

Acorn Community Centre

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 Acorn Community Centre, Havant Borough Council.

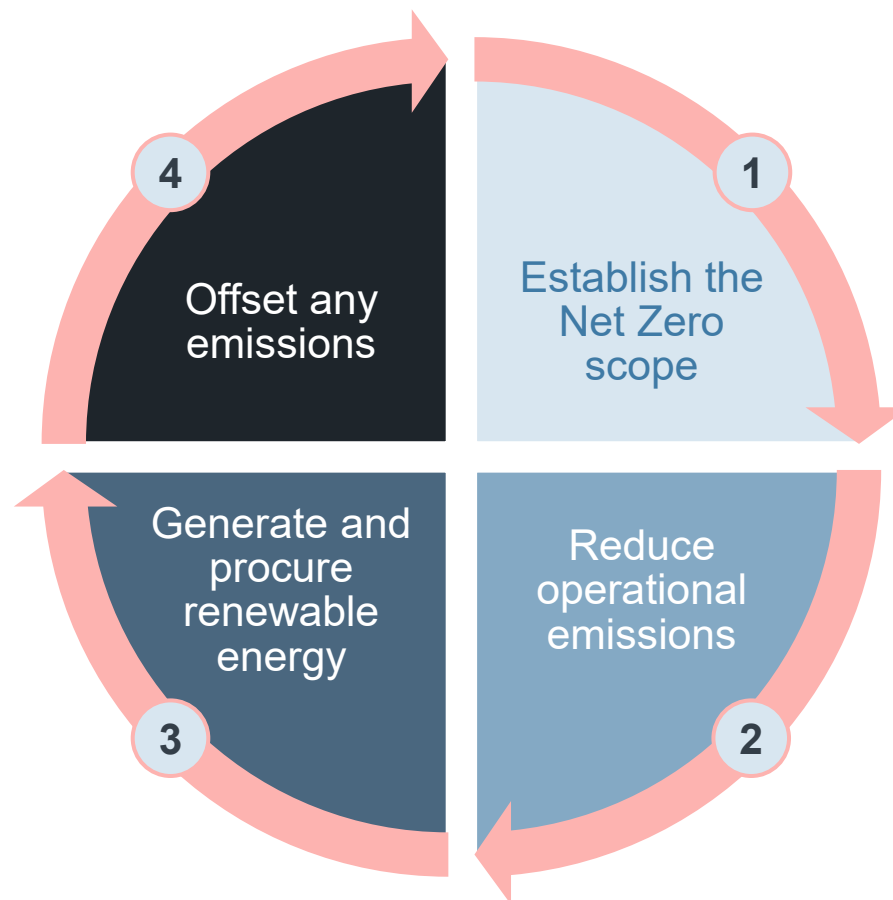
Baseline: Calendar year 2025

- ❖ Energy consumption: 99,646 kWh
- ❖ Energy costs: £13,508
- ❖ Carbon emissions: 21.9 tCO₂e
- ❖ The energy baseline includes electricity imports and natural gas.

Key findings:

- ❖ Improve operational controls with electronic thermostatic radiator valves (eTRVs).
- ❖ Replace gas boilers for air source heat pumps (ASHPs) and infrared (IR) heaters to complete site degasification.
- ❖ Upgrade air handling unit (AHU).
- ❖ Install solar photovoltaic (PV) to generate clean energy on site

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	Install e-TRVs	2026	5,500	1.2	£600	£3,000	5.0	£2,500	
2	Solar PV	2028	0	2.1	£4,300	£22,000	5.1	£10,500	
3	EC fans installation (AHU)	2027	3,300	0.6	£600	£5,000	8.3	£8,300	
4	Lighting	2026	3,600	0.7	£900	£14,000	Over 15 years	£20,000	
5	Replace gas boilers with Air Source Heat Pump	2030	33,690	8.8	£1,800	£152,000	Over 15 years	£17,300	
6	Electric IR heaters	2029	3,600	3.2	-£2,600	£4,000	No payback	£1,300	
Total			49,690	16.6	£5,600	£200,000	Over 15 years	-	-

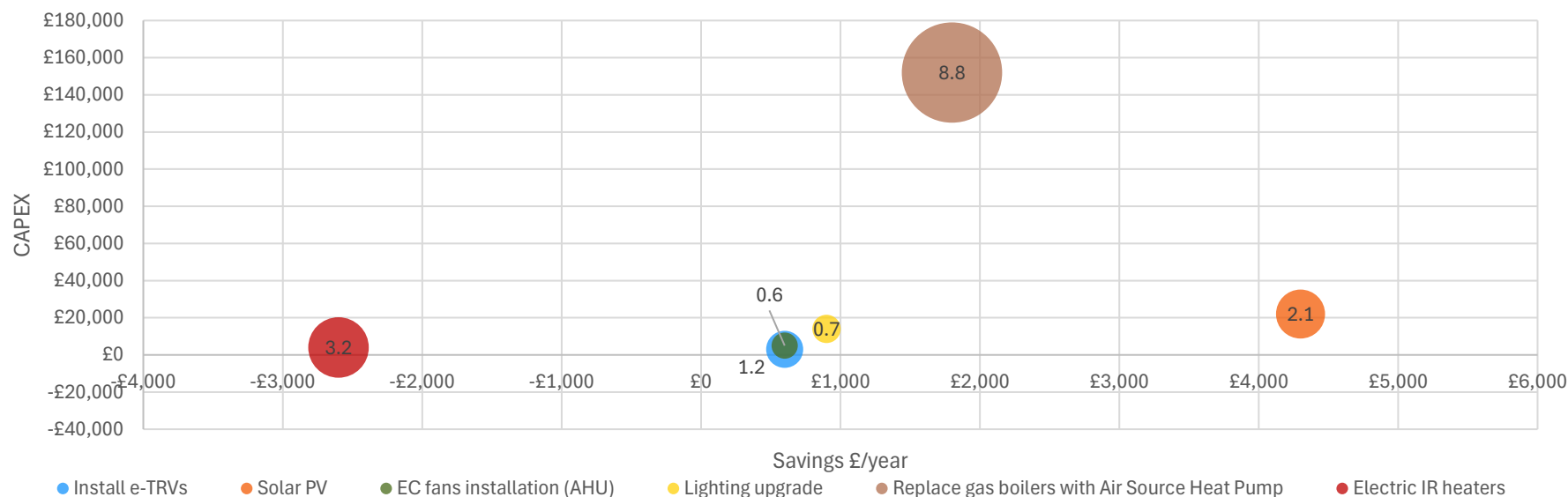
The cost to carbon savings ratio (£/tCO₂e) compares upfront capital investment against annual carbon savings. This is also referred to as carbon abatement cost. Measures with low carbon abatement costs are the most cost effective in reducing carbon emissions, while higher-cost measures may still be required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

Executive summary



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 HBC'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 Acorn Community Centre 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.

