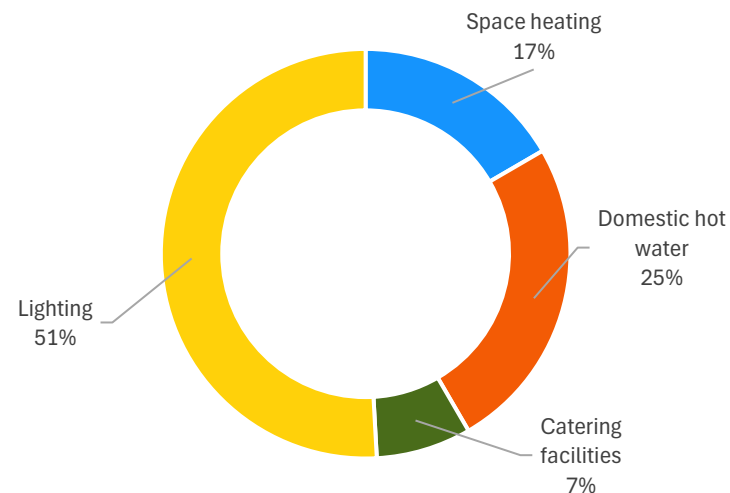
Energy analysis - Electricity

The below left chart, demonstrates the monthly electricity demand for Westbrook Hall, across the 2025 calendar year. It can be observed that colder months (Nov-Mar) tend to have higher power consumption. This can be attributed mainly to longer hours per day that lighting is in use compared to summer months as well as due to the occasional use of portable electric heaters. The drop in December is assumed to be largely attributed to lower occupancy because of holidays period break.

Electricity imports



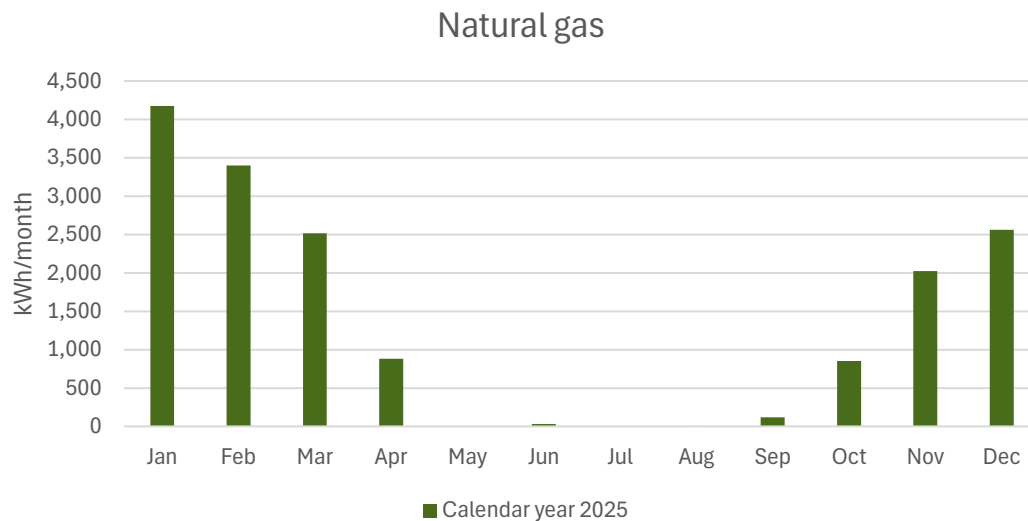
Electricity imports breakdown by end use



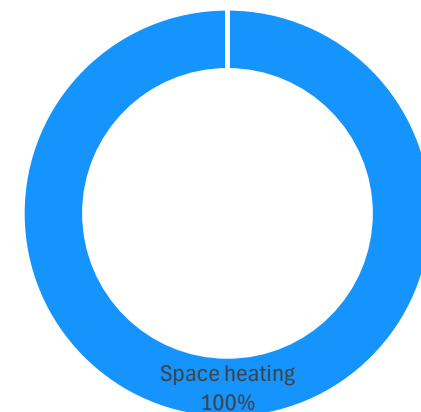
The electricity breakdown graph is based on estimations of the energy consumption of the various items of plant, equipment and systems, calculated using the power rating, hours of use and utilisation diversities. As such, the figures should be taken as an indication only. Despite that, the chart can be used to focus efforts on those areas with the largest energy consumption, and the best potential for making savings.

Energy analysis – Natural gas

The left chart below, captures the monthly natural gas demand for Westbrook Hall, across the 2025 calendar year. Natural gas consumption is exclusively attributed to space heating and therefore the monthly profile aligns with high gas demand during colder months of the year and negligible consumption during warmer periods (May-Sept).



Natural gas breakdown by end use



The natural gas breakdown graph (right) is based on metered data. As such, the figures provide a realistic representation of gas usage at Westbrook Hall. The chart can be used to focus efforts on those areas with the largest energy consumption, and the best potential for making savings.

Heating degree day analysis

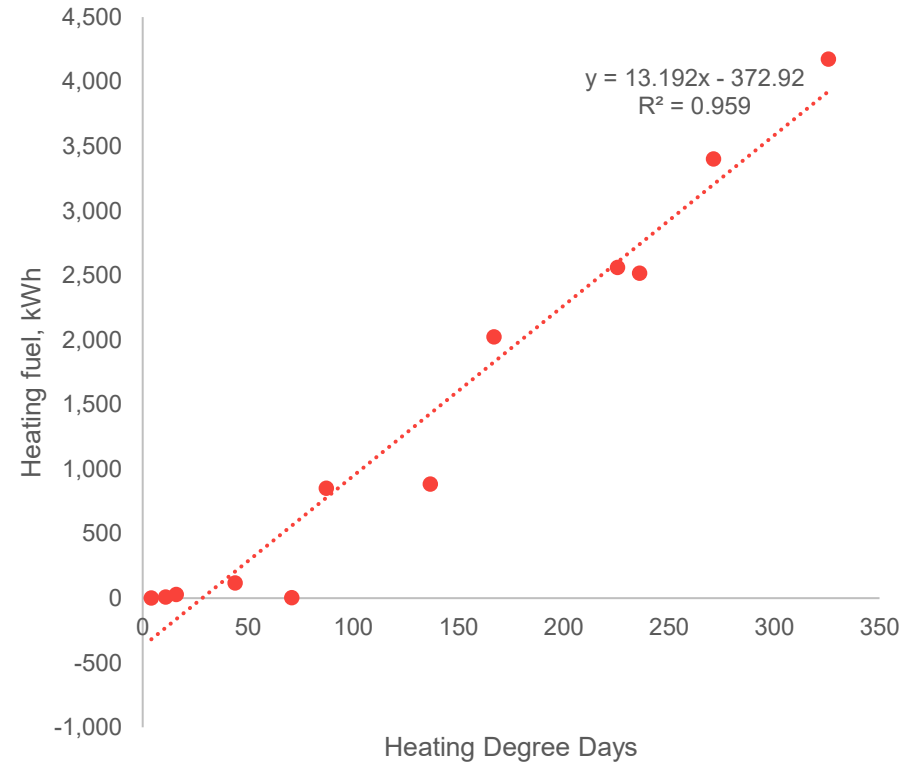
Energy consumption can be compared against external temperatures to assess the impact of temperature on energy consumption.

