# Braunton Parish Council

# Rural Community Energy Fund

# Stage 1 assessment

wrap

Braunton Parish Council

Energy Analysis

## Summary

The table below gives an indication of likely savings from the suggested measures. Estimations of savings, performance and costings are conservative. Cost and carbon savings from some of the measures are not possible due to a lack of heating data for the building.

***Figure 1 Surf museum energy savings***

| Option | Approx. Cost £ | Cost Savings - £ p/a | CO2 savings – kg p/a | Simple payback - years |
|---|---|---|---|---|
| LED lighting replacement of fluorescent tubes | 380 | 78 | 280 | 4.9 |
| LED lighting replacement of GU10 halogen lights | 40 | 39 | 140 | 1 |
| Cavity wall insulation | 2000 | / | / | / |
| Loft insulation top up | 500 | / | / | / |
| Secondary Glazing for single glazed areas | 400 | / | / | / |
| Draught proofing of external doors | 100 | / | / | / |

- The most effective energy efficiency measure would be to replace the halogen lighting with LEDs.
- Other lower cost measures such as the draught proofing and secondary glazing will significantly improve comfort levels and reduce the heating demand from the building.
- Fluorescent lighting can be replaced with LED lighting as the current units fail. Fittings without a starter motor can use retro-fit LED units. Those with a starter motor will require a new light fitting.
- Building improvements such as increasing insulation levels in the surf museum roof, loft insulation tops ups and cavity wall insulation would increase comfort levels and reduce heating demand.
- A solar PV array on the roof will reduce daytime electrical demand. The subsidies for renewable energy are currently under review. If the surf museum does want to progress installation of solar panels then obtaining quotes should be carried out ASAP.
- As a charity the surf museum can pre-accredit for the FIT. This facility is likely to be scrapped by the Government in the autumn of 2015.

## Building and Site

The building can be seen in the ‘Bing Maps’ satellite image below.

*Figure 2 Surf museum satellite image*


The building is run by the Museum of British Surfing, a charitable organisation. The building currently comprises the surf museum, office space for the museum and for Surf GB, and is soon to accommodate a pre-school and youth group in the day and evening respectively.

The charitable organisation has limited funds and is looking for projects that will reduce their environmental impact in a cost effective way.

The museum is currently open Thursday to Sunday, 10am to 4pm. The office space is used 5 days a week. The pre-school and youth group will be used throughout the week.

The surf museum has a 74 year lease on the building from the Parish Council.

## Energy Use

*Figure 3 Surf museum energy use*

| Electrical Demand p/a kWh | $CO_2$ emissions p/a - kg | Cost p/a – £ | MPAN | Grid Connection |
|---|---|---|---|---|
| 3557 | 1596 | 534 | S 03/801/110/22<br>0004/1987/332 | Single phase |

The main board is located in the surf museum with a sub meter in the youth club part of the building.

The energy usage figures above are for the Surf Museum only. The youth club section of the building will see increased demand when the pre-school and youth club are running.

The main electrical demands are from the lighting, office appliances and electric heating. The heating in the surf museum is used as little as possible. There are two ‘black heat’ units in the main surf museum and storage heaters and plug in heaters in the rest of the building. When the pre-school and youth centre come on line the heating demand will increase significantly.

The main demand in the surf museum at the moment, comes from lighting. Switching to LED lights would reduce demand markedly, reducing costs and carbon emissions. The current Illuma spot lights appear to be LED units (it was not possible to remove one, but the model number suggests it is LED).

The fluorescent lighting in the building could be switched for LED units, further reducing electrical demand from lighting. The main surf museum room uses T8 tubes, which can be switched out for LED units and retaining the existing fitting (it is assumed these are fluorescent units – though it was not possible to check a tube). Fluorescent tubes elsewhere in the building can also be replaced with LED units. Costings and savings are given in the summary section.

*Figure 4 Illuma LED spot light units in the surf museum*

There are 10 of these units.

*Figure 5 Spot and strip lighting in the surf museum.*

*Figure 6 Strip lighting in the surf museum.*

These units can be swapped out for more efficient LED units as they fail.

*Figure 7 Halogen GU10 spotlights in the youth centre kitchen*

These should be replaced with LED GU10 units immediately. The halogen spotlights will be 35-50 watts. An LED replacement will be 5-7 watts. A significant energy saving.

*Figure 8 Fluorescent strip lights in the youth centre*

These should be swapped out for LED units – the lighting will be used a lot when the space is used by the pre-school and youth group – LED lighting will offer significant energy savings over fluorescent tubes. Those units without starters will accept retro fit LEDs, those with a starter will require a new fitting.