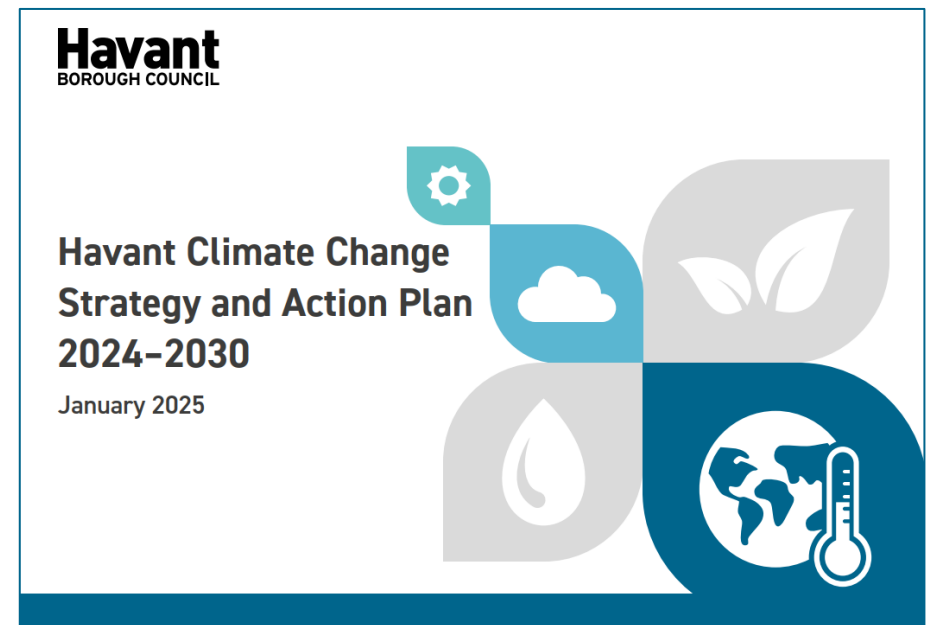
HBC reports emissions in line with the Greenhouse Gas Protocol, covering Scopes 1, 2 and 3. Due to data limitations, Scope 3 reporting is currently limited to Transmission & Distribution (T&D) losses and emissions from outsourced services and leased properties, with coverage expected to expand over time.

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 Acorn Community Centre'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 Acorn Community Centre 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 Acorn Community Centre. The report provides the following:

- Analysis of energy consumption at Acorn Community Centre, including an overview of the site and its energy users,
- Recommendations to reduce the site's energy consumption and operational carbon emissions,
- Guidance on how Acorn Community Centre 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 Acorn Community Centre, while noting that formal verification is not awarded as part of this study.



Site Context



Site overview

Site:	Acorn Community Centre
Address:	3 The Kestrels, Wecock Farm, Waterlooville, PO8 9UX
Floor area:	1,115 m ²
Survey date:	20/01/2026



The Acorn Community Centre belongs to Havant Borough Council and is currently run by Wecock Community Association. It offers a wide and diverse range of activities including toddler/baby groups, social clubs, workshops and seasonal events for all ages and interests. Further to regular activities, the halls and rooms of the venue can be hired out for parties, conferences, workshops, classes, meetings etc.

The site was constructed in 2003 and opened in 2004. It comprises a ground floor building with loft space for the plantroom and two storage rooms. It is assumed that walls are of brick insulated cavity construction. Windows are opening double-glazed type.

Main building areas include a café, laundrette and charity shop alongside the main hall (used for conferences, exhibitions and sports sessions), large lounge (for training sessions, community group sessions and parties), art lounge (for smaller group and training sessions) and a small meeting room (for one-to-one interviews, teaching and meetings). The site also includes Squirrels Nursery which offers care for nursery-aged and pre-school-aged children.

Further to electricity, natural gas is also used on site for the purposes of space heating and hot water generation.

Typical occupancy hours are Mon-Fri 09:00-17:00. Evening activities tend to take place between Mon-Wed 17:00-19:30. Ad hoc events are scheduled during weekends. The Squirrels Nursery operates daily between 07:00-18:00 (babies, toddlers and pre-school). Cleaning activities take place at the end of the day.

Lighting across the building is approximately half fluorescent and half LED. During the survey, it was established that any failed fittings are replaced with LEDs. Lighting controls are predominantly manual apart from toilets that are equipped with presence sensors.

Space heating is achieved by means of two gas condensing boilers, each rated at 55 kW (n+1). These boilers feed into the wet radiators equipped with thermostatic radiator valves (TRVs). A single central timer thermostat controls space heating. The main hall of the community centre relies on two gas-fired radiant heaters for space heating, each with a dedicated thermostat controller.

Hot water is generated via a 20 kW Lochinvar gas-fired water cylinder, maintaining a temperature of 60°C with a water capacity of 382 litres. This is controlled via a dedicated schedule-timer in the plantroom in the loft.

In terms of **ventilation**, two air handling units (AHUs) provide ventilation to most building areas except for the main hall that has a dedicated passive ventilation system. The AHU that was accessible at the time of the survey, located in the loft plantroom, comprises of separate supply and extract fans ducting. The supply fan is belt driven (~4 kW) and the extract fan is direct drive (~2.5 kW). No heat recovery was observed. The other AHU that was not accessible at the time of the survey serves the extension unit and is reported to have heat recovery. No other specs are made available.

Ventilation fans exist in the kitchen and toilets for extraction purposes. The toilets central extraction fan is estimated to draw about 400 W.

No mechanical **cooling** plant exists on site.

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
3	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
2	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
1	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
0 (poor)	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

Energy Analysis



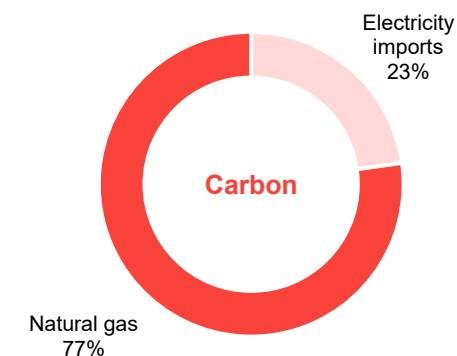
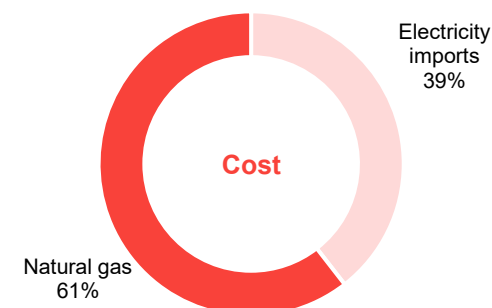
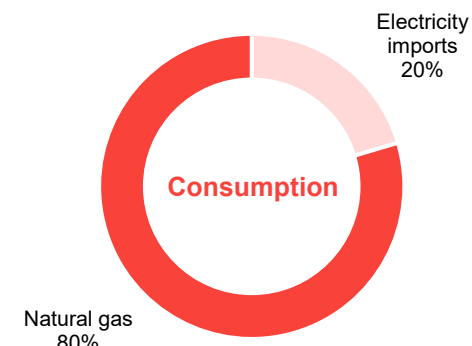
Energy baseline

Acorn Community Centre has provided energy consumption and cost data for the Jan–Dec 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*.

Fuel type	Consumption		Costs		Emissions	
	kWh	%	£	%	tCO ₂ e	%
Electricity imports	20,315	20.4%	£4,943	36.6%	4.99	22.8%
Total electricity	20,315	20.4%	£4,943	36.6%	4.99	22.8%
Natural gas	79,331	79.6%	£8,565	63.4%	16.91	77.2%
Total	99,646	100.0%	£13,508	100.0%	21.90	100.0%

Energy tariffs	£/kWh
Electricity imports	£0.24
Natural gas	£0.11

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 display energy certificate (DEC) 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.