This metric is the degree day. The heating degree day provides the heating requirement of a building, representing a fall in the external average of one degree below a specified base temperature for one day.

The base temperature is the minimum external temperature at which there is no requirement for additional heating. The figures on the right shows the total site gas usage for those months when heating is generally required, compared with heating degree days. A base temperature of 15.5°C has been selected – this should be the external temperature at which heating needs to be provided to the building.

Within the degree days analysis, R^2 should be as close as possible to 1 to represent a perfect correlation.

In this case, $R^2=0.959$, indicating good correlation between gas consumption and heating degree days. As all gas consumption is used for space heating, this is aligned with expectations.



Net Zero Pathway



Net Zero Pathway – Operational emissions



This report focuses on operational emissions and does not consider construction emissions (for new assets, retrofit projects or reportable works), or whole life emissions (for the installation of new equipment). The Net Zero Pathway for operational emissions covered is shown below.



1. Establish the Net Zero scope

- Establish the operational emission baseline, and report emissions,
- Establish Net Zero and interim targets.



2. Reduce operational emissions

- Identify energy and carbon saving opportunities,
- Implement any feasible opportunities, focusing on fossil fuel removal,
- Consider any emissions associated with the implementation of the opportunities, for example:
 - Emissions from any construction work required,
 - Refrigerant global warming potential (GWP) for heat pumps.



3. Generate and procure renewable energy

- Generate renewable energy on site wherever possible,
- Procure renewable electricity for remaining electricity demand.



4. Offset any remaining emissions

- Offset remaining emissions using a recognised offsetting framework,
- Disclose the offset emissions.

The above steps should be followed for all assets, and for all energy consumers, including tenant areas where Havant Borough Council has some level of operational control, or ownership of any energy consumers. This includes building fabric upgrades, plant upgrades, or lighting upgrades.

1. Establish the Net Zero Scope



Operational Emissions Boundary for This Assessment



This assessment focuses on operational greenhouse gas emissions associated with energy use at Westbrook Hall, consistent with HBC's established reporting approach and the Greenhouse Gas Protocol. The operational boundary includes Scopes 1, 2 and relevant Scope 3 sources, with the following considerations:

Included in Scope 1 & 2

- Scope 1: Direct fuel combustion, for example, associated with on-site heating systems.
Note: Emissions from the authority's fleet and fuel use are excluded from this study.
- Scope 2: Purchased electricity consumed at Westbrook Hall.

Included in Scope 3 (Operational-level sources relevant to the building)

- Transmission & distribution (T&D) losses
- Well-to-Tank emissions (WTT)

Excluded Scope 3 Sources

The following Scope 3 categories sit outside the boundary of this feasibility assessment as they fall beyond the operational control of the site-level energy Net Zero feasibility assessment:

- Outsourced operations associated with the building (e.g., energy use for leased areas where applicable)
- Staff commuting
- Staff business travel
- Staff working from home
- Water consumption (see note below)
- Material use
- Waste
- Wider outsourcing activities unrelated to on-site energy use

Water Consumption Note

Water consumption is reviewed qualitatively at a high level to identify efficiency opportunities. Associated emissions are not included in the overall net-zero emissions total for this report.

Net Zero Baseline



The Westbrook Hall energy baseline for calendar year 2025 is given below, including carbon factors, energy rates, energy intensity and carbon intensity.

Energy consumption	kWh/year	£/year	tCO ₂ e/year
Electricity imports	6,018	£1,612	1.5
Natural gas	16,566	£1,368	3.5
Total energy consumption	22,584	£2,981	5.0

The site's baseline energy consumption is of 22,584 kWh, with the majority attributed to natural gas. The baseline emissions from energy use are of 5.0 tCO₂e; 3.5 tCO₂e from natural gas and the remaining 1.5 tCO₂e from electricity imports.

Energy and carbon intensity	Energy intensity (kWh/m ²)	Carbon intensity - baseline year (kgCO ₂ e/m ²)
Electricity imports	24.1	5.9
Natural gas	66.3	14.1
Total energy consumption	90.3	20.0

2. Reduce Operational Emissions



Reduce operational emissions



This section of the report provides opportunities for decarbonisation and reduction in operational energy emissions. It covers the key actions needed to progress towards Net Zero operational carbon at Westbrook Hall. From the Net Zero Decarbonisation Study at Westbrook Hall, the following opportunities were identified, and further detail for each opportunity can be found in Section 2.1 and 2.2:

