# Energy Audit Hullbridge Parish Council Office

Energy survey carried out by Henry Muss Climate & Sustainability Manager Rochford.

6th Feb 2023

## Summary of Opportunities

The audit has identified arond 0.3tCO2 savings equivalent to 30% of the carbon footprint of the office as well as potential wider benefits to support the residential flat upstairs or business next door.

| Measure | Energy savings (kWh) | Carbon (kg) | Cost (£) |
|---|---|---|---|
| Move office furniture to expose radiator | 290 | 53 | Low cost |
| Install an occupancy sensor in the meeting room for lights | 194 | 39 | 100 |
| Assess scope for cavity wall insulation | 350 | 64 | £15-30/m2 |
| Solar Panels | 870 | 174 | 6,000* |
| Total | | 303 | Further investigation |

*Shared with business next door or / and flat above

## Property Type

A 1950s brick-built ground floor property with a residential flat on the 1st floor.


Brick construction is cavity rather than solid wall, but staff suggest its only made up of a single brick skin. The roof is flat roof construction.

## Current energy consumption

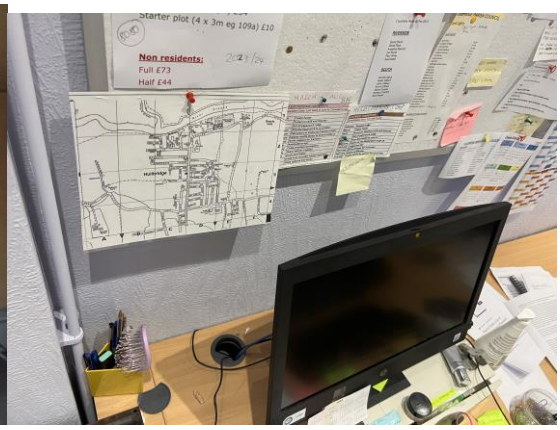
| Fuel | Annual Consumption (kWh's) | Carbon Emissions. (tCO2e) | Cost (£) |
|---|---|---|---|
| Gas | 3,588 | 0.6 | 468 |
| Electricity | 1,737 | 0.4 | 464 |
| Total | | 1 | 932 |

## Energy Efficiency Opportunities

- Heating

The gas boiler is around 10-12 years old and feeds five radiators, two in the meeting room, one in the reception area, one in the office and one in the rear space/workshop.

From discussion the office can get cold in the winter, and this is likely due to the one radiator being blocked by the desks preventing convection upwards and radiation outwards into the space.




Radiator in the office cased in by desk.

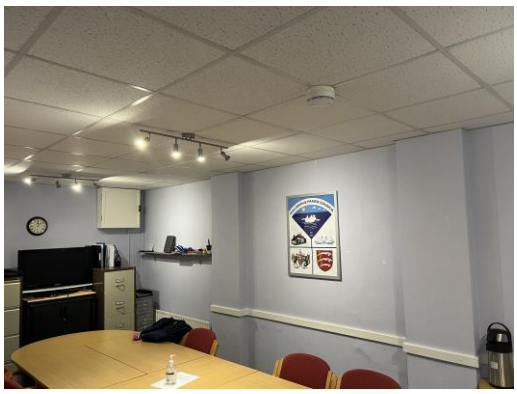
The radiator for the office is located behind the back of the desk and completely blocked, looking from above the desk is flush with the wall preventing heat from convection getting into the office space to heat the space efficiently. As a result, the radiator thermostat was set to 5 (max) to try and warm the space.

It is suggested that the 3-piece desk set up is pulled back two inches to allow warm air to circulate. Another measure would be to drill a series of circular holes in the back of the desk panel, again to allow warm air to radiate into the space.

This would be a free measure using maintenance team and should cut gas bills by around 5-10% as the radiator can then be set to 3 as a set point suitable for the office space. Savings approximately £35/year around 291kWh equivalent to 53kg CO2.

- Lighting

Lighting throughout the office is LED energy efficient down lights. On the day of the survey the lights in the meeting room were all on but there were no meetings planned. It is suggested that the light switch is replaced with an occupancy sensor to ensure the lights are only on when the area is occupied.



Meeting room lights and passive infra-red (PIR) unit for light switch

The light switch in the meeting room could be replaced with an occupancy sensor that can also be linked to natural light levels which when sufficient will not turn the lights on.

The PIR unit is around £55 and is straight forward to install/retrofit. If the lights are left on a couple of hours a day then with an approximate load of (12*3W – 0.36kW) savings of around 194kWh equivalent to £50 annually. Equivalent to around 39kg CO2 annually.

## Building Fabric

The brick facade pattern indicates a cavity wall structure. It is recommended that this is explored to see if there is a cavity that could be filled with insulation. There are damp issues in the meeting room which support the fact that the wall is lacking insulation. If there is no cavity then external or internal wall insulation could be considered – however this is likely to be an expensive option.

If there is scope for cavity wall insualtion this would reduce heat loss by around 30% for the external wall. This would translate to around around a 10% reduction in heating or 350kWh, as well as improving the damp issues.

## Renewable Energy - Solar Power

The flat roof could support photovoltaic panels to produce green electricity


The approximate area for panels is 46m2 which is more than sufficient.

| | | | |
|---|---|---|---|
| Roof area for panels | | 25 | m2 |
| Typical panel size 1.6m by 0.9m (1.44m2) | | 17 | panels |
| Approx. 300W per panel | | 6 | kWpk |
| Electricity generated annually | | 5,323 | kWh |
| Annual financial savings | £0.27 | £1,421 | |
| Annual carbon saving | | 1.0 | tCO2e |
| Rough cost £1,000 per kWp installed | | £6,076 | |
| Payback period | | 4.3 | |

Utilising 25m2 of the roof area there is scope for a 6kW peak solar array which would provide the power needs for the office and the residential flat upstairs in the spring/summer months. Approximately 50% of the year equivalent to around 870kWh per annum.

It's proposed to discuss with the resident if this were something they would like to invest in as the mix of daytime use for the office and early evening and weekends for the flat is a good fit to maximise the green electricity generated.

There are different approaches to sharing the power or exporting that can be explored if the resident is willing. Equally there is a business next door that may also be interested in supporting a renewable energy installation on the roof.