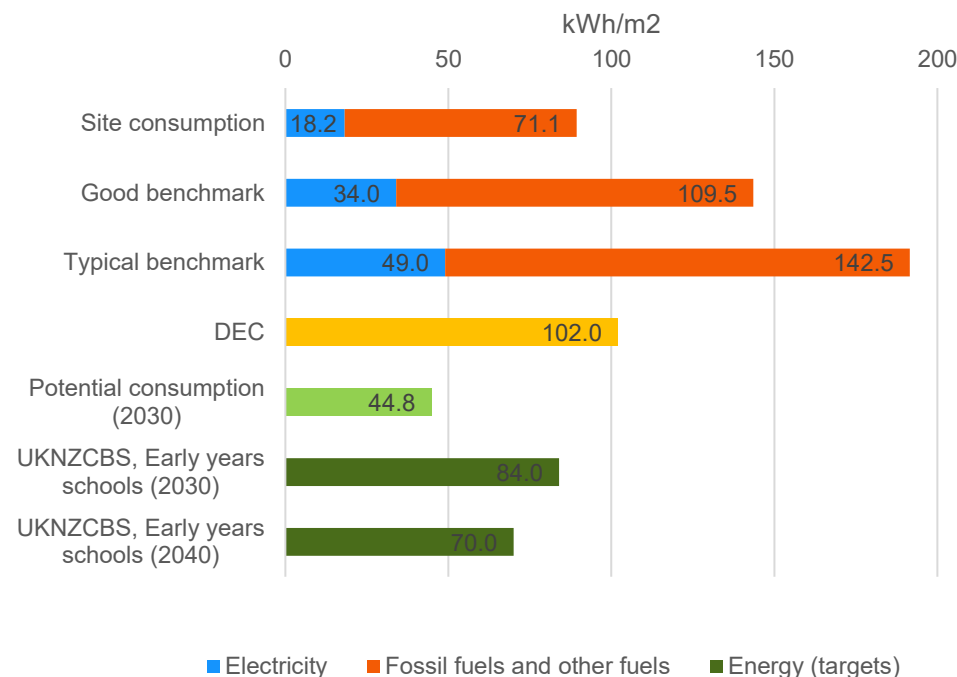
The CIBSE benchmark¹ for local authority community centres and day centres was used to assess the current energy performance of the site. These benchmarks use data from DEC's from 2021 and give the typical energy consumption per square meter per year for community centres and day centres and are derived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

The site is performing better than both the typical benchmark and good benchmarks for these building types, for total energy, electricity and gas, indicating that the site is performing better than similar building types.

The site's potential energy intensity, based on current baseline energy consumption and the identified energy saving opportunities, is 44.8 kWh/m², almost 50% lower than the current performance (89.4 kWh/m²).

This outperforms the UKNZCBS early years schools target² for 2030, which is of 84 kWh/m² and the 2040 target of 70.0 kWh/m². It is noted that this target does not align completely with the use of the site, and a more appropriate target may be used should the UKNZCBS release targets for a wider range of sites.

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

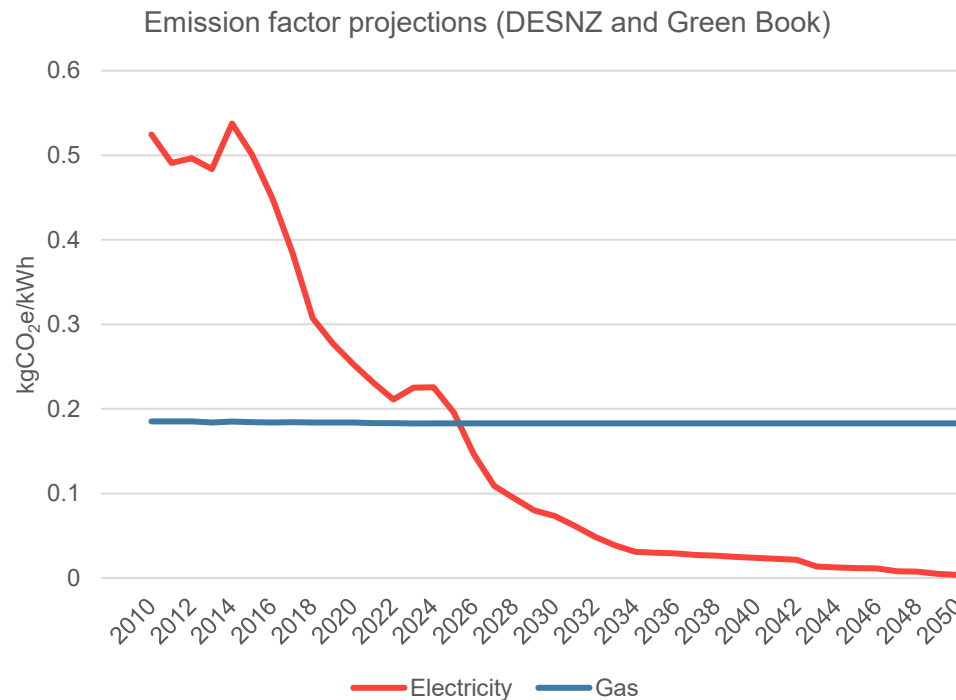
Energy carbon emission projections



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.



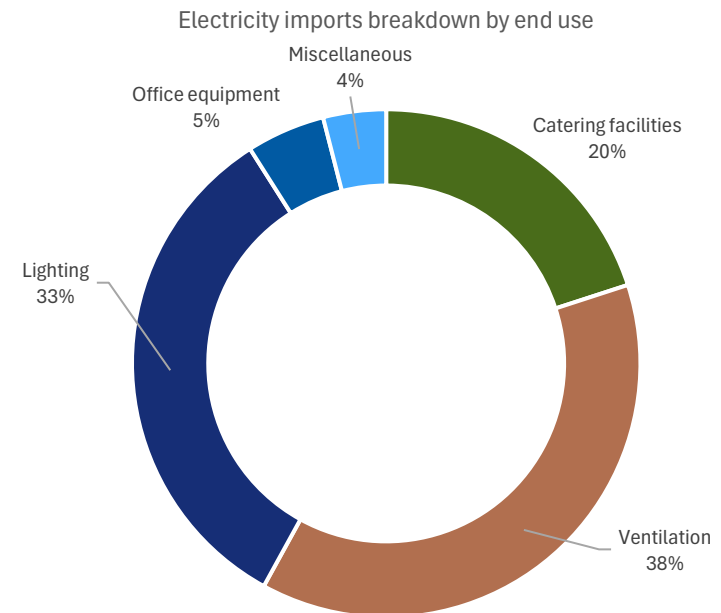
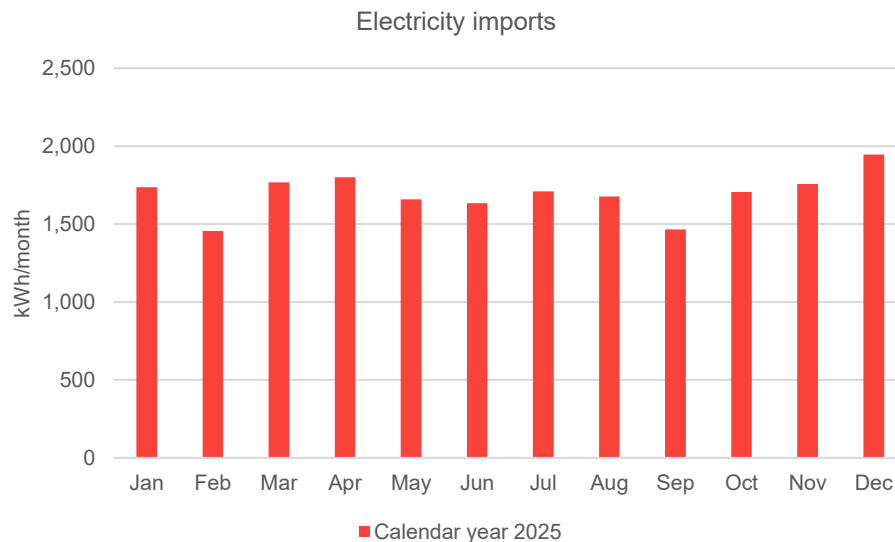
As can be observed on the graph, the electricity carbon factor is decreasing, and is set to continue decreasing until it reaches near zero emissions. However, the gas carbon factor will remain stable as natural gas is a fossil fuel and is not generated by renewables. Therefore, the removal of gas and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