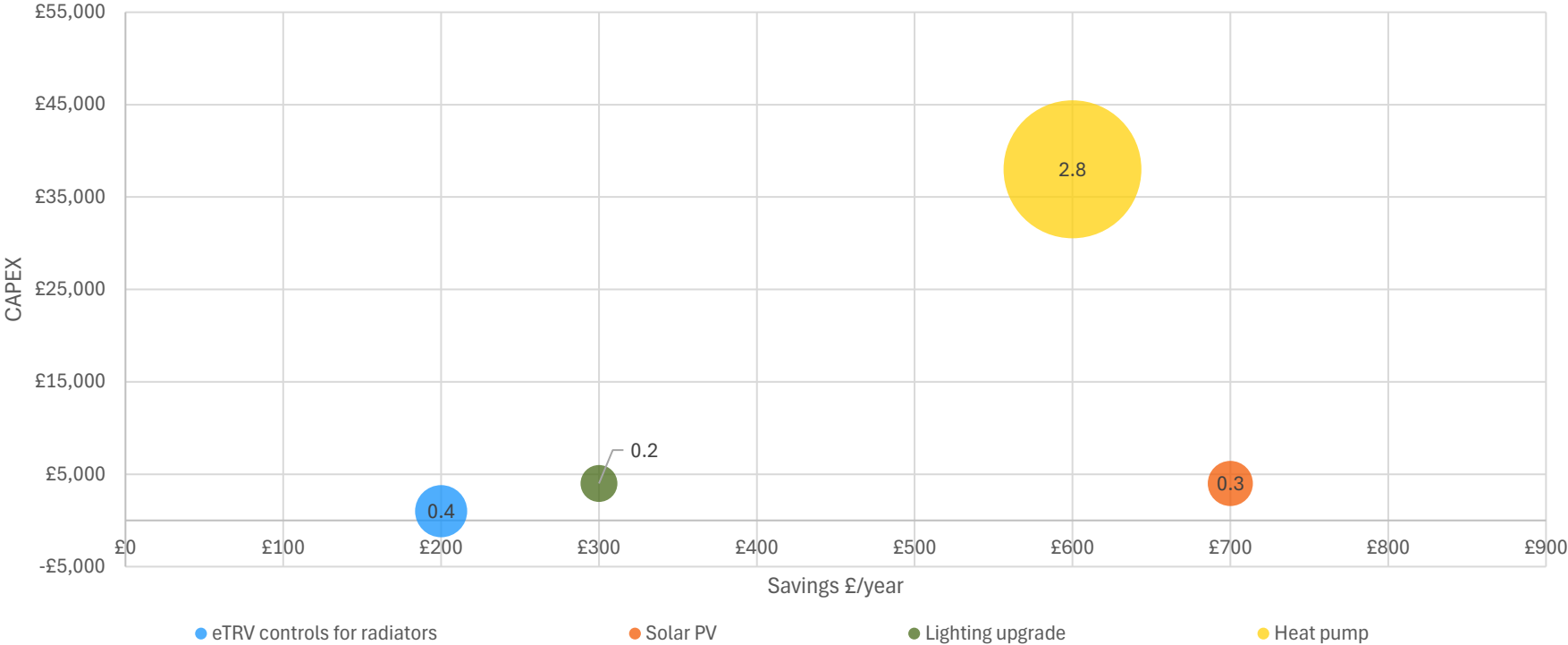
#	Recommendation	Implementation year	Savings			Capital cost	Payback period	Cost to Carbon Savings Ratio	RAG rating for payback timing
			kWh	tCO ₂ e	£	£	years	£/tCO ₂ e	Quick wins
									Medium-term
									Long-term
1	eTRV controls for radiators	2026	2,000	0.4	£200	£1,000	5.0	£2,500	
2	Solar PV	2030	0	0.3	£700	£4,000	5.7	£13,300	
3	Lighting upgrade	2026	1,100	0.2	£300	£4,000	13.3	£20,000	
4	Heat pump	2030	12,200	2.8	£600	£38,000	>15 years	£13,600	
Total			15,300	3.7	£1,800	£47,000	Over 15 years		
Total - short and medium term			3,100	0.9	£1,200	£9,000	7.5		
Total - long term and carbon focused measures			12,200	2.8	£600	£38,000	Over 15 years		

For the purpose of the Net Zero feasibility assessment, recommended implementation years have been assigned to each recommendation, based on the ease of implementation, and allowing for planning permissions and feasibility studies to be conducted where necessary. Recommendations are detailed further in the following section of the report. The solar PV recommendation savings are applied to electricity imports and do not affect the total electricity consumption or intensity. The two recommendations with no payback relate to the site degasification and are key to reaching Net Zero.

Cost to carbon savings ratio



The bubble chart below shows how the identified measures compare in terms of capital investment and energy savings. The annual carbon savings per measure is reflected by the bubble size (also given by the value within or near each bubble). Therefore, a larger bubble represents a larger annual reduction in carbon emissions.



Options appraisal – action plan



The timeline below sets out a potential action plan where measures have been prioritised considering carbon impact, capital intensity, payback and feasibility. Early actions typically focus on low-cost and operational measures while later actions typically focus on more strategic, longer-term investments which are likely to be required to achieve Net Zero.

2026 - 2027	2027 - 2030	2030 onwards
eTRVs: implement over the next 6 months. Low disruption, set temperature levels per area to match typical activities schedule.	Solar PV: implement within 2-3 years. Subject to roof condition and feasibility study. Lighting upgrade: implement over the next 6-12 months. Medium disruption but could be planned around venue's activities.	Air source heat pump: implementation within 4-6 years. High capital cost, enabling measure for achieving Net Zero.

Energy Saving Recommendations – LCCA



Life Cycle Cost Analysis (LCCA) is a method used to assess the lifetime costs and benefits of a measure. LCCA considers the costs and savings of a measure, the time over which this measure is considered, hence its predicted lifespan, and the discount rate applied to future costs and savings, equating these to present day value.

LCCA was conducted for each measure implemented, considering the capital investment required, the energy costs or savings over the lifetime and the maintenance costs or savings over the lifetime.

The discount rate has been considered at 3%.

For the LCCA, the capital cost has been adjusted from the values shown in the original energy saving recommendation, which are for the baseline year, to account for the predicted implementation year. The electricity and gas costs are based on the actual tariffs paid for by Westbrook Hall for the baseline year and have been adjusted over time using the Green Book electricity and gas projections. The maintenance costs are based on the assumed cost to maintain the measure implemented (e.g. maintenance costs for a heat pump), compared to maintenance costs prior to the implementation (e.g. maintenance costs for the previous heating and/or cooling systems). These are adjusted year-on-year using the discount rate, and the costs are for the measure lifespan.

