

SOLAR THERMAL EVACUATED TUBES

The panels rely on solar radiation to heat the fluid in the panels, so they are able to help raise the water temperature even on cloudy days. Fixed horizontally to the flat roof they perform better than flat plate collectors as they are able to collect light from a wider range of angles. The evacuated tubes are also subject to lower heat loss during the colder winter to give useful input on more days of the year.

The fluid within the solar thermal system dumps heat into the solar pre heat store. The lower temperature of the pre-heat store increases the period of the year when the solar thermal system can contribute to the hot water and heating demand.

PV PANELS

We have designed a renewable energy system comprising an array of Photovoltaic panels which are used in collaboration with an array of innovative technologies to create a bespoke system which is able to serve the full energy requirements of the dwelling without the need for fossil fuels. The panels generate the majority of their energy during the daylight hours in the summer months when there is the lowest energy demand by the house. The technologies employed in house aim to store the energy so that it can be used in periods of higher demand in the evenings.

HIGH EFFICIENCY LOG BOILER STOVE

The log burner is an important focal point of the living space however its heat output to the room should be carefully controlled so not to overheat the well-insulated space. Most heat is extracted using the top boiler which will transfer heat to the PCM thermal store to be used later for hot water or heating the house through the MVHR system.

LIFE PO4 BATTERY BANK

multiple modular arrays of lithium iron phosphate (LIFE PO4) batteries provide an optimised long- life electrical energy storage solution. LIFE PO4 are suited to the partial charge scenarios required by domestic batteries. To ensure their long term health a battery an 'active-balancing' management system will be employed.

ELECTRIC VEHICLE

With the client working from home, energy produced by the PV array during the day can be diverted to charge an electric vehicle. Vehicle to home power supply enables the vehicle to provide additional storage capacity at times of peak production. This can then be drawn out at times of Peak consumption.

IMMERSUN

The immerSun unit monitors the excess electricity generated by the PV array, about to be exported to the grid and diverts it to an immersion heater located in the PCM store. This efficiently converts the electricity into heat for on-site storage and use. Electricity generated on site is stored in batteries and the heat store optimising on site energy dependence. 'Generate on site. use on site" is out vision for self sustaining dwellings.

A+++ APPLIANCES

A+++ rated appliances and socket controllers which turn off appliances in stand-by. These will reduce the base energy load of the house.

VICTRON QUATRO INVERTER & CHARGER

This powerful true sine wave inverter is a sophisticated battery charger unit that manages the input from PV and manages its storage in PV batteries. The unit then converts this PV stored energy into AC to power domestic power loads from electric consumables. In the event of a grid failure or generator power being disconnected the inverter within the unit is automatically activated and takes over the supply to the connected loads. This happens so fast less than 10 milliseconds that computers and other electronic equipment will continue to operate without disruption.



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A single 10Kw pellet boiler that provides a 'standby' to feed the thermal store. This will provide additional autonomy to the energy system which can be managed via the house management control system.

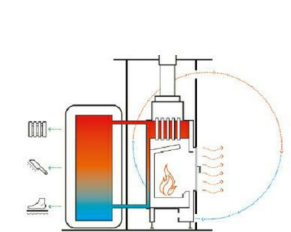
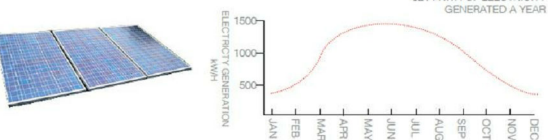
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Heat from the solar thermal array is transferred to the solar pre-heat store for domestic hot water and winter heat supply. The store is filled with Phase change materials (PCM). These Paraffin Wax balls provide latent heat storage which allows for up to 4 times the heat capacity storage over conventional water filled heat stores. This enables more the sun's energy to be harnessed and stored in a smaller volume and for longer periods.

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MVHR is an essential element of an airtight low energy building. If a building is airtight it will lose less heat and consequently reduce the amount of heat it needs. MVHR systems provide a constant supply of clean fresh air in a house while recovering over 90% of the heat from the 'stale' air as it is extracted. MVHR systems also regulate Relative Humidity to between 40% and 60% which optimises air 'health' and optimises CO2 levels to maximise occupant comfort. Process oxygen from the electrolysis process could be released into the home to further optimise internal climate conditions

periods of higher demand in the evenings.



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