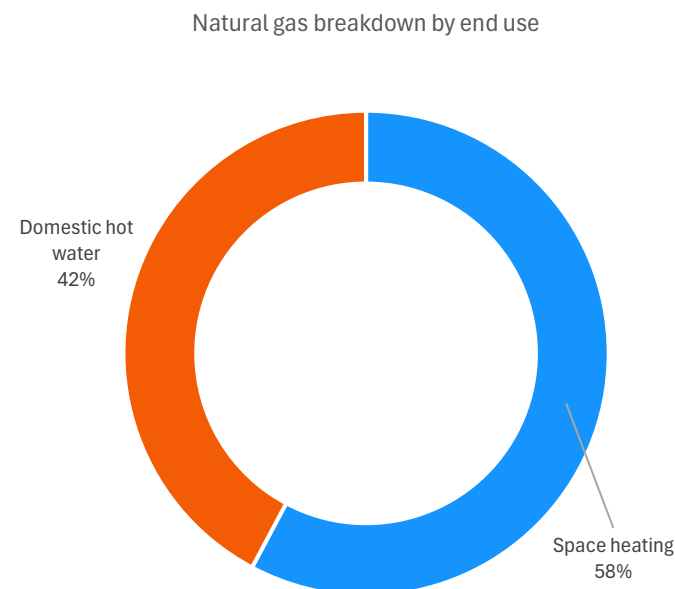
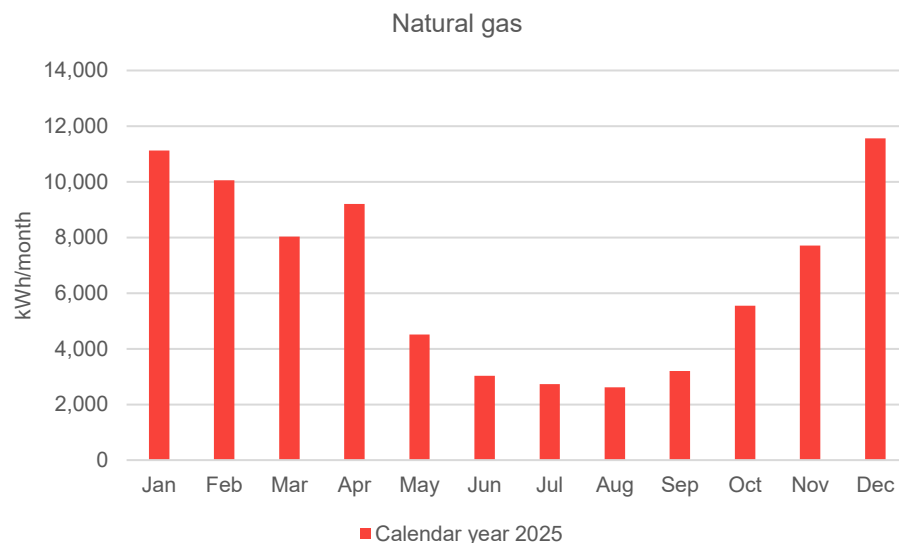
The below left graph, shows the monthly electricity consumption for calendar year 2025. Consumption does not follow any noticeable trends and remains relatively stable over each month. The main electricity consumers are expected to be ventilation and lighting, followed by catering facilities. Office equipment and miscellaneous equipment is expected to make up the remaining consumption.



The electricity breakdown graph (right) relies 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 where applicable. As such, the figures should be taken as an indication only. However, 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 Acorn Community Centre, across the 2025 calendar year. Natural gas consumption is dominated by space heating and therefore the monthly profile aligns with high gas demand during colder months of the year (Oct-Apr). Gas is also used for hot water generation, which explains the gas demand during warmer months (May-Sep). Based on the monthly gas consumption, the breakdown between space heating and domestic hot water has been estimated in the graph shown below.



The natural gas breakdown graph (right) uses metered data and 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. However, 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

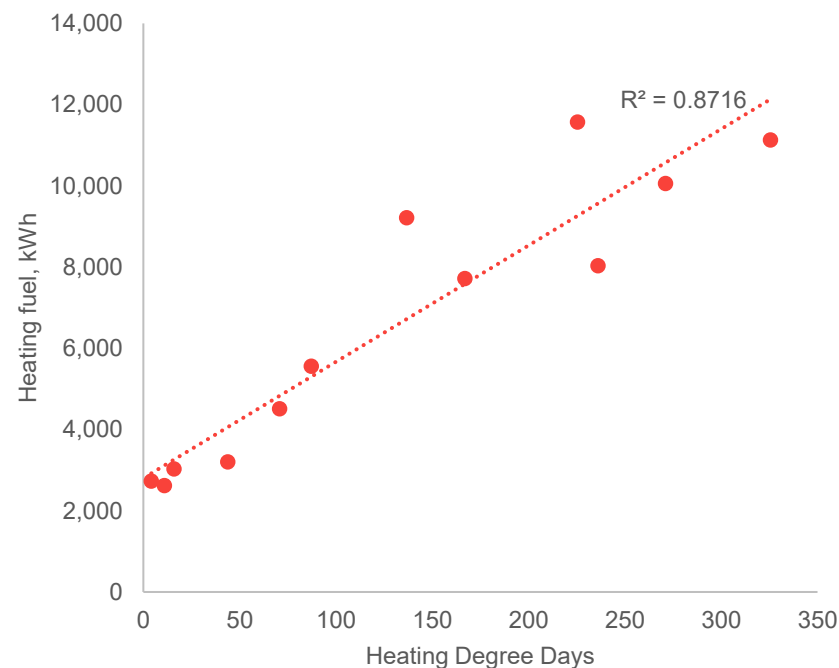
Energy consumption can be compared against external temperatures to assess the impact of temperature on energy consumption.

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 below 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, $R^2=0.872$, indicating an average correlation between gas consumption and heating degree days. As the gas consumption accounts for hot water and catering as well, this is to be expected. Yet, there may be opportunity to further optimise current heating controls.



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 Acorn Community Centre, 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 Acorn Community Centre.

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 Acorn Community Centre energy baseline for the 2025 calendar year is given below, including carbon factors, energy rates, energy intensity and carbon intensity.

Energy consumption	kWh/year	£/year	tCO ₂ e/year
Electricity imports	20,315	£4,943	4.99
Total electricity	20,315	£4,943	4.99
Natural gas	79,331	£8,565	16.91
Total energy consumption	99,646	£13,508	21.90

The calendar year 2025 baseline shows that Acorn Community Centre relies on both electricity imports and natural gas, with no renewable energy generation on site.

Fossil fuel consumption, in this case natural gas, is predominantly used for space heating, with the remaining consumption required for hot water generation.