Energy Saving Recommendations – LCCA



The results of the LCCA are presented in the table below. Negative figures indicate cost savings. Maintenance costs or savings represent costs or savings compared to existing systems (if applicable).

Overall, the capital cost for all measures combined is circa £46,000, with energy cost savings of £23,000 and maintenance costs increase of £1,200.

Recommendation	Implementation year	Recommendation lifespan	Capital cost (£)	Energy costs or savings (£)	Maintenance costs or savings (£)	Total costs or savings (£)	Total energy savings (kWh)
eTRV controls for radiators	2026	10	£1,200	-£1,306	£0	-£106	19,879
Solar PV	2030	25	£3,852	-£11,427	£0	-£7,575	0
Lighting upgrade	2026	15	£3,502	-£3,007	£0	£495	16,669
Heat pump	2030	15	£37,282	-£7,324	£1,194	£31,151	182,410
Total	-	-	£45,835	-£23,063	£1,194	£23,966	218,959

2.1. Operational Energy



eTRV controls for radiators

Implementation in 2026	Annual Savings			Cost (£)	Payback (years)
	£	tCO ₂ e	kWh		
			Gas		
Heating					
Controls improvement	200	0.4	2,000	1,000	5.0



TRV on kitchen radiator



Example of eTRV

Current status:

Space heating throughout the site is achieved via radiators which are fed by the central gas boiler. These have local manual TRVs for adjusting temperature room temperature level. Most TRVs were found at maximum temperature settings. Additionally, a central timer thermostat exists and which dictates the gas boiler operation.

Recommendation:

It is recommended to install electronic thermostatic radiator valves (eTRVs) to the radiators which allow for localised temperature and timer controls on each radiator. The eTRVs are added to a central control application to allow for remote control and improved energy management. Each radiator can be controlled individually or as a group to create 'zones' which can have schedules and temperature setpoints independent of each other.

Savings of 12% have been assumed on the site heating consumption from the implementation of eTRVs, at a cost of £120 per eTRV (including installation and software integration costs). It is assumed that eTRVs should be installed on circa 10 radiators.

Next Steps and Additional Support Required:

- Liaise with competent contractors to investigate options to install eTRVs on the radiators.
- Upon installation define zones and schedule temperature levels based on anticipated activities per room/area.

Lighting upgrade

Implementation in 2026	Annual Savings			Cost (£)	Payback (years)
Lighting	£	tCO ₂ e	kWh		
			Electricity		
Long term capital investment	300	0.2	1,100	4,000	13.3



View of the main hall with existing linear fluorescent fittings

Current Status:

Lighting throughout the site is a mix of LED and fluorescent fittings, all of which are operated with manual controls. Areas that remain on fluorescent fittings are the main hall, the committee room, the storage rooms and the kitchenette. LEDs have been installed across the welfare facilities and the main kitchen. Yet they are manually operated and therefore could be left on at times when these facilities are unoccupied.

Recommendation:

It is recommended to replace all non-LED luminaires with LEDs especially in areas with long occupancy hours (ie main hall). The kitchen, toilets and committee room can benefit further from PIRs sensors to automate controls and ensure lights are switched off when unoccupied.

Savings of 50% are assumed for the replacement of non-LED lighting to LED, and 20-30% for the installation of presence controls.

Next Steps and Additional Support Required:

- Liaise with a competent contractor to carry out a lighting survey and obtain quotes for the replacement of the remaining non-LED lighting and for the installation of presence and daylight sensors.
- Carry out lighting upgrades to LED prioritising areas with long running hours and install passive infrared sensors (PIRs) to enable further energy savings from low occupancy rooms.

Heat pump

Implementation in 2027	Annual Savings				Cost (£)	Payback (years)
Heating	£	tCO ₂ e	kWh			
			Elec imports	Natural gas		
Long term capital investment	600	2.8	-2400	14,600	38,000	>15 years



Existing 32kWth gas boiler for space heating

Current status:

Heating is currently achieved via gas boilers which feed into radiators. This is common practice and traditionally cost effective. However, carbon emissions from this plant will remain significantly higher compared to an electrified solution based on heat pumps. This is because grid electricity emissions are expected to continue reducing in line with the grid decarbonisation target of 2050.

Recommendation:

It is recommended to replace the gas boiler with an air source heat pump (ASHP). The existing gas boiler was installed in 2010 and is therefore approaching its lifetime end. While the installation of an ASHP has no viable payback due to the high upfront costs, replacement should still be considered as it is the primary method for decarbonising the site. Additional savings not quantified will arise from the removal of gas supply to the site.

Savings are based on an assumed efficiency of 80% for the gas boiler compared to a coefficient of performance (COP) of 3.5 for the replacement ASHP. Costs are based on the replacement of the boiler and associated plant for a 32kWth heat pump, sized based on the existing boiler rating. Since modern heat pumps can achieve high flow temperatures while maintaining high efficiency levels, it is recommended to explore a solution that could generate domestic hot water (DHW) as well. Therefore, additional electricity savings would be possible compared to the current POU water heaters. These savings have been included above and assume POU efficiencies at 98% versus a COP of 2.5 for DHW generation from the ASHP.

ASHPs can also provide cooling, if this is an option that Westbrook Hall seeks to explore for occupant comfort.

Next Steps and Additional Support Required:

- Liaise with a competent contractor to obtain quotes for the replacement of the gas boiler with an ASHP.
- Replace the gas boiler and decommission the gas connection to site.

Heat pump

Implementation in 2027	Annual Savings				Cost (£)	Payback (years)
Heating	£	tCO ₂ e	kWh			
			Elec imports	Natural gas		
Long term capital investment	600	2.8	-2400	14,600	38,000	>15 years

Next Steps and Additional Support Required:

- Liaise with a competent contractor to obtain quotes for the replacement of the gas boiler with an ASHP.
- Explore solutions capable to generate DHW.
- Ensure low global warming potential (GWP) refrigerant is utilised.
- Review any government/local incentives for heat pump installations.
- Consider in conjunction with solar PV; size PV system to account for the electricity demand increase due to heat electrification.



Example of high temperature heat pump for space heating and DHW.

2.2. On-site Renewable Electricity Generation



On-site renewable electricity generation



Generating renewable electricity on-site will reduce Westbrook Hall's electricity import consumption and costs and will reduce its reliance on the electricity grid.