*Figure 9 Electric storage heaters in the youth centre*

There are 3 of these units in the youth centre. There are other electric heaters in the building – black heat ceiling mounted units in the surf museum and electric plug in heaters in the office(s). Electric heating has high associated carbon emissions.

## Building Improvements

The main surf museum section is a solid wall construction. To reduce heat loss from the walls of the building would require internal or external wall insulation. Both of these options are not financially viable – unless grant funding was obtained for the work.

The walls of the youth centre part of the building of a later construction date and are likely to have cavity walls. Cavity wall insulation would reduce heat loss from the building and is a cost effective measure.

The high ceilings in the surf museum are hard to treat – it would mean significant cost and disruption to insulate this area. The most viable option would be insulated panels fixed to the ceiling.

The youth centre has loft space – any opportunity to top up loft insulations levels should be undertaken. This will help to reduce heat loss from the roof of the building, and is a cost effective measure.

The floors of both parts of the building could be insulated using floor panels, however this would be a significant capital cost and be very disruptive.

The building has a mix of single and double glazing. Any single glazed windows should have secondary glazing fitted. This is a cost effective measure that can help to reduce heat loss form the building during the winter months.

Draught proofing should be added to any external doors where not already installed.

In summary the most effective measures for improving the building are cavity wall insulation, secondary glazing, loft top up insulation and draught proofing.

## Electrical System Improvements

There is a significant amount of lighting in the building. At present it is predominantly the office area and surf museum sections that are being used. However as the usage of the youth centre part of the building increases, the lighting demand from this part of the building will increase as well. Therefore the current lighting can be switched to LED units, to reduce demand.

The GU10 spot lights in the kitchen should be replaced immediately, as the savings here are very significant (70-80%).

The fluorescent tubes should be replaced as they fail, with more efficient LED T8 units – this will achieve an efficiency saving of approx. 40%.

The current heating system is electrical – it is a mix of IR heaters in the surf museum, storage heaters in the youth centre and plug in electrical heaters elsewhere. To reduce costs and carbon emissions from this heating system would require installation of a wet system. A wet system would allow installation of a conventional mains gas boiler (needs connection to mains) or a wood fuel boiler unit. Insulation should be the first priority and the main opportunities are loft top up, ceiling insulation in the surf museum and filling any cavity walls that are not currently insulated.

## Renewable Generation

### Solar PV

The building has significant summertime electrical demand, due to greater visitor numbers and longer opening times. Therefore solar PV would be an excellent match in offsetting daytime electrical demand.

The building has enough roof space to accommodate around 8 kWp. This is also what Western Power Distribution would allow the building to have – the building has two meters and you can install around 4 kWp on each phase. There is enough south facing roof space to install the solar PV on- there is some shading from the nearby trees in the winter sun.

### Wood Fuel Heating

The options for installation of space heating are:

- Air source heat pump linked to low temperature radiator units – this would not be ideal. With the number of visitors to the building, a heat pump would struggle to provide cost effective heating with the large number of air changes the door opening and closing. There is also limited wall space for radiator units. Underfloor heating could be used but installation costs would be high.
- Wood fuel heating – wall mounted radiators or blown air units linked to a wood fuel boiler unit. This could utilise local wood fuel or delivered pellets.
- Connection to mains gas supply and installation of gas boiler unit.

It is not recommend that heat pumps (ground or air source) are installed in this building.

The most viable renewable heating system would be a wood fuel boiler. However to be cost effective a system would be best linked to the countryside centre next door. This building has a larger heating demand and coupled with the surf museum would provide sufficient heating demand for a wood fuel boiler unit, helping to offset the high capital costs.

The viable wood fuel boiler options would be a log boiler, utilising local seasoned timber supplies, or a pellet boiler using delivered processed fuel.

A log batch boiler would require manual loading and a storage area for the seasoned timber. A pellet boiler would require less space footprint but would not utilise local timber supplies. Prices of fuel would depend on where the logs were sourced from. The costs of pellet fuel are roughly equivalent to that of mains gas (in the long term).

A log boiler could heat both the countryside centre and the surf museum and use local community woodland for timber, to keep costs low. Supply could be linked to local ‘logs for labour’ scheme, keeping supply costs down whilst covering the harvesting and storage of the timber.

Mains gas would provide cost effective heating of the premises but connection to the mains supply could be expensive. Enquiries as to this cost are being made.