

This report provides energy efficiency and energy management recommendations for Sample Village Hall. It consists of sections covering energy efficiency recommendations for heating, insulation, lighting and energy management. The final section includes information on funding opportunities that may be open to your organisation.

## Summary of Recommendations

- Relocate heating thermostat
- Insulate pipework
- Arrange radiator balancing / bleeding
- Relocate storage to allow heat flow
- Install lockable TRVs on radiators
- Improve heating control
- Consider wall insulation
- Upgrade lighting
- Improve signage



Image from Google.

## Background

EiE carried out a site visit and interviewed John Example. All recommendations in this report are based on information and observations obtained during the site visit to the hall.

### *About*

Sample Village Hall was built in the early 1950s but has since undergone major repair and renovation including restoration to the roof in 2000. Income for the hall comes from three main sources; income from lettings, rental paid by the small shop that uses part of the building, and a grant from the parish council. The committee would like to identify methods to reduce the running costs of the hall.

### *Usage*

The hall is used throughout the week by a wide range of users for approximately 20 hours each week. Uses include Yoga – (1.5 hours), karate (3 hours), Pilates (4 hours), ballet (2 hours), Zumba (1 hour), coffee morning (1 hour), short mat bowls (2 hours), youth club (2 hours). There are also a number of less frequent / irregular users including OCC, Cherwell DC, the Parish Council, a monthly “Thursday Club”, a monthly film night along with around 10 private weekend hires per year.

Information on energy as provided in energy bills is shown below

<i>Fuel type</i>	<i>Date from</i>	<i>Date to</i>	<i>Annual energy use in kWh</i>	<i>Pence per kWh</i>	<i>Cost (excluding standing charge and VAT)</i>	<i>Standing Charge</i>
Electricity	01/03/14	01/03/15	3,710	12.56	£466	27.41p/day
Gas	15/01/14	15/01/15	64,560	4.60	£2,970	57.1p/day

Heating to the hall is provided by two Brand Name gas fired boilers which are estimated at 25kW. These units will provide more than sufficient heating for a building of your size. However, some changes to heating management (and insulation, see below) will allow these boilers to provide heating more efficiently to the building and to reduce the running costs.

### Relocate heating thermostat

The thermostat for the central heating system is located in the loft, close to the boiler itself. It is therefore likely that the thermostat is affected by the heat produced from the boiler and the uninsulated pipework. There is concern that the boiler can be running, while the radiators are not heating up. This suggests that the thermostat switches off / turns down the system before the radiators in the main hall get warm.



Consult an electrician to relocate the thermostat in a more appropriate location. Energy Saving Trust Guidance Note 302 gives advice on where to install a room thermostat. Identify an appropriate location based on this advice. This states “A room thermostat should be sited in a regularly heated area that allows free circulation around it. It should not be exposed to draughts, and should be away from internal heat sources and direct sunlight. It should also be in a position that is readily accessible *[to the householder]*, e.g. not in cupboards or behind furniture. The thermostat should be sited about 1.5 m above floor level, *[except where the occupants include a wheelchair user. In this case a suitable height in excess of 1 m should be agreed with the householder.]*” The full guidance can be downloaded from <http://tinyurl.com/qcsm67t>.

### Insulate pipework

The majority of the pipework in the loft delivering hot water to the radiators is un-insulated. Un-insulated pipes reduce the ability to provide heating where it is intended and mean the boiler has to work harder. In your case it also means that the loft is being heated unnecessarily. Each metre of uninsulated pipework loses around 100W – equivalent to an old-style light bulb. This is a low cost improvement as pipe insulation can be bought locally or on-line and installed by a volunteer. This also could be included in plans to improve the existing heating system.



For example: <http://www.insulationexpress.co.uk/Insulation/Pipe-Insulation.htm>

### Arrange radiator bleeding / balancing

There is concern that some radiators heat up in the hall, while others remain cold even when the heating is fully on. This may be indicative of one of two problems. The radiators may need 'bleeding'. Radiators that feel cold at the top but have some heat at the bottom may have air trapped inside them, preventing the hot water from circulating. It is a simple job to remove air from the radiators via the bleed valve. Alternatively ask the heating engineer to do this when the system is serviced.

Alternatively the radiators may need 'balancing'. This is often a job for a plumber. Balancing ensures that all radiators heat up at the same rate. If a radiator is too cool it needs the flow of hot water to be increased, if it is too hot, then the flow of hot water should be reduced. A balanced heating system should be fitted with lock-shield valves that will prevent the valves being altered.