Any on-site generated renewable electricity consumed by Westbrook Hall has zero operational emissions, and any exported electricity shall be metered and reported to provide carbon emission benefits. Renewable electricity generated on-site shall be included in Westbrook Hall's baseline energy consumption and energy use intensity.

Installing solar Photovoltaic (PV) arrays would allow the building to generate some of its own electricity. Other solutions such as wind and hydroelectric are not feasible at this site.

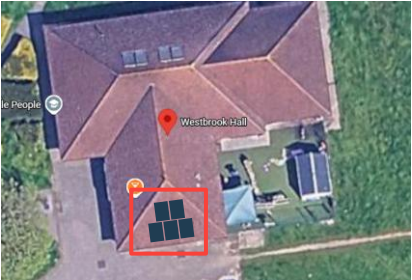
How does solar PV work

- Solar PV systems use cells to convert solar radiation into electricity. The PV cell consists of one or two layers of a semi conducting material, which is usually silicon. When solar radiation hits the cell, it creates an electric field across the layers causing electricity to flow. This solar radiation is still present on cloudy days but is less intense. The greater the intensity of the light, the greater flow of electricity, which means sunny days provide a greater opportunity for generating electricity on site.
- On days where the electricity generation from the solar PV system exceeds the building's demand, any excess generation can be exported to the electricity grid for a financial benefit to Havant Borough Council.



Implementation in 2030	Annual Savings				Cost (£)	Payback (years)
Energy generation	£	tCO ₂ e	kWh			
			Elec imports	Renewable elec		
Long term capital investment	700	0.3	2,800	-2,800	4,000	5.7

Current Status:



Proposed installation

There is currently no renewable energy generation on site. There is available space on site's pitched roofs where solar PV panels could be installed. In the past, Havant Borough Council have obtained quotes for the installation of solar PV arrays.

Recommendation:

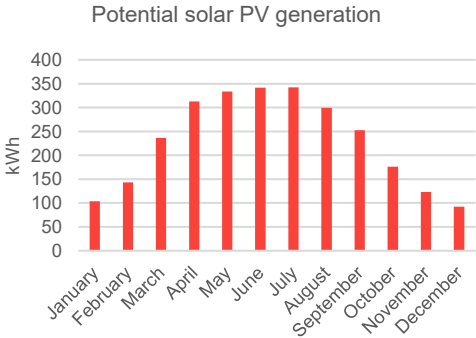
It is recommended to install solar PV on the south facing section of the roof. While quotations have been obtained for various installation types with different solar PV configurations, WSP have modelled a solar PV system for HBC to have the best return on investment. Based on this, five 510 Wp panels are considered to be installed on the south-facing roof as indicated on the top left image.

This 2.6kWp solar PV system, could generate circa 2,800 kWh per year, all of which is assumed to be used directly on site.

The potential monthly solar PV generation is provided in the graph to the bottom left.

Next Steps and Additional Support Required:

- Obtain and review additional solar PV options from high standard contractors.
- Consider system size (or future expansion), in conjunction with heat pumps installation.
- Investigate shading impact from nearby trees and any structural or grid connection constraints.
- Review any government/local incentives that are available.



2.3. Energy and Carbon Projections



Reduce operational emissions



Implementing all the recommendations detailed previously, would lead to energy savings of 68%, from 90.3 kWh/m² to 29.1 kWh/m².

The carbon intensity would drop by 91.8% in 2030, 96.8% in 2035, and 99.7% in 2050. This drop is largely attributed to the decarbonisation of the electricity grid, as it is assumed that the site would be free of fossil fuels by 2030, following the replacement of gas boilers for heat pumps.

At present, Westbrook Hall would have to offset 5.0 tCO₂e to reach Net Zero. By 2030, assuming all opportunities are implemented, 0.4 tCO₂e would remain to offset, and by 2035 this becomes just 0.2 tCO₂e.

Offsets would still be required to reach Net Zero, even if electricity is purchased from a renewable or green tariff.

The graphs in the following slides show the following:

- Impact of the recommendations on the site's energy intensity upon implementation,
- Impact of the recommendations on the site's carbon emissions in 2035,
- Projected building operational carbon emissions from 2025 to 2050.

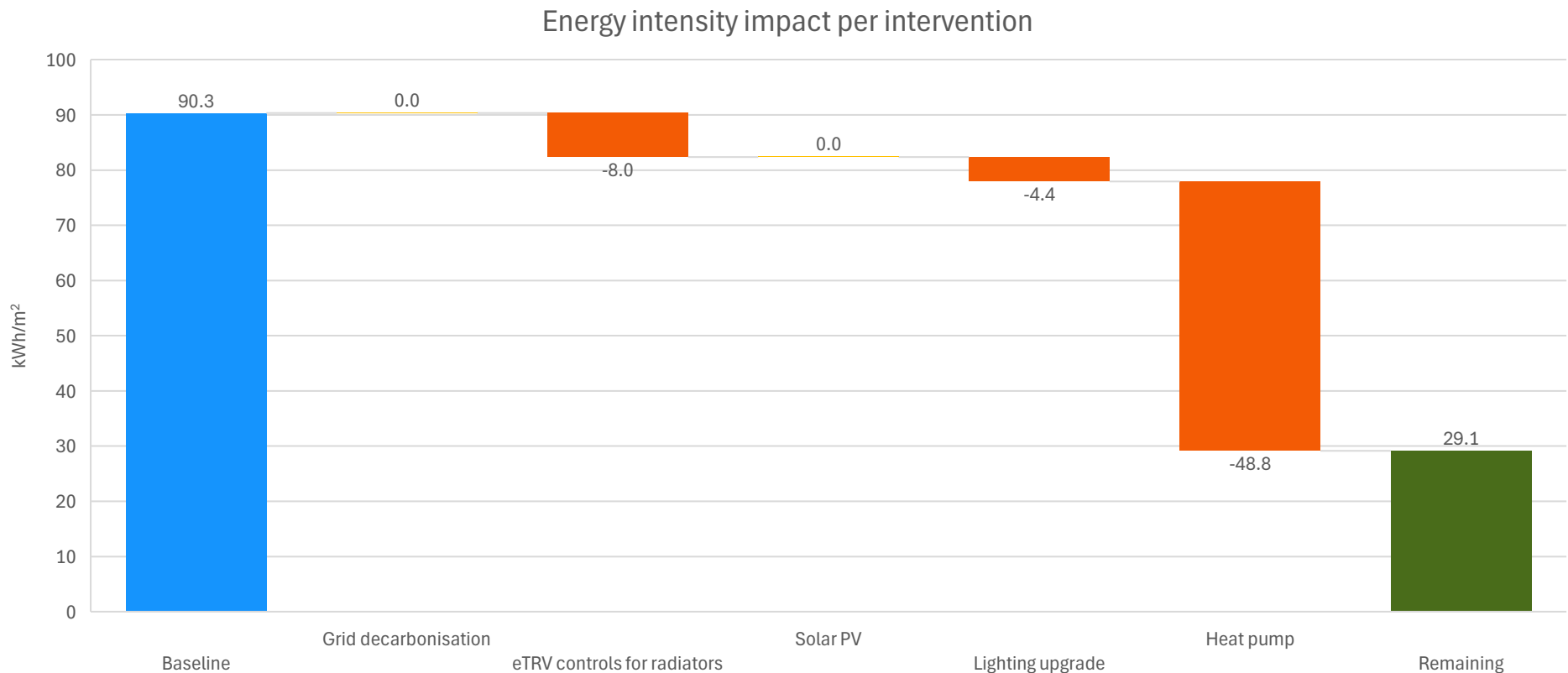
As can be observed from the graphs, the bulk of the energy and emissions reduction is from the replacement of the gas boiler with a heat pump.

