

Energy Audit Report

Organisation: Benson Parish Hall and Sports Pavilion
Contact: Pete Eldridge
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Aim

This report provides prioritised energy efficiency improvement recommendations for Benson Parish Hall and Sports Pavilion.

Summary of Recommendations

- Improve control of heating
- Improve performance of TRVs
- Monitor energy use
- Review hot water times
- Investigate roof and wall insulation
- Investigate heating system in the Sports Pavilion
- Control ventilation
- Investigate lighting controls



Methodology

EiE carried out interviews with Pete and Tanya and reviewed details of the premises. All recommendations in this report are based on information and observations obtained during the site visit and any information subsequently provided by the contacts.



Background

The building

The hall opened in 1988 and is built with brick walls and a high pitched roof. The main hall has a tiled interior ceiling. The main hall, kitchen, lounge, toilets, and cloakroom are on the ground floor. There is an office and committee meeting room on the first floor. The boiler room is accessed from outside the building. The Sports Pavilion is connected behind the main hall and has 4 changing areas with showers. There is also a Post Office in the foyer.

Usage

The main hall is currently used for over 40 hours per week by a variety of regular, and a few occasional users. The committee room is used about 10 hours per week for yoga and the occasional meeting. The lounge on the ground floor is used less frequently.

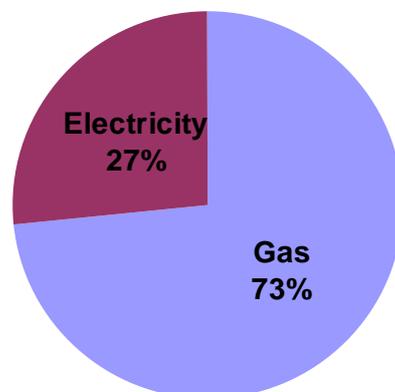
Heating

The main building is heated every day from 07:30 to 21:00 by 2 gas fired boilers (94.5 hours per week). Controls are set by engineers once per year, but there is local control to boost the heating time by an hour in addition to the above timings. Heat is delivered via radiators that have TRVs with the exception of the 10 vertical radiators in the main hall. These have flow valves about 8 feet above the floor. Main hall users have stood on chairs to adjust these valves.

Energy use information

Some details were provided about the building's energy use as well as estimated costs for 2013/2014. Based on this we have calculated the following breakdown of energy use:

Benson Parish Hall and Sports Pavilion kWh 2012



36126 kWh electricity

98701 kWh gas

Note: Energy information was based on costs provided (£8103 total) and a few actual meter readings

Over 73% of energy use from the Parish Hall and Sports Pavilion is gas solely for the Parish Hall. This gas is mainly heating with some for hot water. We recommend energy efficiency efforts focus on reducing heating.

Recommendations for energy efficiency

The following recommendations are in order of priority considering costs, savings, and ease of implementation.

Improve control of heating

The heating for the Parish hall (including the main hall) is constant regardless of the timing of actual use. Further, the hall is felt to cool down quickly, but also to overheat. Users sometimes adjust the flow valves on the radiators in the hall.



De-stratification fans

The hall has fans that can push warm air from the ceiling closer to the floor level. While some attempts have been made to educate hall users about the controls, the staff do not appear to be using the fans when the main hall is unoccupied. Using the fans would reduce the need for heating.

ACTIONS

- Run the fans regularly when the main hall is not in use to better use warm air.
- Encourage hall users to run the fans if they are not warm enough.

Radiator valves

The radiators in the main hall need to be returned to their optimal settings and protected from further tampering. When users adjust the valves, heating in the entire building is affected.

ACTIONS

- Ensure flow valves are fully open on all 10 main hall radiators.
- Remind hall users not to touch the valves but to ask staff to adjust the heating (see next recommendation).
- If necessary, arrange to remove the plastic handles from the valves (so that they can only be adjusted using a tool).

