

Derby and Joan Community Hall

Initial assessment

Based on the survey carried out on July 14th, an initial appraisal of energy efficiency improvements has been carried out, based on the SAP 2005 method. The following assumptions have been made about the structural elements

- i) the walls were constructed using standard timber frame method at the time of construction.
- ii) That the loft space is currently uninsulated.

Below are the results of the analysis for the following improvements.

- i) Lining the walls internally with an foamed insulation backed plasterboard (often referred to as Kingspan board) using board with either 25mm or 40mm of insulation.
- ii) Insulating the loft to a depth of 270mm with standard glassfibre/rockwool insulation.
- iii) Replacing the glass entry doors into the main hall with modern double glazed units.

With current heating system (gas wall heaters)

| | Heating requirement gas (kWh) | SAP value | SAP grade | CO ₂ heating (tonnes/y) | Annual Heating cost |
|---|--|--------------|--------------|--|---------------------------|
| Current buildings | 55822 | 38 | E | 10.85 | £1,961.98 |
| Internal insulation with 25mm insulation backed plasterboard | 52697 | 41 | E | 10.24 | £1,858.55 |
| Internal wall insulation with 40mm insulation backed plasterboard | 51908 | 41 | E | 10.09 | £1,832.44 |
| Loft Insulation in roof to 270mm | 25803 | 68 | D | 5.02 | £968.39 |
| Loft Insulation 270mm plus internal insulation (40mm) | 21289 | 73 | C | 4.14 | £818.99 |
| Loft Insulation 270mm plus internal insulation (40mm) plus double glazed doors to main hall | 20669 | 73 | C | 4.02 | £798.48 |

The first point to note is that the forecast for the current heating costs is approximately half the amount paid for gas last year. This implies that either the heating is not used as much as would be expected from the pattern of usage or possibly that the loft is already insulated. This does not alter the expected potential value of savings.

Internal Wall Insulation: expected savings of between £100 and £130 and carbon emission savings between 0.6 to 0.75 tonnes of carbon dioxide annually. The materials for this should be in the order of £1500 and labour costs a little more than skimming the walls as currently planned. It will have the effect of making the room feel warmer in cold weather and should help keep the temperature down during the hotter parts of the summer.

Loft Insulation; (if this has not already been carried out) is the most significant improvement identified from this analysis, potentially reducing heating costs by around 50%. Cost in the order of £500 to £1000. Access into roof space needs to be made, but this is necessary to carry out other improvements. It would be advisable to create access quickly to be sure of the situation. It is believed that the current ceiling was not part of the original construction but added latter.

With heating upgraded to gas central heating with radiators

| | Heating requirement gas (kWh) | Heating pumps etc -electric (kWh) | SAP value | SAP grade | CO ₂ heating (tonnes/y) | Annual Heating cost |
|---|-------------------------------|-----------------------------------|-----------|-----------|------------------------------------|---------------------|
| Current buildings | 51439 | 131 | 41 | E | 10 | £1,834.28 |
| Internal insulation with 25mm insulation backed plasterboard | 48556 | 131 | 44 | E | 9.44 | £1,738.85 |
| Internal wall insulation with 40mm insulation backed plasterboard | 47831 | 131 | 44 | E | 9.3 | £1,714.85 |
| Loft Insulation in roof to 270mm | 23742 | 131 | 69 | C | 4.62 | £917.55 |
| Loft Insulation 270mm plus internal insulation (40mm) | 19561 | 131 | 74 | C | 3.8 | £779.18 |
| Loft Insulation 270mm plus internal insulation (40mm) plus double glazed doors to main hall | 18986 | 131 | 74 | C | 3.69 | £760.14 |

Double glazing to entry doors to main hall: In energy terms little is gained from this, around £20, though there may be comfort improvements resulting from improved draught proofing.

Heating improvements

It has been suggested that replacing the current gas wall heaters with a modern, high efficiency boiler and radiator system would improve the ease of operation for users and permit a higher level of control. The value, in energy terms, of upgrading the heating is

shown below, along with the value of the same energy improvements with the proposed change to the heating.

It is worth noting that in energy terms the current heating appears fairly efficient and that using a modern boiler system with radiators on its own results in quite small savings (little more than £100 per year)

The cost of running the upgraded heating system has been based on the same assumptions as for the energy improvements. It is necessary to determine why the current heating costs are lower than expected to know the full implications of upgrading. If the apparent current savings are due to a higher than expected level of insulation in the loft, then replacing the heating system will result in small savings. If however the current low costs are due to under use of the current system because of the difficulty in operating it, then a new system may result in increased costs but a warmer building. (this could be offset by insulating the loft.

Other savings:

Heating in the toilets: electrical heating in the toilet areas is an expensive way to achieve this. While the motion sensing system attempts to provide heat when needed, it would seem likely that this is actually causing the toilets to be heated when not needed. Radiators from a central boiler set to a lowish temperature are probably preferable.

Water heating in toilets: Electrical water heaters are the most expensive way to provide hot water but given that the use is probably quite low and sporadic, supplying this from a central boiler (at around 40% of the cost) may also be wasteful, filling pipes with hot water that is not used.

Electrical Appliances: the main electrical item where there is potential to make savings is the fridge. Replacement with a modern efficient model will save a little over £20 each year. Through heaters for producing hot water as required rather than the current Burco boilers may be worth considering

Lighting: The current arrangement of lighting tubes switched in banks means that if some lighting is needed it is necessary to switch on all the lights. If the switching was arranged so that each turned on several tubes throughout the room, then users could select to switch on some of the lights only when there is nearly enough natural light coming through the windows.

Opportunities for renewable energy generation

The main renewable opportunities would be solar panels, either for producing electricity (solar PV) or producing hot water (solar thermal). Given that the hot water requirement appears to be quite low, solar thermal panels would not be recommended, although technically they could provide an income once the Renewable Heat Incentive (RHI) is introduced next year.

Solar PV would be able to provide some useful electricity during the daytime, to subsidise some of the electricity use. Although the orientation is not ideal (45° either side of south, this is 52° from south), it is close enough to produce a useful output. Electricity produced alone does not provide enough benefit to justify the cost but there is a large income to be had from the Feed In Tariff introduced last April which would make them a useful investment.