



## Stakeholders

**Mark Trahearn**, Greenwich Leisure Ltd;  
**Roger Shenton**, SolX Energy Ltd;

## THE BACKGROUND

White Horse Leisure and Tennis Centre (WHL) is a state of the art leisure centre, located in Abingdon, Oxfordshire in the UK. The centre boasts a variety of facilities including: Newly refurbished gym, fitness class studio, group cycling studio, 8 lane swimming pool, squash courts, badminton court sports hall, sauna & steam room & numerous tennis courts on all surfaces.

WHL facility is operated by Greenwich Leisure Ltd (GLL) who also manage over 250 further leisure centres in partnership with more than 30 local councils across the UK. Following internal research by this 'not for profit' organisation into WHL's electrical consumption zones, GLL found their air-conditioning to have a high potential for energy savings.

Based on the financial feasibility study into the systems at WHL, GLL have invested into its first solar assisted air-conditioning system retrofit installation. ThermX solar thermal cooling and heating technology has patent and patent pending rights worldwide. By adding ThermX solar thermal assisted technology, the HVAC load could be reduced resulting in a projected net plant reduction of around 25%.

This paper focuses on the benefits & results of ThermX solar thermal technology installation, comparing pre-installation base lines with post-installation data to determine the savings achieved, financial results and respective payback periods.

## THE PROJECT

GLL commissioned a review of the electrical consumption & potential viability for solar thermal installation to the refrigeration & HVAC systems at WHL. This energy audit recommended an installation onto the VRF cooling systems for the fitness class studios.

These are serviced by 3 Mitsubishi VRF systems; 2 x 35kw & 1 x 30kw. The systems are used for cooling only & are in service constantly during the centre's 14 hrs of operation per day.

Sub-metering of each of the 3 systems over a 7-week period showed that the systems collectively were consuming pro-rata in the region of 95,357 kWh per year prior to installation of the solar thermal technology.

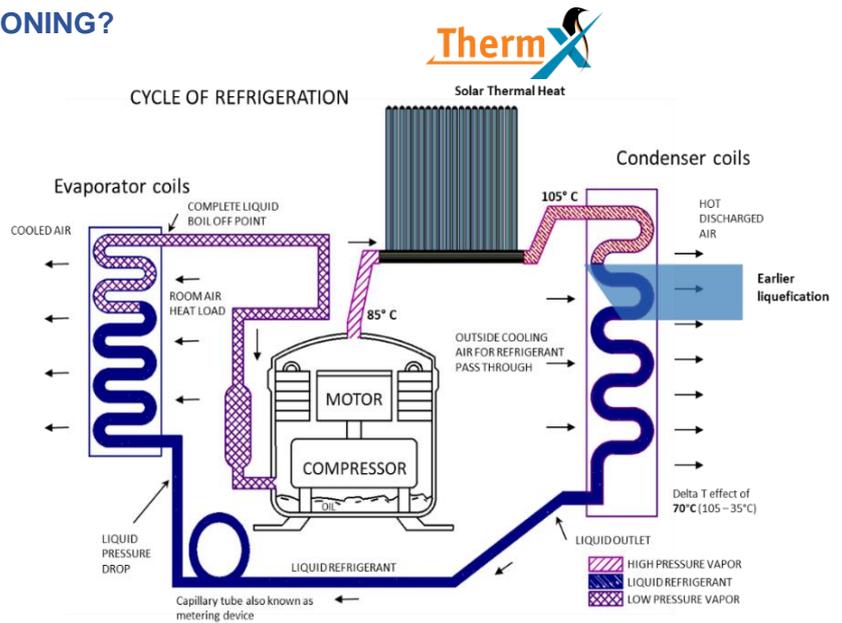
The Mitsubishi VRF units are located on the roof of the building. This is a large expanse of open space, so proved to be ideal for the placement of the solar thermal collectors.

2 collectors were required for each system & given the tubular design of them they are not required to be angled towards the sun. Obviously, the more they are exposed to direct sunshine, the more benefit they offer. Therefore, southerly positioning is always preferable.