Recommendations for energy efficiency

Improve control of heating (continued)

Thermostat control

There is one thermostat for the Parish Hall; the whole system is either on or off. The only local control of radiators is TRVs. The set temperature is 20°C. One solution would be to add zones to the heating so that the main hall heating is separate from the rest of the building. This way the main hall temperature could be reduced (to 18°C, for example) when not in use. This would potentially save £400-500 per year. Zoning the heating often requires some additional plumbing and potentially variable speed pumps.

ACTIONS

- Contact your boiler company to discuss adding zoning for main hall heating. You may wish to obtain quotes from other contractors.
- Once the controls are installed, ensure staff are encouraged to reduce temperature by a few degrees when the main hall is not in use.
- Ensure the door to the hall is closed (and kitchen window) when the hall is not in use.



Parish Hall foyer

Improve performance of TRVs and radiators

Some of the radiators in the Parish Hall had new TRVs that were not working correctly (there was no heating from the radiator in the men's toilets, and the foyer radiator was set to frost stat, but the radiator was quite hot). This might be a problem with sticking valves caused by a build up of sediment in the plumbing or from faulty equipment. When TRVs function correctly there will be better local control of heating.

ACTION

- Contact your heating contractor and ask them to investigate and fix problems with TRVs

Monitor energy use

Electricity and gas meters for the main building were not viewed during the visit. Energy information supplied contains evidence of estimated readings making actual use difficult to know. By documenting and submitting energy meter readings regularly and accurately, energy management, as well as monitoring bills, will be easier.

ACTIONS

- Arrange for staff to note actual meter readings (electricity and gas) at all meters on the same day once per month. Enter these into a spreadsheet and calculate usage.
- Submit meter readings to your energy suppliers prior to invoicing (the timing of this will differ based on your bills). Depending on your supplier, readings can be submitted via website, email, or by telephone.
- When you have a year of readings, review information to ensure noticeable increases in energy use are reacted to by staff.

Recommendations for energy efficiency

Review hot water controls

Parish Hall

Hot water is provided to the Parish Hall via a gas-fired boiler (183 litres) on from 7am until 10pm. Water has been reported to be too hot, though the unit is set at 55°C. The tank size is much larger than demand from toilets and the kitchen (Note: the kitchen has 2 independently heated dishwashers). Hot water costs the hall about £150-£200 per year. However, point of use electric hot water in the toilets and kitchen would cost about £20 per year. However, units would need to be installed.

ACTIONS

- Investigate installing point of use electric hot water for the toilets and kitchen that only use power when water is running.
- Contract a number of contractors to provide quotes for installation.



Hot water tank for Parish Hall



Hot water tank for Sports Pavilion

Review hot water controls

Sports Pavilion

Electrically heated hot water in the Sports Pavilion is controlled by 7 day timers (top and bottom controls for one large tank (approx. 200L?) and two smaller heaters for the other 2 changing areas). The programme timings could not be reviewed during the visit. Reviewing these times will identify times when the heating can be reduced (as well as any errors in settings). Further, brief instructions for reviewing and setting times need to be provided by the controls.

ACTION

- EiE will email a copy of the timer instructions for the ACL Lifestyle timer (LP111). Review the times and adjust accordingly to best match actual usage. Hot water only needs to be on 60 minutes prior to use.

NOTE

The exact size of the hot water tank in the Sports Pavilion was not reviewed, however regulations for prevention of Legionnaires disease require tanks over 250L to operate at 60°C when in use. When tanks have been out of use for a week or longer, the temperature needs to be brought up to 70-75°C for an hour