The grid decarbonisation will also have a large impact on emissions reduction. If natural gas use is continued in the building, the impact will be greatly reduced, and the carbon intensity of the building will remain high.

Energy intensity impact per recommendation

The waterfall graph below shows the baseline energy intensity of the site and the impact of each energy saving measure. (Blue= baseline, orange= decrease from measures, green= remaining post measures implementation)

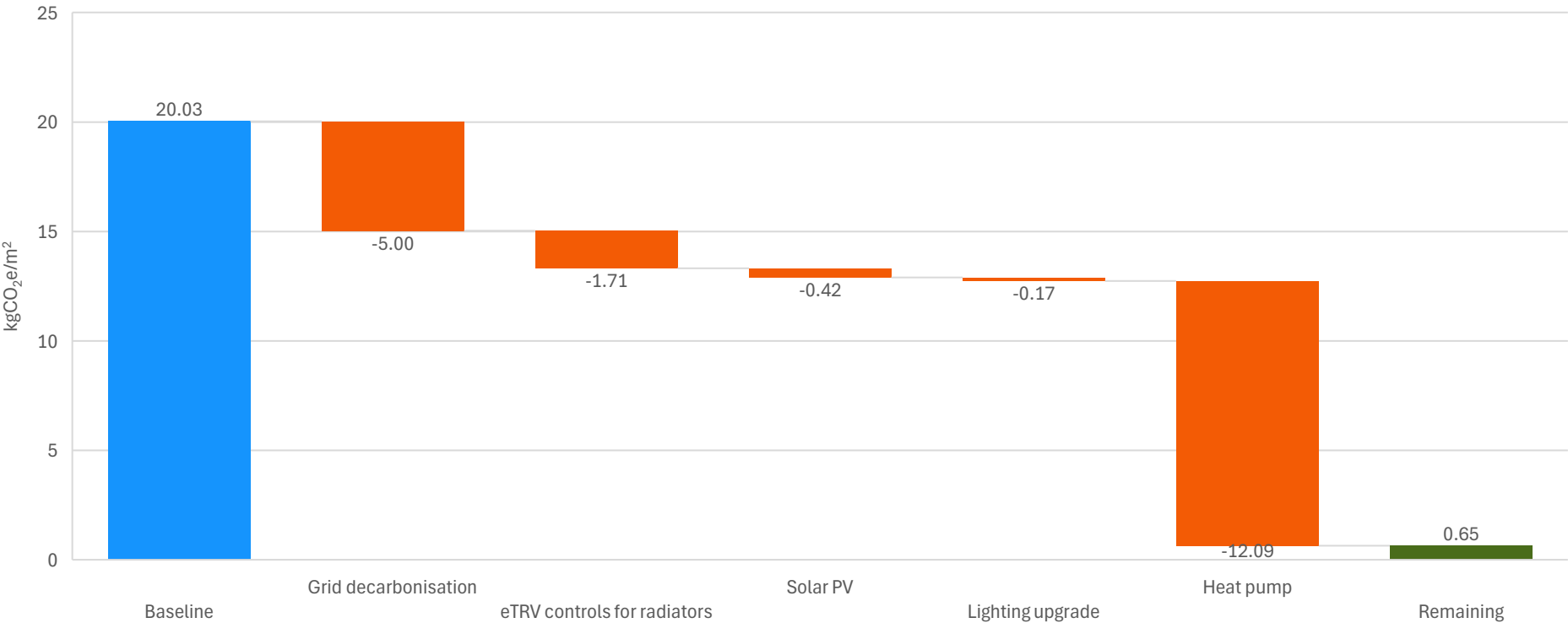
As already mentioned, the introduction of heat pump bears the highest potential reduction to the site's energy intensity, followed by the eTRV controls measure. The solar PV measure does not contribute to energy reduction hence has no impact to site's energy intensity.