Energy and carbon intensity	Energy intensity (kWh/m ²)	Carbon intensity - baseline year (kgCO ₂ e/m ²)
Electricity imports	18.2	4.5
Total electricity	18.2	4.5
Natural gas	71.1	15.2
Total energy consumption	89.4	19.6

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 Acorn Community Centre. From the Net Zero Decarbonisation Study at the Acorn Centre, 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	Install e-TRVs	2026	5,500	1.2	£600	£3,000	5.0	£2,500	
2	Solar PV	2028	0	2.1	£4,300	£22,000	5.1	£10,500	
3	EC fans installation (AHU)	2027	3,300	0.6	£600	£5,000	8.3	£8,300	
4	Lighting	2026	3,600	0.7	£900	£14,000	Over 15 years	£20,000	
5	Replace gas boilers with Air Source Heat Pump	2030	33,690	8.8	£1,800	£152,000	Over 15 years	£17,300	
6	Electric IR heaters	2029	3,600	3.2	-£2,600	£4,000	No payback	£1,300	
Total			49,690	16.6	£5,600	£200,000	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 recommendation with no payback relates to the site degasification and is key to reaching Net Zero.

Cost to carbon savings ratio



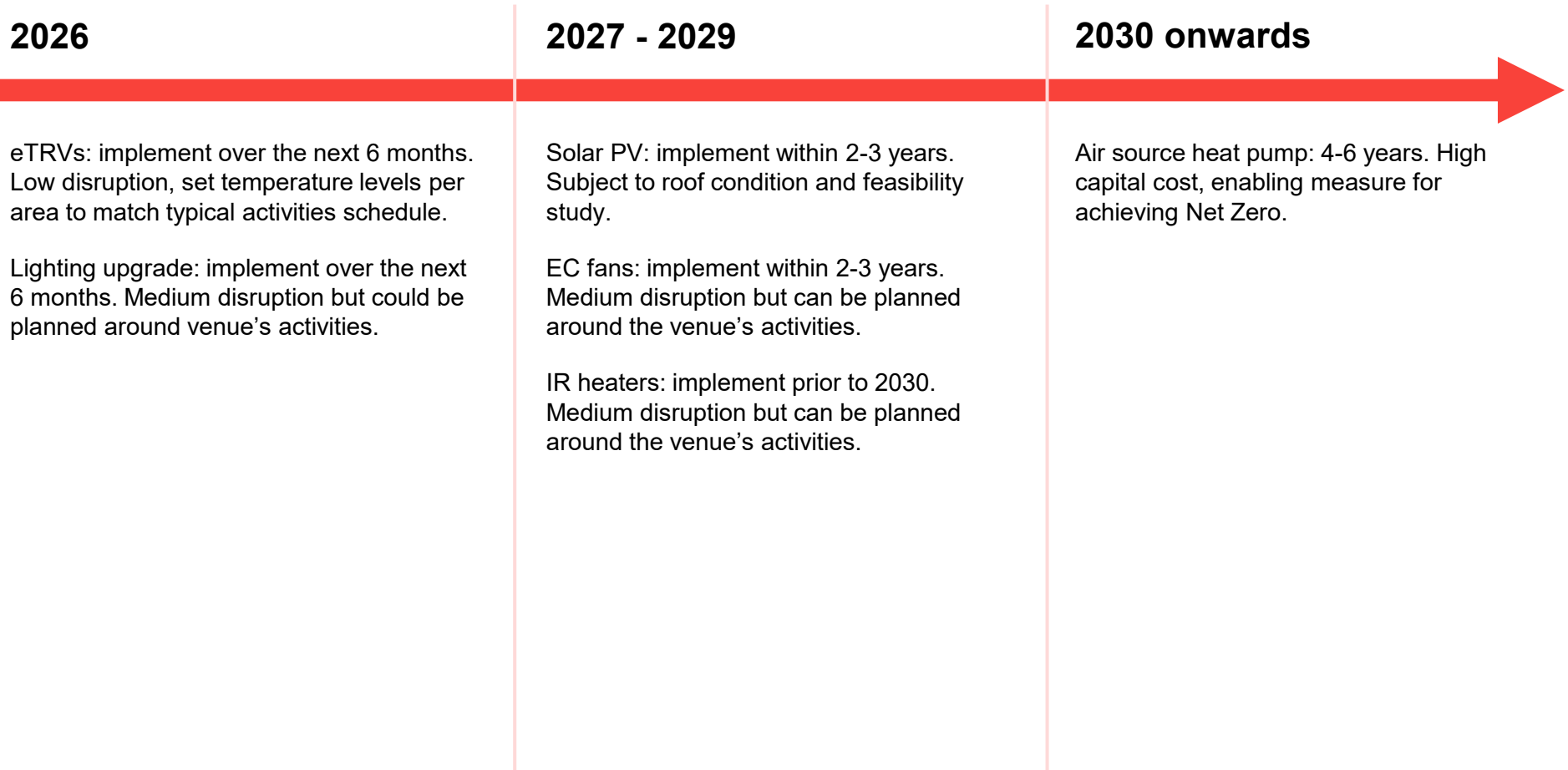
The bubble chart below shows how the identified measures compare in terms of capital investment and energy savings. The annual carbon savings per measure is reflected by the bubble size (also given by the value within or near each bubble). Therefore, a larger bubble represents a larger annual reduction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



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 taken as 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 Havant Borough Council for Acorn Community Centre 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 of around £180,000, with energy cost savings of roughly £106,000 and maintenance costs of around £6,000.

Recommendation	Implementation year	Recommendation lifespan	Capital cost (£)	Energy costs or savings (£)	Maintenance costs or savings (£)	Total costs or savings (£)	Total energy savings (kWh)
Install e-TRVs	2026	10	£2,600	-£4,700	£400	-£1,600	55,000
Solar PV	2028	25	£21,000	-£67,500	£5,400	-£41,100	0
EC fans installation (AHU)	2027	20	£4,600	-£8,300	£0	-£3,700	65,800
Lighting	2026	30	£13,700	-£16,800	£0	-£3,100	108,000
Replace gas boilers with Air Source Heat Pump	2030	20	£134,700	-£34,400	£0	£100,300	673,800
Electric IR heaters for Community Centre Hall	2029	20	£3,700	£26,200	£0	£29,900	72,000
Total	-	-	£180,300	-£105,500	£5,800	£80,700	974,600

2.1. Operational Energy



Install e-TRVs

Implementation in 2026	Annual Savings			Cost (£)	Payback (years)
	£	tCO ₂ e	kWh		
			Gas		
Heating					
Controls improvement	£600	1.2	5,500	£3,000	5.0



Examples of existing radiators with TRVs.



Example of eTRV

Current status:

Most areas at Acorn centre rely on wet radiators for space heating. These are equipped with manual thermostatic radiator valves (TRVs) for localised indoor temperature control. Typically TRVs are set at the desired level but not dynamically adjusted to suit actual space usage, which could lead to higher heating demand.

Recommendation:

It is recommended to install eTRVs 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 22 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.

EC fans installation (AHU)

Implementation in 2027	Annual Savings				Cost (£)	Payback (years)
HVAC	£	tCO ₂ e	kWh			
			Elec	Gas		
Long term capital investment	£600	0.6	1,920	1,380	£5,000	8.3 years

Current status:

Currently, two air handling units (AHUs) provide ventilation to most areas of the building, except for the main hall. AHU 1 that was accessible during the survey, is located in the loft plantroom and includes separate supply and extract fans. The former is belt driven and the latter is axial direct drive. These fans are operated with the help of a multi-channel timer and are assumed to run constantly at 100%.