Recommendations for energy efficiency

Investigate roof and wall insulation

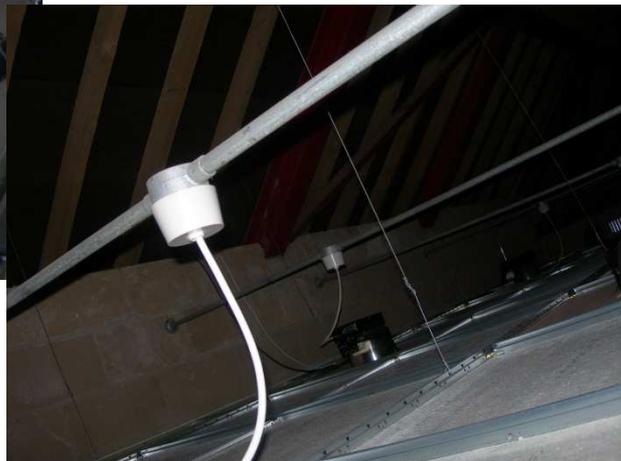
Roof

The main hall is felt to cool down quickly after heating is off. Inspection of the ceiling tiles reveals some insulation. Levels of roof insulation are similar in the lounge. More insulation on the inside of the roof, between the wooden joists, will improve comfort levels in the building and reduce the need for heating. The cost benefit shows a payback of 5.5-8.5 years (see below). However, when contractors have provided quotes with specific costs, the payback can be recalculated more accurately.

The roof area is approximately 1300 m². The cost of 50mm insulation board would be £6,500. Labour is estimated at £3500, the total would be £10,000. The potential annual savings would be 20-30% of £6000 total annual energy costs = £1,200 to £1,800. Payback is therefore 5.5 to 8.5 years.



Roof space above main hall



Roof space above lounge

Wall

There was no apparent evidence that insulation has been added to the walls. Given that the building was completed in 1988, there is a high likelihood that there is an un-insulated wall cavity. Further, insulation in walls of the committee room seems to consist of Styrofoam boards that might also be improved. There are a number of ways to investigate insulation levels before approaching contractors for quotes to improve.

The wall area is approximately 675 m². The cost of adding wall insulation would be about £8000 including labour. The potential annual savings would be 10-15% of £6000 total annual energy costs = £600 to £900. Payback is therefore 7 to 10 years.

ACTIONS

- Explore funding options including TOE2, other charitable trusts, and if appropriate, the Green Deal. There may also be other funding routes available only to the Parish Council.
- Ask for quotes from 3 contractors and re-calculate the payback period based on the above savings. If the period is felt to be reasonable (3 to 5 years, for example), proceed with the work.

Recommendations for energy efficiency

Investigate heating system in Sports Pavilion

Heating in the Sports Pavilion is provided by a single infrared heater; the changing rooms are not normally heated. However, heating is provided through a ventilation system (labelled 'ceiling heating'), though was reported as being ineffective. The controls for the ceiling heating are in the cupboard with the other controls; the settings were not reviewed. The location of the ceiling heating equipment was not identified during the audit. By identifying the equipment information can be gathered about optimal operations.

ACTIONS

- Review the timing settings for 'ceiling heating' and reduce these to match occupancy if appropriate.

Investigate the location of the ceiling heating equipment and ensure it is in good working order and is set appropriately. You may need further assistance from EiE or a contractor when you locate the equipment. Please don't hesitate to contact us.



Sports Pavilion controls



Ventilation in lounge

Control ventilation

The lounge has a vent to the outside that causes heat loss and draughts. The committee room has mechanical ventilation with some controls. By reducing the heat loss in cold weather, the meeting room can be made more comfortable. While this is unlikely to reduce the heating demand much, the increased comfort will be appreciated by meeting room users.

ACTION

- Approach a contractor to fit a cover to the lounge vent that can be opened if required. This will ensure the room can be vented if needed (whereas a permanent block to the vent may cause problems in the future).

Investigate lighting control

Lights in the toilets in the Parish Hall are controlled manually and can be left on by users for hours. Controls can be augmented with an absence detector that will switch off lights after periods of inactivity. An alternative option may be for staff to manually switch off lights throughout the day as needed. If toilet lights are assumed to be left on needless for 30% of the time, the savings from occupancy detectors would be about £50 per year. The cost for a contractor to install 2 detectors is about £300 - a 6 year payback.

ACTION

- Obtain quotes from lighting contractors to install 2 absence detectors in the Parish Hall toilets. Absence detectors are in addition to a manual switch, allowing users to still turn off the light manually. PIR sensors replace the manual switch and react to presence (by turning on) and absence.