



BAXI -SENERTEC UK



Release No. 151082

INTEGRATING SOLAR THERMAL FOR WHOLE SYSTEM EFFICIENCY

Low and Zero Carbon technologies are increasingly being integrated into commercial heating systems in order to improve the energy performance of buildings and to meet various legislative and planning requirements, like the Merton Rule for 10% to 15% of a building's energy use to be derived from renewable sources. Paul Hardy Managing Director of Andrews Water Heaters, Potterton Commercial and Baxi-SenerTec UK discusses some of the benefits of the Solar Thermal System option.

The simplicity of installation and operation and the environmental benefits offered are believed to be the key reasons why so many commercial projects are adopting solar thermal systems as the solution of choice for delivering the required carbon reductions. Another important consideration is the fact that the air-tightness of building has also been improving so that hot water is fast becoming the dominant load rather than space heating. It therefore makes sense to look for ways of reducing the energy used to heat domestic water services.

What are the main advantages of Solar Thermal Systems?

A solar thermal system has to incorporate a hot water cylinder in which to store the heat collected and reduces fossil energy usage by providing pre-heat to the cold water feed to the primary water heating source. Solar thermal solutions thereby offer an opportunity to significantly reduce carbon dioxide emissions – approximately 100 kgCO₂/m² of collector array per annum when compared with a natural gas primary heating appliance (based on a gross thermal efficiency of 80% with gas 0.193 kgCO₂/kWh (source: DTI). Such a system will go a long way to contributing towards achieving the Government's aim of 20% energy to be derived from renewable technologies by 2020.

With many years of development and usage worldwide solar thermal is perhaps the most proven and reliable of renewable options available, with the overriding advantage that heat from the sun is completely free.

The application of solar thermal systems is relatively simple, generally utilising the roof or, some types of solar arrays can even be designed to form part of a building facade. As solar thermal systems generate heat and not electricity, the installation is not complicated by other issues, as may be the case with other LZC technologies (eg. ground work for ground source heat pumps). Moreover, a solar thermal system has only one moving part, the pump, so maintenance costs are minimal.

Collector Options

There are two types of solar collector available, both fulfilling different specification requirements depending on the building. Glazed flat plate collectors are the more commonly used and can be mounted on a pitched roof or on a flat roof when attached to an 'A' frame. Evacuated tube collectors require a lower surface area of collector array per litre storage, which is ideal where roof space is limited. For instance, a 450 litre cylinder requires 4 glazed flat plate collectors, with a gross collector area of 10.2m² or two evacuated tube collectors, with a gross collector area of 5.7m². In addition, direct flow evacuated tube collectors can be mounted horizontally or on a vertical wall, further extending the range of design options available.

An average of 30-40% of the hot water load may be satisfied by the solar thermal system, this percentage being referred to as the Solar Fraction (SF). A well designed solar thermal system in summer months it may be able to achieve a SF of 100%, alleviating the need to burn fossil fuel in a boiler or water heater to generate hot water. In the colder winter months the SF may be as low as 15% requiring energy from the primary heating appliance to meet the hot water demand.

Collector Configuration

For large solar thermal systems it is not possible to connect the entire solar collector array in a series configuration. This is due to a combination of internal thermal expansion within the collector header and high pressure loss across the array. The latter would require that a larger circulator be used for the solar heat transfer fluid, leading to higher 'parasitic loss' negating some of the carbon reduction benefit. Therefore, a large number of collectors would need to be connected in a combination of series and parallel circuits. For both types of collector, the optimum orientation is south facing and the optimum angle of inclination is between 30° and 45° from the horizontal. When positioning rows of collectors, care must be taken to ensure sufficient spacing so as to prevent the collectors from shading each other during certain times of the year.

Direct flow evacuated tube collectors offer greater flexibility with regard to installation as they can be placed flat on a roof and each tube rotated by +/- 25° to optimise orientation and collector absorber angle, thereby significantly reducing occupied roof space.

Whole System Efficiency

Solar thermal systems are capable of providing significant savings in energy and running costs in the commercial sector as part of a well-designed system. An efficient system would preferably incorporate a solar thermal package coupled with a high efficiency water heater for hot water requirements, alongside other LZC technologies such as a ground source heat pump working in conjunction with a condensing boiler to provide efficient space heating.

Some leading manufacturers, like Baxi Commercial Division, can be approached as a total solutions provider and regarded as part of the project team, offering expertise as well as fully integrated systems that maximise the use of LZC technologies, thereby significantly reducing the carbon emissions and running costs of commercial buildings.

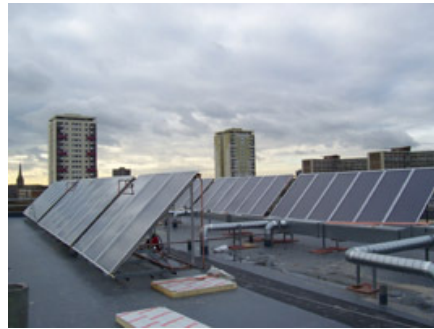
/Ends



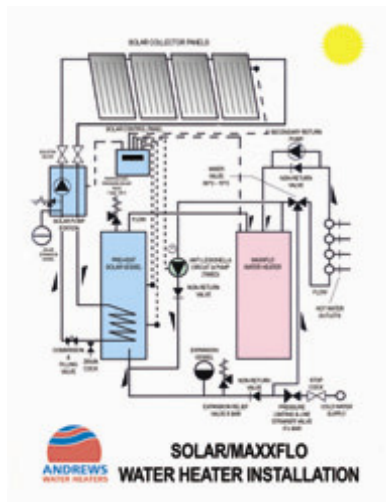
BAXI - SENERTEC UK



INTEGRATING SOLAR THERMAL FOR WHOLE SYSTEM EFFICIENCY



(SOLARflo glazed flat plate collectors from Andrews Water Heaters, installed at Travelodge, Fulham)



Low and Zero Carbon technologies are increasingly being integrated into commercial heating systems in order to improve the energy performance of buildings and to meet various legislative and planning requirements, like the Merton Rule for 10% to 15% of a building's energy use to be derived from renewable sources. Paul Hardy Managing Director of Andrews Water Heaters, Potterton Commercial and Baxi-SenerTec UK discusses some of the benefits of the Solar Thermal System option.