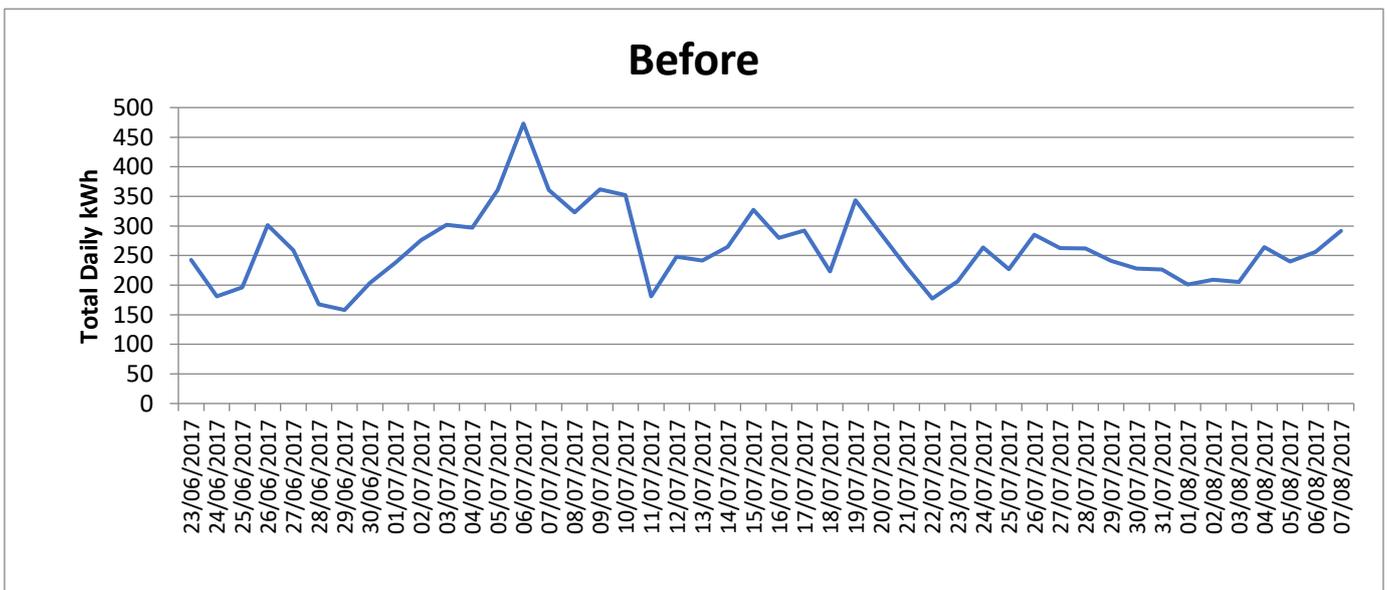
### WHAT IS SOLAR ASSISTED AIR CONDITIONING?

In short terms – ThermX solar thermal assisted air conditioning is a patented renewable energy technology, which involves the installation of a solar thermal collector in the refrigerant line, adding an element of heat which would under normal circumstances be generated by the compressor, allowing the modulating compressor or compressors to unload. This process accelerates the heat transfer at condensation point, thus improving the quantity of liquid flow through the expansion valve, reducing or eradicating flash gas. As a result, the cooling capacity in the evaporator is enhanced, achieving the observed energy reductions. The technology works on all modulating system sizes.



