



Case Study Village Hall

Energy survey and revamp of heating system saves Village Hall over 40% in heating costs.



Benefits

By eliminating the patchwork of old equipment that had been added in an ad hoc fashion and completely redesigning the whole system with a focus on what was needed, a large saving in fuel costs (nearly 50% saving) were made whilst still providing more usable heat and hot water.

Like everyone else these days, the community in Much Marcle wanted to save as much money on the running costs of their village hall “the Memorial Hall”. So they tasked a consultant to do an Energy Survey of the building and to then make a list of improvements that could be made.

The survey found a list of minor improvements that could be made but also made a list of more radical changes that would bring even greater fuel savings.

MINOR IMPROVEMENTS

- Increase levels of insulation in roof.
- Repair, and install draught-proofing brushes on doors
- Install insulation to wood panels under glass sections

MAJOR IMPROVEMENTS

- Replace the current oil boiler with a high-efficiency bio-fuel boiler
- Install suitable thermal store to maintain bio-fuel boiler efficiency.
- Install thermostatically controlled return temperature control for Bio-fuel boiler
- Remove the hot water cylinder from the roof space above the toilets.
- Replace radiator TRV (radiator

thermostats) with self-balancing flow-sensing versions.

- Install control system PT1000 room sensors.
- Install insulated hot water return circuit to taps in toilets.
- Install PIR (movement) sensors in all toilets to activate the hot water return loop, and circulation pump.
- Install mixed circuit pump stations.
- Install weather compensated system controller.
- System controller to have remote access
- User and admin access, local and remote.
- Multi-time options for heating circuits.
- Temperature monitoring of thermal store.
- Multiply thermal store loading options depending on time, day and period of the year.
- Install a suitable immersion heater into the thermal store.
- Install electrical export monitoring system.
- Remote access to PV export control system.

Boiler

The current boiler was replaced with modern, highly efficient Worcester Bosch biofuel boiler, allowing the use of recycled fuel.

Thermal store

A 500 litre R1 highly insulated cylinder which combines heating and hot water for kitchen and toilets with mains pressure supply was installed. This meant that no large volume of preheated potable water is stored, reducing legionella issues.

Hot water in the toilets

The current cylinder was removed and an insulated return loop back from toilets with a temperature sensor ensures hot water on demand. It is controlled via a time clock and PIR sensors (movement sensor). If within a set period and the PIR sensor detects movement, the hot-water supply is heated, otherwise, it will wait to be activated. This circuit will run a legionella kill if required.

Using exported electricity

The thermal store has an immersion heater powered by the Solar PV panels on the roof. All electricity generated is monitored, and any directed and consumed by the immersion heater in the thermal store is recorded. This free and green electricity will be stored in a thermal store used for heating and hot water.



ATON

POWER TO HEAT

ATON is a plug & play solution for using surplus PV energy – without additional wiring. It consists of an energy meter and an immersion heater, which can be variably controlled from 50 W to 3 kW, for installation in a buffer cylinder.

Through a wireless connection, the energy meter (x2-tech) specifies the output the immersion heater can consume. The immersion heater sends all measurements (high limit safety cut-out, internal temperature and the values of the two external sensors) back to the energy meter.



The benefits are large and we estimate at least a 40% saving in fuel usage with a better overall heat distribution.



Control System

The control system is a simple touch screen interface. Two heating circuits, The Main Hall and Bob Dallow Room. Weather compensated heating maintains a background temperature of 12-14c to maintain the structure of the building. During the day (operational periods), the room temperature increases to the set point.



If a period of heating is required that is not planned, there is a simple user activation method either local or remote via App to switch on the heating.

Intelligent balancing radiator valves

With modern high efficiency circulating pumps that automatically change speed as thermostatic valves close, the valves need to be intelligent to get the best performance from the radiator. The introduction of this type of valve to the radiators within the Memorial Hall has both helped to reduce energy use and create a better heat distribution.



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