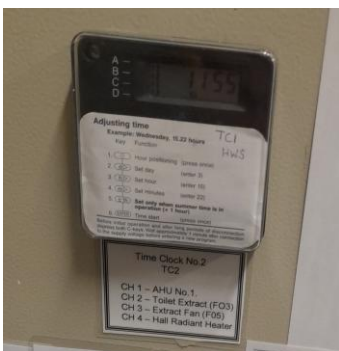


AHU 1 in loft plantroom.

Recommendation:

It is recommended to replace the fans with Electronically Commutated (EC) equivalent as these accommodate easy speed control. On the supply side, this will reduce losses arising from the belt drive configuration. Additionally with the introduction of an air quality sensor, fan speeds can be adjusted according to CO₂ levels and thus optimise ventilation rates according to site occupancy levels. This has the potential to directly reduce fans' power demand as well as reduce the AHUs heating demand. Some further savings may be possible by matching AHU run hours to occupancy schedules.

An average speed reduction of 15% has been considered against the AHU fans speeds which could result to circa 40% drop on fans' electricity baseline. A 3% saving has been factored in as well, against the site's baseline heating demand. The indicated CAPEX accounts for the EC fans replacement and the CO₂ sensor integration.



Existing multi channel timer for controlling AHU 1

Next Steps and Additional Support Required:

- Liaise with AHU contractors to quote for EC fans and CO₂ sensor upgrades. Subject to costs and space limitation, consideration should be made whether to entirely replace AHU1 for a new unit that allows for heat recovery as well .
- Ensure compatibility with existing controls or introduce dedicated controller that allows AHU status monitoring and easy settings adjustment.
- Explore if dampers are required per AHU served area to ensure adequate ventilation is achieved.

Lighting upgrades

Implementation in 2026	Annual Savings			Cost (£)	Payback (years)
Lighting	£	tCO ₂ e	kWh		
			Elec		
Long term capital investment	£900	0.7	3,600	£14,000	Over 15 years



Examples of existing fluorescent fittings in Acorn Centre.

Current Status:

Lighting on site was observed to consist of both fluorescent and LED fittings. Failed fittings are understood to be replaced with LEDs. Controls were observed to be predominantly manual apart from welfare facilities that utilise presence sensors (PIRs).

Recommendation:

It is recommended to replace any remaining fluorescent lighting with equivalent LED fittings. The savings presented above consider like-for-like replacements and an average 54% reduction against the current lighting baseline. Some further savings could be realised achieved with the deployment of PIRs in meeting rooms and office areas.

Next Steps and Additional Support Required:

- Carry out a lighting survey to establish replacement cost and prioritise areas with long operating hours.
- Source quotations and proceed with replacements using reputable contractors.
- Consider dimming functionality in nurseries to facilitate activities and possibly increase higher energy savings.

Electric IR heaters

Implementation in 2029	Annual Savings			Cost (£)	Payback (years)
Heating	£	tCO ₂ e	kWh		
			Elec Gas		
Long term capital investment	-£2,600	3.2	-21,850 25,450	£4,000	No payback



Existing gas radiant heater in the main hall at Acorn Centre.



Example of electric IR heaters in high ceiling venue.

Current Status:

The main hall of the community centre currently relies on two gas-fired radiant heaters for space heating, each with a dedicated thermostat controller. A timer controller, located in the loft plantroom, dictates the operating hours during which the gas radiant heaters can be enabled.

It is common practice for high ceiling spaces to utilise gas radiant heaters, yet the use of gas means that carbon emissions will remain high compared to an electrified solution.

Recommendation:

It is recommended to replace the gas radiant heaters with equivalent electric Infrared (IR) heaters. It has been estimated that four IR cassettes, each rated at 3.4kW, would suffice to provide the required space heating.

Current gas consumption has been estimated considering the good CIBSE heating fuel benchmark for sports halls, at 103 kWh/m² per annum. The indicated savings, assume gas radiant heaters and electric IR heaters efficiencies at 85% and 99% respectively.

Even though this recommendation does not have a payback, it is important to consider for its strong decarbonisation performance.

Next Steps and Additional Support Required:

- Consider logging existing gas radiant heaters to accurately derive annual gas demand. This will enable a more accurate sizing of electric IR replacements.
- The increase in electricity demand should be modelled and considered in the design of the solar PV system.
- Source quotations from reputable contractors and carry out replacements.

Replace gas boiler with ASHP

Implementation in 2030	Annual Savings			Cost (£)	Payback (years)
HVAC	£	tCO ₂ e	kWh		
			Elec Gas		
Long term capital investment	£1,800	8.8	-13,320 47,010	£152,000	Over 15 years

Current Status:

Space heating on site is currently provided by two gas condensing boilers, each rated at 55 kW. These generate hot water that feeds into radiators and the AHUs. In addition, a gas calorifier, rated at 20kW, is generating domestic hot water used across the site. All plant is located in the loft boiler room.

Recommendation:

It is recommended to replace the gas boilers with an air source heat pump (ASHP) to reduce the site's reliance on fossil fuels, in this case natural gas.

Calculations assume the existing systems operate with approximately 85% efficiency. The replacement ASHP would likely operate at an efficiency of 300% and would therefore, result in overall energy savings. The total thermal capacity required has been estimated at 75kW to accommodate the space heating as well domestic hot water (DHW) generation.

Capital costs have been estimated based on the higher cost of typical UK prices to accommodate systems integration and controls upgrades.

Next Steps and Additional Support Required:

- Source quotations from reputable contractors and assess space requirements and structural loads limitations.
- Establish if increase in electrical connection capacity is required.
- Consider measure in conjunction with solar PV installation to maximise offset of electrical demand
- Explore applicable local/government financial incentives.



Existing gas boilers (left) and gas water cylinder (right) at Acorn Centre.

2.2. On-site Renewable Electricity Generation



On-site renewable electricity generation



Generating renewable electricity on-site will reduce Acorn Community Centre's electricity import consumption and costs and will reduce its reliance on the electricity grid.

Any on-site generated renewable electricity consumed by Acorn Community Centre 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 Acorn Community Centre'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

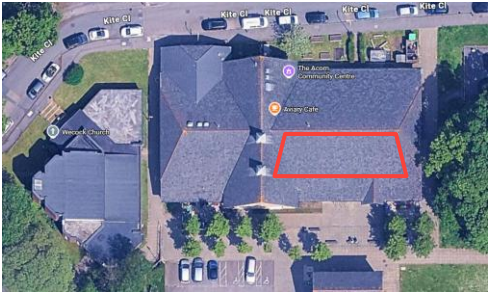
- Solar PV systems use cells to convert solar radiation into electricity. The PV cell consists of one or two layers of a semi conducting material, which is usually silicon. When solar radiation hits the cell, it creates an electric field across the layers causing electricity to flow. This solar radiation 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 Acorn Community Centre.



Solar PV (roof mounted)



Suggested implementation in 2028	Annual Savings				Cost (£)	Payback (years)
Energy Generation	£	tCO ₂ e	kWh			
			Elec imports	Renewable Elec		
Long term capital investment (with payback over 3 years)	£4,300	2.1	17,670	-17,670	£22,000	5.1 years



Issue:

Presently Acorn Community Centre does not benefit from any renewable energy generation systems. Power generated locally can be used to partly offset grid imports and assist in reducing energy cost impacts arising from volatile electricity price.

