CLPM
CONSTRUCTION PROJECT CONSULTANCY

Heating System Strategy &
Energy Efficiency Report

Prepared for: Nicole McCaig

of

Ivers Parish Council

(Iver Heath Pavilion)

On behalf of CLPM Ltd by: Marcus Moulson

CLPM Heat & Energy Consultant

25th October 2022

This document is prepared using information supplied or gathered during the meeting. We do not endorse any products or services; any such mentioned in this report are for example purposes only, where possible hyperlinks will be embedded for ease of access.

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 1980's. Approximately 260m2.
Some areas have been renovated but not all areas.

Usage:

This property is used on a regular basis, a portion is used by the tennis club and a portion is used for other activities including a local football club. The event rooms are used for other community activities.

Structure:

Traditional brick-built structure with cavity walls and a double pitched roof of concrete pan tiles. Accommodation is a 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 with wooden frames and are in fair order but do date back to the original construction. There are steel 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 Potterton kingfish cf125 gas boiler (48.8) utilising Honeywell controls. Heat delivery is via period steel radiators fitted with TRVs (thermostatic control valves) a small 120ltr hot water tank feed the kitchen and toilet basins.

A dedicated Lochinvar gas fire water heater (360ltr – 50kW) provide hot water to the showers

The system utilises a pair of assistor pumps to drive the showers. I assume this is due to a limited supply rate to the property.

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

Insulation:

Loft insulation levels are unknown (no access) but I suspect that there should be approximately 120mm of loft roll. This assumption is based on experience of commercial properties of this era. I will also assume that there is no cavity insulation. Given the configuration of the plant room I would also expect to find cold water storage tanks in the loft space to feed the pumps/showers.

Power:

The property has a single-phase connection.

Lights:

A lot of the lights in the property are older strip lights or tungsten bulbs.

Heat calculation:

A calculation of the heating requirements of the property would be 30 to 35 kW (260m2 footprint). The exact size of the water boiler is unknown but will be approximately 40kW based on similar size products.

Our Suggestions:

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. I would suggest the cavities be checked for the presence of insulation, if none is found then it would be prudent to have it installed.

Windows and Doors:

The windows and doors are in fair condition given the age but will probably need to be addressed at some stage. I would suggest the use of a modern uPVC double glazed product. You did mention that the steel shutters were due to be replaced with powered units rather the manual ones currently fitted. These activities would tie nicely together.

Lights:

I would suggest a move to LED or similar low energy lights to replace the existing strip lights and tungsten/halogen bulbs. It can be surprising how much energy can be saved by a simple upgrade.

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.

The current extraction in the shower areas could do with an upgrade, I would suggest humidity-controlled units rather than the current manual units. These would ensure that

the areas are purged of moisture rich air when used. This type of extractor is readily available in various sizes for different applications.

Heating system:

The current heating system is getting to the stage where it will need replacing. The boiler probably dates back to the original construction, Potterton are known to be reliable but there will come a time. The radiators are also of an era and not as efficient as modern products. A modern control system such as Honeywell Evo Home will also improve efficiency of the system, save money and allow remote monitoring and control.

Replacing the gas boiler can be achieved using various options dependent on requirements. A replacement gas boiler would be the simplest and cheapest option.

A move to renewables such as air or ground source would be possible but would require an upgrade in electricity supply to a commercial three phase supply which could be very costly depending on local supplies/cabling.

Hot water:

The current hot water boiler is ideally suited to the task as it can produce the large amounts of hot water quickly enough for this type of facility. New versions are available either using gas or electric. Gas is currently the cheaper option (factor of 3) to run but is not as environmentally sound as electric.
Renewables system can generate hot water but not as quickly as the gas or electric. The amount of water usage will govern the best way to generate the hot water.

An example: several football teams playing on a Sunday will require the system to reheat very quickly almost to the point of continuous production. The gas and electric systems can achieve these rates, but a renewable driven system could not supply at this level.
If you only require a single tanks work (400ltr) then this could be heated over a relatively short period of time, overnight for example (depends on unit sizes etc).

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 not ideally oriented for the use of PV panels. Although the adjacent Bowls club roof is. The bowls club roof could potentially support 60 panels (weight loadings would need to be checked) which could give you 225kW of power at peak times more than enough to drive the bowls club and the pavilion. With battery storage it could also provide night-time lighting for both the bowls area and the tennis courts.

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 in the filter system, not as effective in removing lime scale but does slow the buildup process.

Summary:

We discussed the ongoing renovation works of the pavilion. This is an ideal time to make changes to the property's efficiency in term of heat losses and power usage. How much of renewable technologies you incorporate will depend on the capitol available and the willingness to spend it. Current running costs of renewables and gas-based systems are very similar but if you are having to replace existing systems anyway then the additional expense of renewable product over gas fired could be justified when environmental factors are brought into consideration. Given the high utilisation of the facility it may be prudent to embrace the new technology to protect the future of the local population.

Of the various buildings I have surveyed, this one is the most in need and I think it should be the main focus of spending (other than insulation improvements to the others). The age of the system does push this property up the list for attention. Efficiency improvements would be the best of all the properties (especially given its popularity).

I hope you find this report of use.

Kind regards
Marcus Moulson
CLPM Heating and Energy Consultant