Carbon intensity impact per recommendation – 2035

The projected carbon intensity impact of each recommendation for 2035 is shown in the graph below. This compares the carbon impact of reductions against the Havant Borough Council Net Zero aspirational target. The heat pump measure carries the highest impact followed by eTRV controls. HBC's Net Zero aspirational target of 68% emissions reduction by 2035 can be met (and surpassed) if all measures are implemented. (Blue= baseline, orange= decrease from measures, green= remaining post measures implementation)

Carbon intensity impact per intervention (2035)

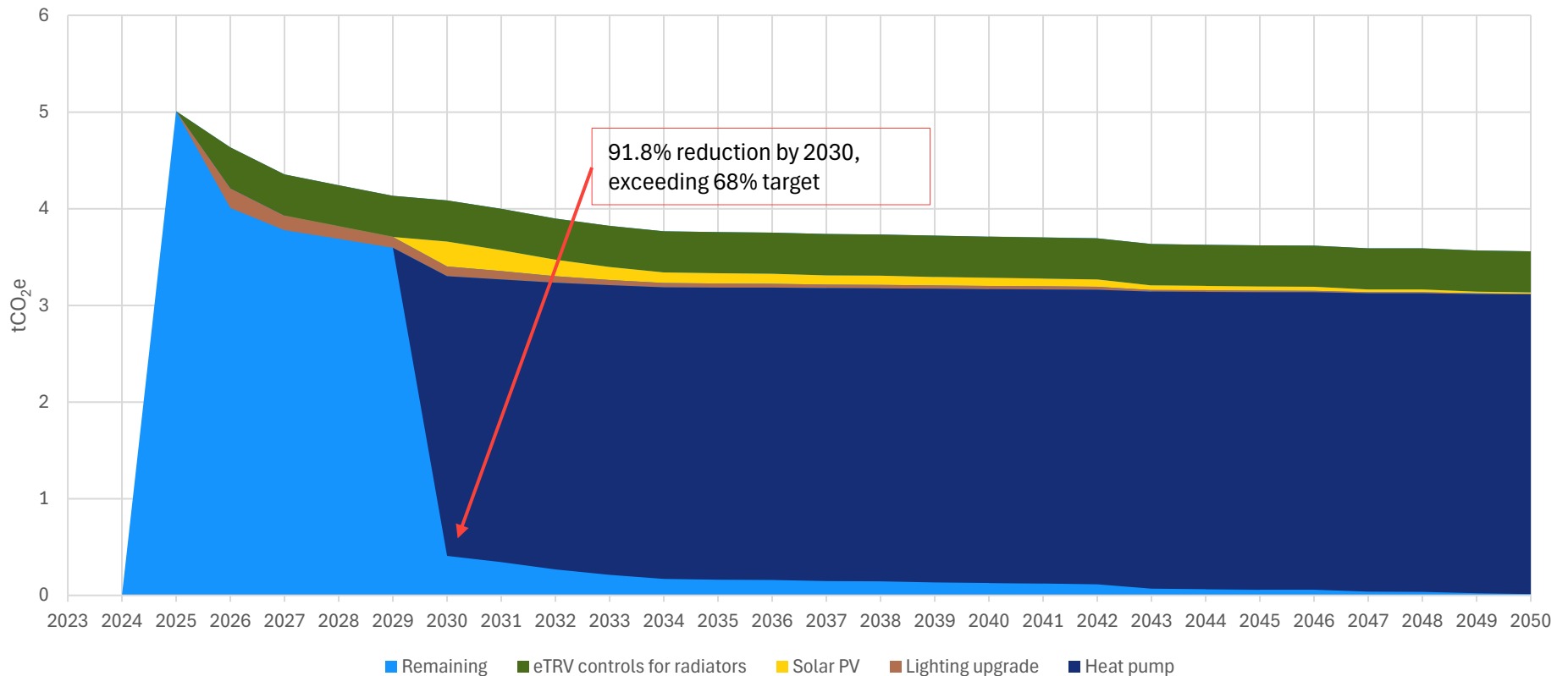


Projected site operational carbon emissions

The projected building operational carbon emissions and impacts of each recommendation is shown below.

According to this projection, carbon emissions by 2030 can potentially drop by 91.8% , surpassing the HBC target for 68% reduction. Similarly, the drop by 2035 would become 96.8%, leaving a small amount of residual emissions to be offset for HBC to achieve its 2035 operations Net Zero target.

Projected carbon emissions



2.4. Operational Water Use



How does operational water use relate to emissions?

Although water use typically represents a smaller proportion of a site's overall carbon footprint compared to energy, it is still an important operational metric. Energy is required to abstract, treat, heat, distribute and ultimately dispose of water, meaning that reductions in water use directly contribute to lower operational carbon emissions. Understanding water consumption also supports resilience, resource efficiency and compliance with emerging sustainability expectations.

The importance of reducing operational water use to reach Net Zero

Although water itself is not a direct carbon emissions source, the processes behind supply and treatment do contribute to emissions. Every cubic metre of water used on site contributes to emissions through energy-intensive pumping and treatment, while hot water use adds further emissions from energy consumption. As a result, improving water efficiency helps to reduce operational carbon and supports progress toward NetZero, particularly where large volumes of water are used on site.



Operational water use



This section presents Westbrook Hall’s water consumption, associated costs and carbon emissions alongside recommendations for operational water use reductions.

Water use on site is measured via manual meter readings where available and carbon has been calculated using standard water supply carbon factor (0.1913 kgCO₂e/m³) and treatment carbon factor (0.17088 kgCO₂e/m³) for all water disposed of via the network supplier’s drains. The table to the right provides an overview of Westbrook Hall’s annual consumption in 2025.

Water Consumption	Annual Usage m ³	Annual Cost £	Annual Emissions kgCO ₂ e
Consumption 2025	173	£1,030	62.7

Water consumption intensity has been calculated and the annual intensity metric has been compared against local and regional benchmarks. The Real Estate Environmental Benchmark* (REEB) from Better Buildings Partnership (BBP) for offices in the UK from 2024 was used as the closest match to Westbrook Hall. It is noted that Westbrook Hall does not operate as offices, but water benchmarks are limited in scope, hence this benchmark was deemed the closest match.

	Actual Performance	Typical Performance	Good Performance
Water consumption (litres/m ² pa)	692	479	298

Westbrook Hall is underperforming against a typical and good benchmarks for offices, indicating that there is potential for reduction. However, it is noted that Westbrook Hall operations would differ from office operations.

* <https://www.betterbuildingspartnership.co.uk/sites/default/files/media/attachment/REEB%20Water%20Insight%202025.pdf>

As part of this Net Zero feasibility assessment, current operational use was evaluated and is summarised in a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis below.

Strengths

- Some areas of the site demonstrate moderate efficiency or controlled water usage
- Toilets use single flush systems and taps are manually controlled.

