Solartwin projects.com
Zero carbon solar water heating for washing and bathing

Case Study: The Catholic High School, Chester

The new Emmaus Building at The Chester Catholic High School has been built to accommodate the school's highly successful and expanding Sixth-form. Solartwin provided a complete turnkey solution from initial design through to onsite project management of the solar water heating system.

Client:

Liverpool based architects OMF Derek Cox designed the building to include such features as; sixth form accommodation on two floors including quiet rooms, seminar rooms, learning resource and a double height common room which is the focal point of the building. The common room doubles as a performance area for the school's Performing Arts Department which itself contains music, practice and rehearsal rooms, a recording studio and drama and dance studios.

Solartwin together with Paul Moy Associates, calculated that the total domestic hot water demand for the new sixth form centre would be approx. 8456 kWh/annum. This equates to approx. 675 litres of water heated from 10C – 65C for each day the building is occupied, roughly 200 days per year. The solartwin system is designed to contribute approx 50% of the buildings annual domestic hot water demand.

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Due to the schools occupancy being generally low over the summer months, we designed the solar thermal system to be optimised for "all-year" performance. This involved positioning the Solartwin collectors at a fixed angle of 70 degrees from horizontal, which increases the systems performance during Winter/Spring/Autumn months when the sun is at its lowest on the horizon, whilst reducing the summer gain when building is least occupied.

To achieve the 70-degree fixed angle the Solartwin collectors needed to be fixed to angle frames. This raised the issues of wind-loading, as the Solartwin collectors would effectively act as sails, and how the framework would be fixed to the building structure.

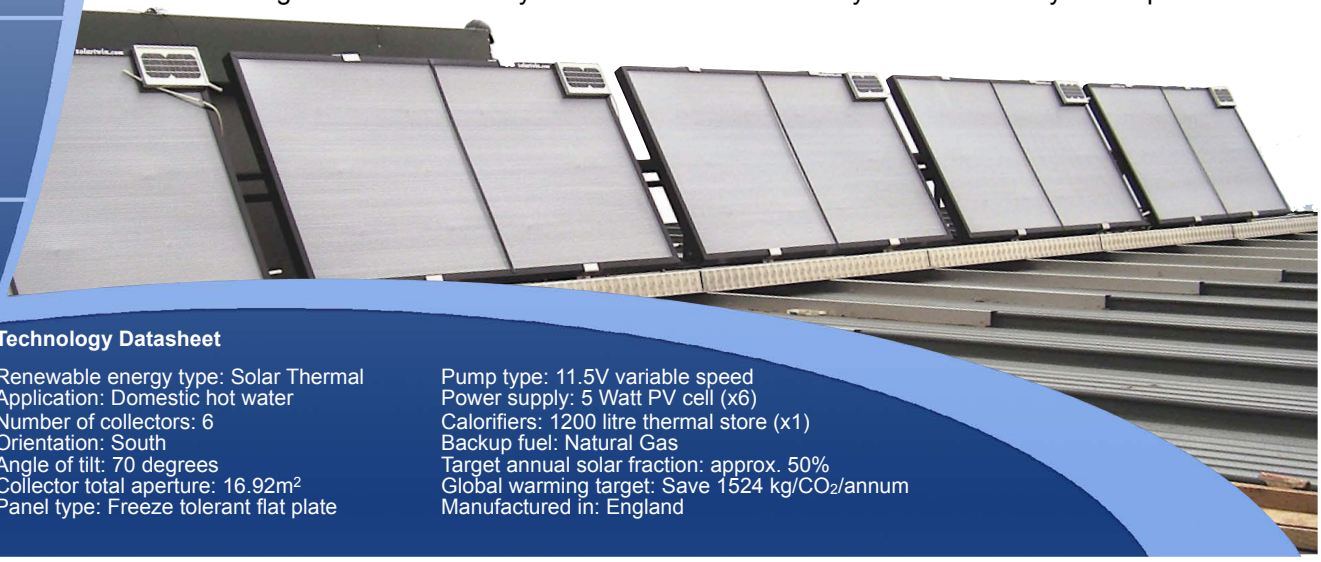
Principal Contractor:

We developed a solution with the design team, Read Construction (the principle contractor) and the roofing contractor which consists of "top-hat" sections which are fixed into the standing seam roof structure. A steel channel sub-frame is built up off the sections which avoided any penetrations through the roof, or fixings onto the main steel structural steel frame that could have caused weathering issues. We ensured roof access and a walkway with man-safe system were installed as part of the framework to allow access for maintenance or inspection of the solar collectors. We have extended the framework to allow for a 4kWp photovoltaic system to be installed in future as funds become available.

M&E Consultant:

We supplied and installed 6 no. 2.82m^2 (16.92m^2) Solartwin flat plate freeze tolerant collectors which are connected direct and in parallel to a 1200 litre thermal storage calorifier, located in the plant room. The system is designed to preheat the mains cold water supply to a gas fired hot water calorifier. The Solartwin pumps and controls are photovoltaic powered meaning the solar thermal system does not consume any mains electricity in its operation.

Architect:
OMF Derek Cox



Technology Datasheet

Renewable energy type: Solar Thermal
Application: Domestic hot water
Number of collectors: 6
Orientation: South
Angle of tilt: 70 degrees
Collector total aperture: 16.92m^2
Panel type: Freeze tolerant flat plate

Pump type: 11.5V variable speed
Power supply: 5 Watt PV cell (x6)
Calorifiers: 1200 litre thermal store (x1)
Backup fuel: Natural Gas
Target annual solar fraction: approx. 50%
Global warming target: Save 1524 kg/CO_2/annum
Manufactured in: England