### Relocate storage to allow heat flow

The majority of radiators in the main hall are blocked by chairs stacked along the outside wall. As most hirers only use a few chairs, these are likely to stay in place for most rental periods. These will block the flow of heat from the radiators. The radiators will heat the chairs and the chairs will gradually release the heat to the building. In practice, although the heat will be released to the room, this might be after the period of rental has finished, meaning there is no benefit from the heating. The room will take longer to heat up than without the chairs.



Arrange to relocate the chairs away from any radiators. Ensure that no other furniture is stored in their place. Consider adding signs to discourage users from placing items in front of the radiators.

### Install lockable TRVs on radiators

There are TRVs (thermostatic radiator valves) on the radiators in the main hall. There is some concern that users alter settings on these TRVs meaning that heating levels are altered and are not restored to original settings. The purpose of TRVs is to vary individual room temperature throughout a building. It is not possible to adjust the temperature of different areas of the main hall using TRVs, as it is all one room. Therefore, the TRVs must all be set at the same level (level 4-5 in cold winters; level 2-3 in spring and autumn, \* frost setting in summer).

Consider replacing the standard TRVs with lockable (tamper-proof) units that can be locked at the appropriate level. Users should be encouraged to use the relocated hall thermostat.

### Improve heating control

The existing system has a comparatively sophisticated control system. However, information from the audit suggests this is not being used to its full potential. The installed system includes a Drayton Tempus one control unit. This provides the ability to set up to three heating periods each day, which can be programmed a week in advance.

Heating should be programmed to make sure it matches usage for that week. When heating the area for each booking, programme the heating to turn on a maximum of one hour before they arrive and to turn off half hour before they leave. This should allow the area to be heated sufficiently for the duration of the hire and will allow heating to be controlled by users. Users should use the thermostat to set the temperature at an appropriate level based on the activity (higher temperatures for sedentary activities, lower temperatures for active sessions) but should also be required to return the thermostat to its default position at the end of their rental period. As bookings for regular activities are consistent the majority of settings can be done seasonally.

Full instructions for setting the current unit can be downloaded from <http://tinyurl.com/oc4y3pt>

If bookings become more irregular or ‘one-off’ bookings increase then replacing the control with a unit that can be set a month or more in advance or that can be set remotely may be more appropriate.



### Heating Actions:

- Obtain quotes from contractors to relocate the thermostat using the EST guidance.
- Arrange for a contractor or volunteer (lower cost) to insulate the pipework.
- Arrange for a contractor or volunteer to bleed radiators and, if necessary, arrange for a contractor to balance radiators.
- Move chair storage to an alternative location.
- Obtain quotes from contractors with experience of installing lockable TRVs.
- Use control panel instructions to set heating times based on usage. If access to the control panel is difficult, consider relocating it when the thermostat is moved.

## Consider wall insulation

### Cavity wall insulation

An inspection from the loft space shows that there is a cavity present in the initial construction. This internal cavity could be insulated. There is no evidence that this work has been undertaken in the past and externally there are no signs of previous surveys for cavity wall insulation.



Before cavity wall insulation is installed any damp issues must first be addressed. If insulation becomes damp this can reduce its quality and effectiveness. More information on insulating cavity walls can be found at the following link: <http://tinyurl.com/Cavitywallinsulation>. A full inspection of the walls will also be needed to ensure that the walls are suitable for cavity insulation.

### Internal wall insulation

If cavity wall insulation is not possible, an alternative is to consider obtaining quotes to add internal wall insulation (IWI) to the hall to increase the level of insulation.

IWI provides improved thermal performance and is suitable when rooms are spacious enough to afford some loss of area, or when owners do not wish to alter the outside of the building. There are two types of IWI, stud wall and rigid insulation boards. Stud walls comprise of a wooden frame, filled with insulation material such as mineral wool fibre. Depending on the type of insulation used, stud walls are usually of a greater depth and are therefore strong enough to support fittings such as radiators. Rigid insulation board attaches directly to the wall and should be at least 60mm thick, and can be up to 100mm depending on the insulation material. More expensive materials will provide the same level of insulation, with thinner boards. Internal wall insulation is expensive and must be carried out by a professional. Damp can be exacerbated if insulation is installed over problem areas.



Installation of insulation backed plasterboard



Close-up of insulation board



Britwell Salome Village Hall completed internal wall insulation

## Costs

Costs to install cavity wall insulation are around £8-£10/m<sup>2</sup>. Based on an estimated wall area of 200m<sup>2</sup> (excluding windows and doors) the cost of cavity wall insulation is between £1,600 and £2,000.