Weaknesses

- There is one water meter, and most readings are estimated with one actual meter reading per year. Incomplete water data limits the ability to accurately compare the data to industry benchmarks.

Opportunities

- Install automatic water meters and ensure data is logged to enable accurate future baselining and monthly and seasonal monitoring.
- Install dual flush systems to toilets.
- Install non-concussive taps.

Threats

- Regulatory requirements around water-efficiency and reporting could mean that metering and submetering becomes mandatory.
- Operational risks from leaks, particularly where hot water is heavily used.
- High water tariffs could mean reducing water consumption becomes a necessity for cost saving.

Operational water use opportunities



This section provides opportunities for decarbonisation and reduction in operational water use which will support progress towards Net Zero operational carbon at Westbrook Hall. The following have been identified:

- **Monthly meter and submeter reads:** Monthly meter reads and submeter reads should be taken and recorded. This will enable Havant Borough Council to identify whether the invoices are correct which could lead to cost savings. It will also enable more effective monitoring which will help to identify any data anomalies and identify potential areas for reducing water consumption and targeting efforts for reducing water consumption.
- **Non-concussive taps:** Upgrade taps to automated type to minimise water usage and ensure taps are not accidentally left running.
- **Sensor flush controls upgrade:** Sensor flush controls could be installed for the toilets allowing for a controlled volume of water used for flushing toilets and reducing the likelihood of continual flushing occurring.
- **Water saving behaviours and awareness training:** Carrying out staff awareness programmes on water consumption can reduce excessive water misuse and reduce bad habits such as leaving a tap running when not required.
- **Rainwater harvesting:** Installing a rainwater harvesting system would allow for collection of rainwater for use on site. This will reduce main water consumption, bringing about cost and carbon savings.

3. Offset Remaining Emissions



What is carbon offsetting?

Carbon offsetting is the process of compensating for carbon dioxide emissions by investing in projects that reduce, avoid or remove an equivalent amount of carbon dioxide elsewhere, such as tree planting, renewable energy and waste gas avoidance.

Why is carbon offsetting important for achieving Net Zero?

Even after reducing emissions as far as possible, through maximising energy efficiency, switching to renewable energy and minimising all operational emissions, some unavoidable emissions will remain. Carbon offsetting provides a method of removing or preventing emissions that are hard to eliminate, enabling organisations to truly reach Net Zero.

Why does offsetting come last?

The ultimate goal of Net Zero is to stop emissions from entering the atmosphere in the first place, not to compensate for them afterwards. Reducing emissions at the source delivers real, permanent decarbonisation, whereas offsetting only balances out emissions that have already occurred. Relying on offsets means greenhouse gases continue to be released into the atmosphere, which is the opposite of what Net Zero aims to achieve. Offsetting should therefore be reserved solely for the small proportion of residual emissions that cannot be eliminated through technology, operational changes, or design improvements.

What does ‘good’ offsetting look like?

All offsets should be high quality to ensure transparency, efficacy and legitimacy. High quality offsets should be:

- Accredited under trusted standards (e.g. ICROA-endorsed¹, ICVCM Core Carbon Principles²),
- Additional (the project only delivers that carbon benefit because the investment made it possible, it would not have occurred otherwise),
- Verified by an independent body,
- Linked to projects with clear climate benefits (e.g. tree planting, carbon capture storage, methane capture).

¹ <https://icroa.org/>

² <https://icvcm.org/core-carbon-principles/>

Appendices



Appendix A: Methodology and limitations

Methodology:

This Assessment of Energy Saving Opportunities has been designed to provide information relating to:

- The current energy consumption, management and site operation;
- Potential savings with regard to occupational behaviour, plant operation, feasibility of plant upgrade and site energy management.
- Identifying the potential for renewable resources to aid with energy efficiency.
- Any relevant information provided by the Client has been reviewed, with action taken to ensure this information is taken into account and/or verified where necessary. All information is then assessed to define the potential for energy savings and/or cost savings, where applicable. Recommendations are made for additional work where this is necessary to fully define the implementation and cost estimates for further detailed assessment that is recommended can be provided under separate cover, where appropriate.

Limitations:

WSP UK Limited has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from WSP UK Limited.

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The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources (including the Client) and discussions with relevant authorities and other interested parties. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, WSP UK Limited reserves the right to review such information and, if warranted, to modify the opinions accordingly.

It should be noted that any recommendations identified in this report are based on information provided by the Client and as gathered during the site survey. In some cases, access cannot be granted to all areas of the site, in these instances and in the absence of information to the contrary, WSP will use the information provided to complete the report.

Before relying upon this assessment of energy saving options and capital and operating cost estimates, it is recommended that the Client should review these initial results and compare them with other energy and technology costs data and literature that is available. WSP have produced these ball-park estimates of capital and operating costs for the purposes of initial feasibility assessment only using the limited data and assumptions provided by the Client at this time. A full front-end engineering and design (FEED) study would be required to confirm and refine the technology cost estimates and determine the true payback time and NPV.

Appendix B: List of abbreviations



HBC	Havant Borough Council
AHU	Air Handling Unit
ASHP	Air Source Heat Pump
BMS	Building Management System
DHW	Domestic Hot Water
EC fan	Electrotonically Commutated Fan
GHG	Greenhouse Gas
GWP	Global Warming Potential
HVAC	Heating, Ventilation and Air Conditioning
kWp	Kilowatt Peak
kW	Kilowatt
W	Watt
LED	Light-Emitting Diode
PIR	Passive InfraRed (sensor)
PoU	Point-of-Use (water heaters)
Solar PV	Solar PhotoVoltaic

UKGBC	UK Green Building Council
UKNZCBS	UK Net Zero Carbon Buildings Standard
TRV	Thermostatic Radiator Valve
DESNZ	Department for Energy Security and Net Zero
CIBSE	Chartered Institution of Building Services Engineers
LCCA	Life cycle cost analysis
eTRV	Electronic Thermostatic Radiator Valve
VSD	Variable Speed Drive
IR	Infrared
SWOT	Strengths Weaknesses Opportunities and Threats
REEB	Real Estate Environmental Benchmark
BBP	Better Buildings Partnership



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