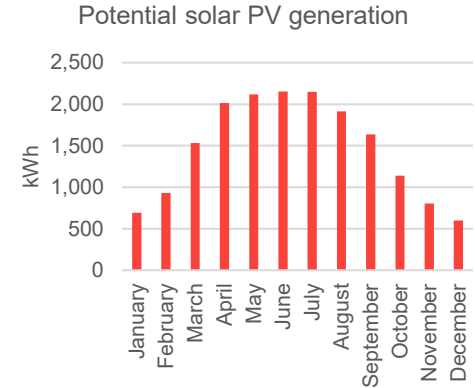
Solution:

The south-facing pitched roof has been identified as suitable for solar PV installation, outlined in red in the image to the left. This area combined amount to about 120m² which could accommodate a solar PV array of approximately 16 kWp, subject to further feasibility and structural surveys. Capital cost is based on the median UK cost per kWp for an array of this size.

It is estimated that this solar PV array would generate around 17,700 kWh annually. It has been assumed that 100% of generated electricity would be used on site, subject to heat electrification measures going ahead as well.

Next Steps and Additional Support Required:

- Conduct structural surveys to establish if additional loads from solar PV can be accommodated.
- Size the solar PV array accounting for future electricity demand increase for site's heat electrification (space heating and DHW).
- Source quotations from reputable contractors and assess technically and financially.
- Explore applicable local/government financial incentives.



2.3. Energy and Carbon Projections



Reduce operational emissions



Implementing all the recommendations detailed previously would lead to energy savings of 49.9%, from 89.4 kWh/m² to 44.8 kWh/m².

The carbon intensity would drop by 86.4% in 2030, 94.5% in 2035, and 99.3% 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 the gas boilers.

At present, Havant Borough Council would have to offset 21.9 tCO₂e to reach Net Zero. By 2030, assuming all opportunities are implemented, 2.98 tCO₂e would remain to offset, and by 2035, 1.21 tCO₂e would remain. In 2050, 0.15 tCO₂e would remain.

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.

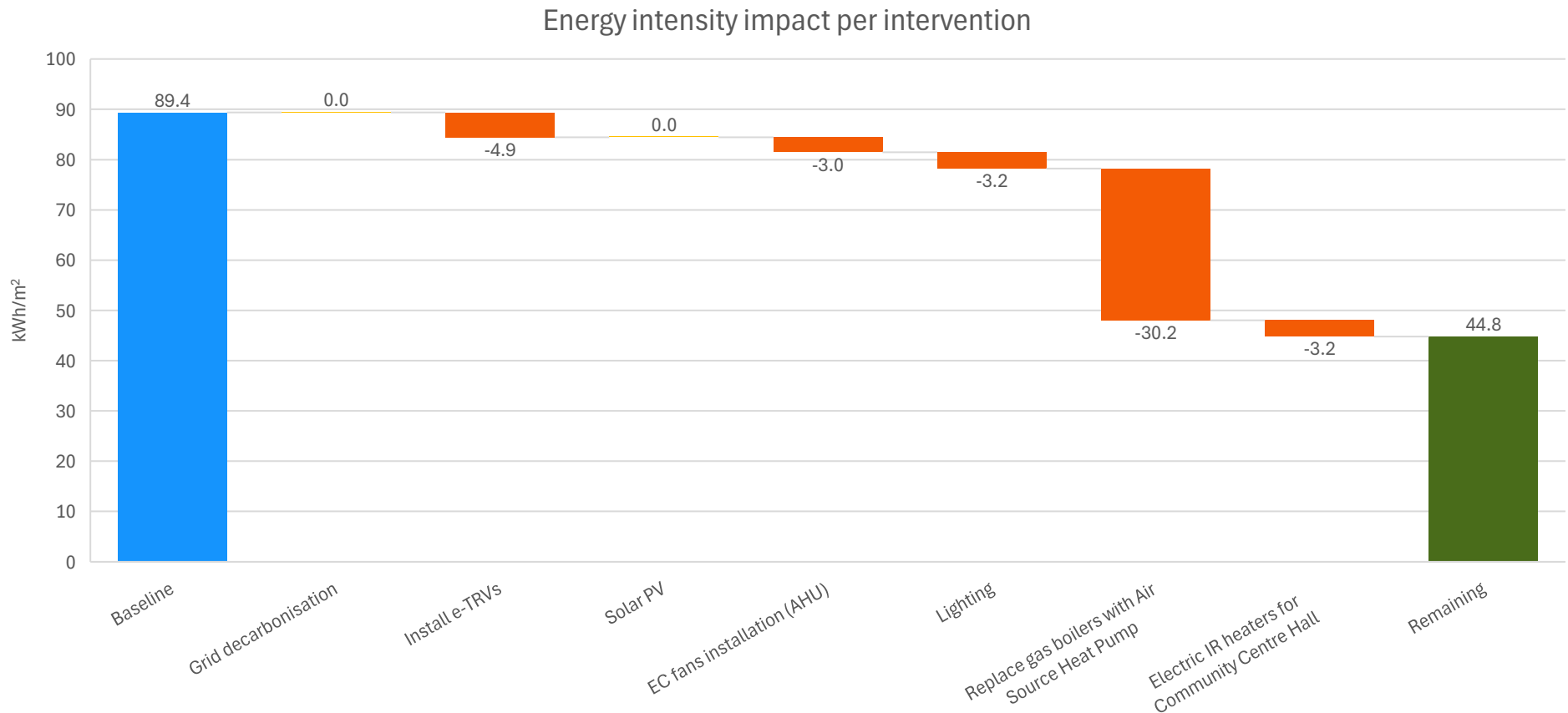
As can be observed from the graphs, the bulk of the energy and emissions reduction is from the replacement of the gas boilers with a heat pump and IR heaters.

The grid decarbonisation will also have a large impact on emissions reduction. If fossil fuel remains in the building, the impact will be lessened greatly, and the carbon intensity of the building will remain high.