Costs to install internal wall insulation are estimated at £42/m<sup>2</sup>. Based on an estimated wall area of 200m<sup>2</sup> (excluding windows and doors) for the original building, the cost of internal wall insulation is £8,400.

### Insulation Actions:

- Obtain quotes from contractors with experience of both cavity wall insulation and internal wall insulation and associated issues such as avoiding condensation.
- There are no obvious signs of damp at the hall, but if any damp does exist ensure these are solved before installing insulation that may be affected.
- Ask contractors to quote the U-value (rate of heat loss) of the hall with insulation.

## Upgrade lighting

Lighting in the kitchen, bar and terrace room is provided by MR16 spotlight bulbs. These are likely rated at 50W. Many of these have burnt out and are yet to be replaced. You are considering replacement with low energy halogen bulbs however these could be upgraded to lower energy LED alternatives.



Consider installing LED equivalents such as [www.lightbulbs-direct.com/crompton-non-dimmable-led-5w-mr16-warm-white-50-deg/p3800](http://www.lightbulbs-direct.com/crompton-non-dimmable-led-5w-mr16-warm-white-50-deg/p3800) to reduce energy use, and to reduce lighting costs. Although the initial financial outlay for LED bulbs will be higher than direct replacement, LED lights are often more than 10 times more efficient than traditional incandescent lighting of similar output. LED lights also have other advantages such as:

- Long bulb life (meaning reduced maintenance costs).
- Low heat emission (meaning safer handling of lights).
- RGB LED fixtures are available which produce a variety of colours (to add more control for parties and other users) if required.

The following calculation is based on 38 bulbs (16 in Terrace Room, 12 in the bar, 10 in the kitchen) in use 1040/year

	Bulb cost (£)	Annual energy use (kwh/yr)	Annual energy savings (kwh/yr)	Annual energy costs (£)	Costs in year 1	Payback period
Current: 38 x MR16 bulbs	0	1976	-	£257	£257	-
Option 1: 38 x low energy 35w halogen MR16 bulbs	£189	1383	593	£180	£378	3
Option 2: 38 x MR16 LED 5w bulbs	£198	198	1778	£26	£436	2

For examples of similar buildings with LED lighting see <http://www.efficientlight.co.uk/Projects/Morval-Village-Hall.aspx>

## Lighting Actions:

- Ensure lighting replacements are low energy versions.
- Alternatively, approach contractors to upgrade all spotlights to new energy efficient alternatives. The most cost effective approach to this is likely to be as a single project to upgrade all spotlights at the same time.

### Improve Signage

There is no evidence of labels or signage to help users control lighting and heating. During the visit it was unclear where heating units, water heaters and controls were located. Consider adding signs, particularly if thermostats are relocated, to stop users altering settings and explaining why TRVs are locked. Simple instructions, without too much text and perhaps some graphics, are most effective. Varying the signage periodically will continue to draw users' attention to it, for example adding a cost saving figure that shows how much effect closing a door or turning off lights has. Perhaps asking hall users (such as youth clubs) to help design awareness posters will also help them feel a

sense of ownership to raising awareness and following the poster instructions. Examples of employee awareness posters are available on the Carbon Trust website and although these are aimed at office staff, the language and messages can be adapted for a community hall: <http://tinyurl.com/ctsignage>.



Simple sign from another Oxfordshire village hall

### Energy Management Actions

- Engage users to help improve energy saving signage within the hall

### WREN

WREN's Small Grant Scheme accepts funding applications between £2,000 and £15,000 (if the total project is under £50,000) <http://www.wren.org.uk/schemes>.

### TOE2

Up to £5,000 for energy efficiency measures following an energy audit. Contact Fiona Danks on 01865 407003 [admin@trustforoxfordshire.org.uk](mailto:admin@trustforoxfordshire.org.uk). This grant application could be for a number of the lower-cost recommendations made in this report.

### Biffa Award Funding

Biffa Award provides grants to a range of community projects, for example building improvements that increase the range of services on offer to the local community. Grants between £5,000 and £50,000 are available. For eligibility criteria, please see the website: <http://www.biffa-award.org/community-buildings>.

### The Low Carbon Hub

Contact the Low Carbon Hub to find out about support for a community share offer for renewable energy <http://www.lowcarbonhub.org/advice/how-to-set-up-a-community-enterprise>.

### Community First Oxfordshire

Contact Lynne Newin at Community First Oxfordshire for assistance with funding the recommendations from this energy audit report [lynne.newin@communityfirstoxon.org](mailto:lynne.newin@communityfirstoxon.org)