CLPM
CONSTRUCTION PROJECT CONSULTANCY

Heating System Strategy &
Energy Efficiency Report

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of

Ivers Parish Council (Iver Pavilion)

On behalf of CLPM Ltd by: Marcus Moulson

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You & Your Property:

CLPM were instructed by Ivers Parish Council to survey the property and report on its efficiency for future use.

The Existing Property:

This is a purpose-built structure constructed in 2010. Approximately 260m2.

Structure:

Traditional brick-built structure with cavity walls and a double pitched roof of common clay tiles. Accommodation is typical sports pavilion with two main changing and showering areas, officials' area, and a general entertainment space.

Windows & Doors:

Windows and doors are all double-glazed aluminum windows and are in good order with little sign of wear or issues. Doors are similarly in good order; all mechanisms are free and working correctly. There are steel power shutters over all windows and doors for security, the biproduct of this is that the widows etc. are protected from the weather which contribute to the efficiency of the building.

Heating/Hot Water:

Heating is provided by a Glow worm Flexicom boiler (30kW) utilising Honeywell control. Heat delivery is via underfloor heating throughout the building with room level controls.

Hot water is generated by an AO Smith cyclone III gas fire water boiler (480ltr, 84kW).

All equipment is housed in the plant room and looks to be well maintained and in good order.

Insulation:

Loft insulation levels are unknown (no access) but I suspect that there should be approximately 150mm of loft roll. This assumption is based on experience of commercial properties of this era. I will also assume that there is cavity insulation incorporated during construction.

Power:

The property has a single-phase connection.

Heat calculation:

I calculate the heating requirements of the property would be 18 to 20 kW (260m2 footprint). Which ties in with the currently installed boiler.

Our Suggestions:

As part of our discussions, you indicated that this building is currently very under utilised. The suggestions below are geared to making efficiency improvements for future use. However, these improvements will require capital investments in greater or lesser degrees. Insulation improvements are generally not a bad thing and are relatively inexpensive and should reduce the running costs on a day-to-day basis. The other suggestion will only be beneficial if the utilisation is maximized.

Insulation:

As we discussed I suggest that the loft installation level be checked and increased to a minimum 300mm, 400mm will not hurt the situation. Also, since the building is relatively recent then the construction plans could be reviewed to understand if cavity insulation was

specified. If the original plans are not available, I would suggest the cavities are checked for the presence of insulation, if none is found then it would be prudent to have it installed.

Windows and Doors:

There is little to do with the windows as they appear to be in good order and working well. The steel shutters are protecting them from the rigors of the weather and suppling a degree of thermal efficiency.

Airtightness/Breathability:

Insulating a property is not enough in itself, controlled air movement is very important. A well-insulated and sealed house needs to breathe. Obvious areas such as kitchens and toilets should have appropriate extraction systems. The more you insulate and seal a structure the more important it becomes to ventilate it in a controlled manner.
I saw no evidence that the building is not ventilating correctly especially considering the lack of use.

Heating system:

The current boiler is a good quality product with a good service and parts support network. Comparable in running cost terms to other systems available to you including renewable systems such as Air Source heat pumps. The current single phase connection limits the output of an air source unit to 12kW and a ground source unit to 18kw, which is below the current requirements of the building. The insulation improvements should reduce the heat requirements for the property a little further.

Given that the running costs of gas and air source are currently very similar, the capital investment (approx. £18 - £20k for air source and £36 - £40 for ground source)) to change

to a renewable system on environmental grounds, would need further consideration by the council financial departments.

Hot water:

The large amount of water needed by such properties is best served by the specialist water boiler already installed (approximately 80 – 90kW). When this product reaches its, serviceable life span you may wish to look at a renewable option. But to generate the same amount as the current gas-based product would require an upgrade in power to a commercial 3 phase supply.

Renewable Heating Systems:

Renewable heating systems come in two forms:

Ground Source:

Ground source comes in two forms: a pipe buried in loops underground which will need roughly 100m2 for each kilowatt of heat required, so you need a large area of land. The other option is drilling boreholes to extract the heat from the ground. Although more efficient than air source (4:1 as opposed to 3.2:1, heat kilowatts for electric kilowatts used) the initial setup costs and disturbance is far higher than a comparative air source system.

Air Source:

Air source is a far easier and cheaper installation process although less efficient (see above). The difference in relative costs makes it a better option. There is a small noise issue, but correct placing of the unit(s) may well mean you will not notice it. Air source units do vary in what noise they produce.

Renewable systems differ to traditional fossil boilers in several ways, but the key difference is the working temperature of the system. Fossil fuel boilers have a working temperature

of 75 to 80 degrees whereas renewable systems such as ground source and air source have a working temperature of between 35 and 50 degrees. This difference affects the size of radiators required to deliver heat into any given room. The size differential can be up to a 40% increase in radiator output/size. Another component that is different in the systems is the hot water tank. Tanks used for renewable heating systems are specifically designed to get the most out of the lower working temperatures and keep it. A buffer tank is usually installed as part of the system which will need to be housed somewhere locally in the house.

PV:

The modern approach to the use of Photovoltaic panels is to have sufficient to service the building's needs, rather than the old way of trying to produce the maximum and selling it back to the National Grid. A reasonable array will go a long way to offset the daytime needs of an average property.

The Roof is ideally positioned for the use of PV panels (south facing), you should be able to install around 12kW of PV panels (approx. 30 units). This power could be utilised in heating the hot water as well as providing daytime electricity. The only drawback is that during the winter months (football season) the output of PV panels will be less than the summer months.

Water Softener/scale inhibitor:

If the property is supplied directly from the mains water supply, it will have a high level of limescale. Limescale will coat the surfaces of heat exchangers which will reduce efficiency and reduce the longevity of taps. Two millimeters of scale will reduce the hot water production efficiency by around 10%. When fitting a water softener careful consideration should be given to the location of an untreated (Fresh) supply such as kitchens.

An alternative to a softener is the use of a Scale reducer of filter system, not as effective in removing scale but does slow down the buildup process.

Summary:

The building is in very good order and would not require any major works to improve the efficiency. Whether the council choose to invest capital in upgrading this underutilised asset is down to them. It would be possible to improve the green credentials of the pavilion but that would not affect the running cost in the current energy market. If gas prices where to climb them the return on investment would look a lot healthier.

A move to renewables could be considered when the current heat generation systems come to the end of their serviceable lives. But a move to renewable will require a commercial level three phase power supply, which may be costly to install.

I hope you find this report of use.

Kind regards
Marcus Moulson
CLPM Heating and Energy Consultant