Energy intensity impact per recommendation

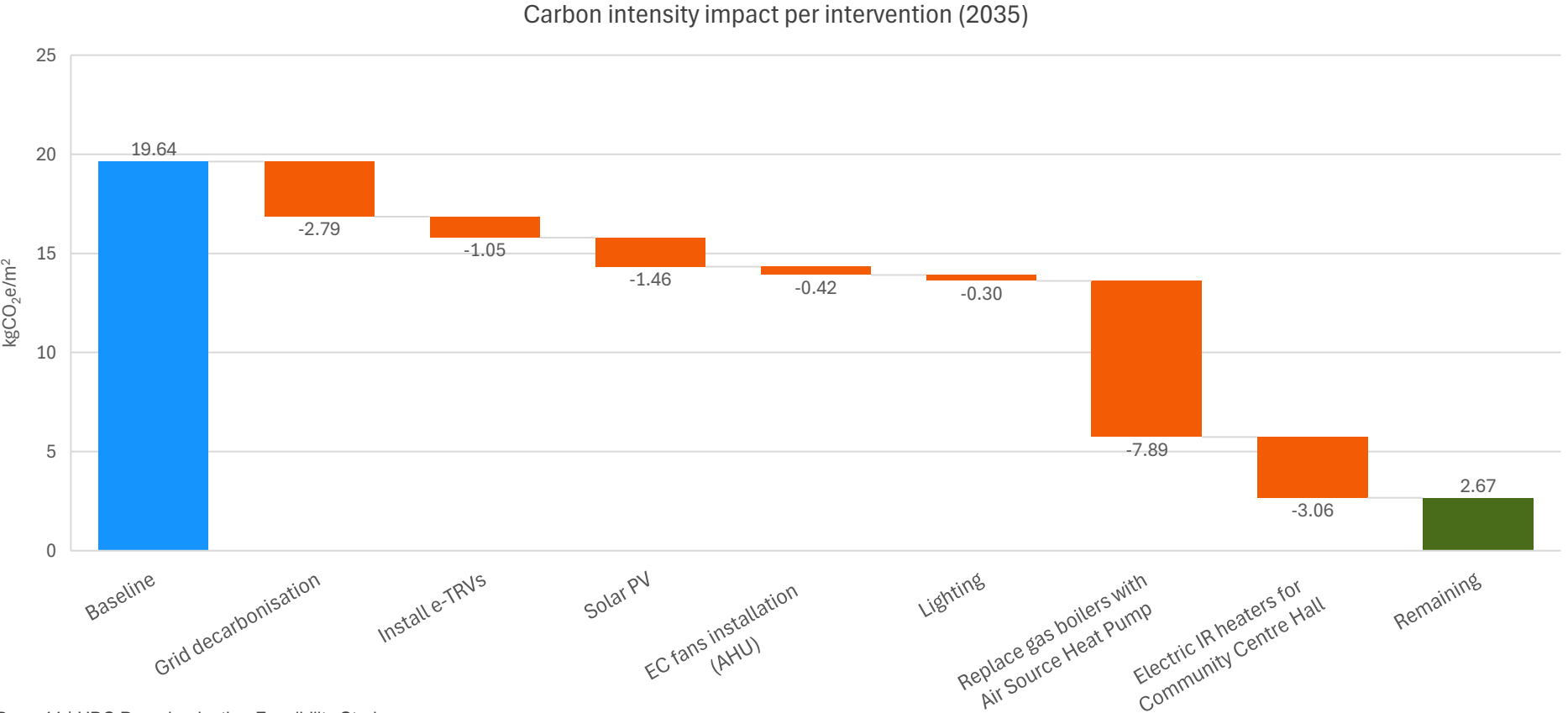
The waterfall graph below shows the baseline energy intensity of the site and the impact of each energy saving measure. (Blue= baseline, orange= decrease from measures, green= remaining post measures implementation)

Replacing the gas boilers with ASHP will have the greatest impact on energy intensity. The solar PV measure does not contribute to energy reduction hence has no impact on the site's energy intensity.



Carbon intensity impact per recommendation – 2035

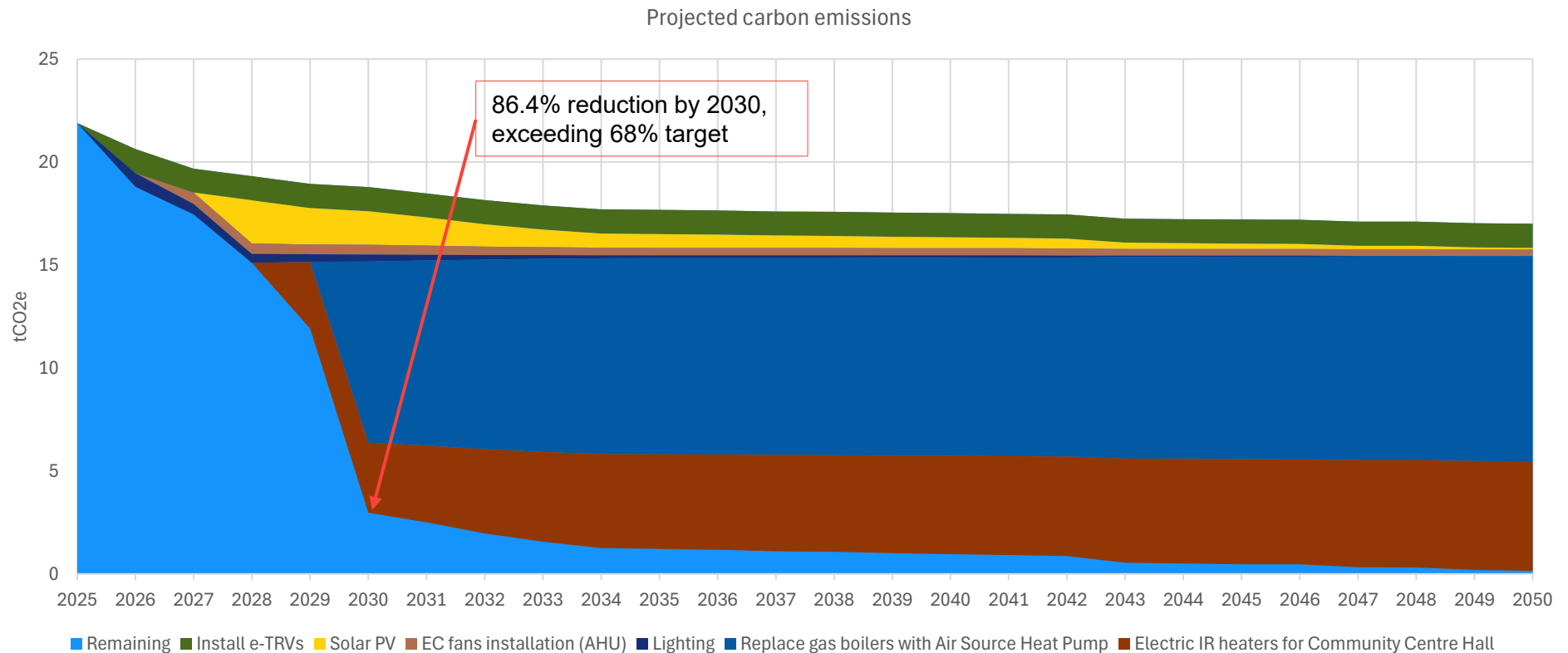
The projected carbon intensity impact of each recommendation for 2035 is shown in the graph below. This compares the carbon impact of measures against the Havant Borough Council Net Zero aspirational target. The heat pump measure carries the highest impact, followed by the IR heaters for the Community Centre Hall. The grid decarbonisation will also play a crucial role in the decarbonisations. HBC's Net Zero aspirational target of 68% emissions reduction can be met (and surpassed) if all measures are implemented. (Blue= baseline, orange= decrease from measures, green= remaining post measures implementation)



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 in 2030 can potentially drop by 86.4%, surpassing the HBC target for 68% reduction. Similarly, the drop by 2035 would become 94.5%, leaving only a small amount of residual emissions to be offset for HBC to achieve its 2035 operations Net Zero target.



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 Net Zero, particularly where large volumes of water are used on site.



Operational water use



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

Water use on site is monitored via quarterly invoices. Water emissions have been calculated using the standard water supply carbon factor of 0.1913 kgCO₂e/m³ and the water treatment emission factor of 0.17088 kgCO₂e/m³(both for 2025) for all water disposed of via the network supplier’s drains. The table to the right provides an overview of the Acorn Centre’s annual consumption for calendar year 2025.

Water Consumption	Annual Usage m ³	Annual Cost £	Annual CO ₂ e kgCO ₂ e
Calendar year 2025	1,166	£5,595	422

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 the Acorn Centre. It is noted that the Acorn Centre 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)	1,046	479	298

The Acorn Centre is underperforming against a typical and good benchmarks for offices, indicating that there is potential for reduction. However, it is noted that the Acorn Centre’s operations would differ from office operations.

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

During the 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 readings are a mix of actual and estimated readings. 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 Acorn Community Centre. From the Net Zero feasibility study at Acorn Community Centre, the following opportunities were 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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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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