### PRE-INSTALLATION ENERGY AUDIT

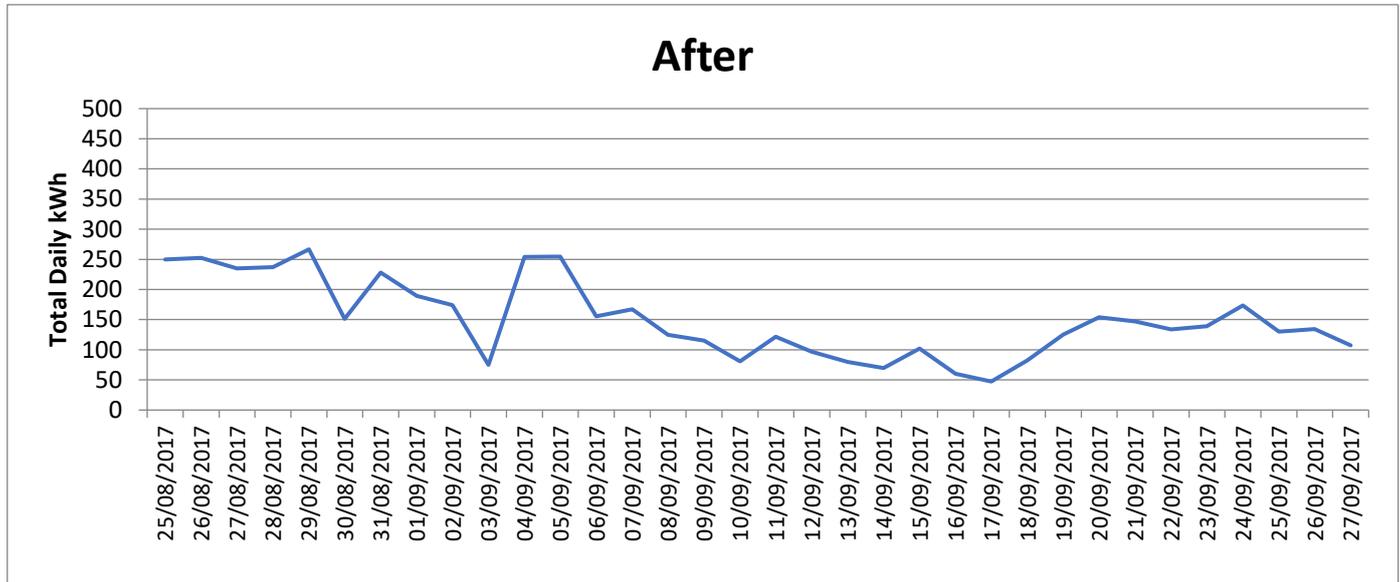
During the pre-installation energy audit phase, the energy usage of the individual VRF systems were assessed to prepare the financial feasibility study required for GLL to invest. The consumption of the 3 systems were measured over a 7-week period and the collective daily consumption profile is shown below.



Based on the input consumption and load profiles a conservative net energy saving of 21,002 kWh per annum was predicted for the ThermX solar assisted add-on. If achieved, this would result in a pay-back period of the full capital expenditure of this project in only 4.4 years.

### SAVINGS RESULTS

Following completion of the project the air conditioning systems were monitored further & below can be seen the first 4 weeks of data. Post-installation monitoring will continue for another 3-4 weeks to complete the review.



#### Pre-installation Consumption

Average daily	261.29 kWh
Estimated annual consumption (extrapolated)	95,370 kWh
Approx. annual running costs	£ 10,490

#### Post-installation Consumption

Average daily	149.54 kWh
Estimated annual consumption (extrapolated)	54,582 kWh
Approx. annual running costs	£ 6,004

<b>Overall savings</b>	<b>42.76 %</b>
<b>Cash savings</b>	<b>£ 4,486</b>
<b>Consumption savings</b>	<b>40,788 kWh</b>
<b>ROI</b>	<b>3.5 years</b>

*'We are always looking at introducing new technologies to further reduce utility spend as this is our second biggest cost. We met with SolX Energy to gain an understanding of how the ThermX system could benefit our existing plant, with a conservative projection of 25% from the offset we were keen to trial. 2 months on, the system is delivering a 42% saving which has exceeded our expectations. We are certainly looking forward to seeing what further savings can be achieved in the height of summer next year....'* **Mark Trahearn, Greenwich Leisure Ltd**

## SUMMARY

SolX Energy's ThermX solar assisted air conditioning and refrigeration is an exciting new renewable energy technology that maximizes the benefits of HVAC systems that have variable speed drives or modulating multi-staged compressors. The more modern the HVAC infrastructure, the higher the return on investment.



Unlike technology such as solar PV, solar assisted HVAC requires significant pre-engineering assessment and design. Clients and system integrators who can afford compliant measurement and verification will benefit from the peace of mind that their investment is working for them.

Whilst this study does not include the full life-cycle costing, it's relevant to note that the working load on the HVAC components is significantly less and as a result will increase its life expectancy.

In areas where power quality is an issue it is worth measuring and reporting power quality issues as this can affect compressor and VSD life and premature failures can incorrectly be attributed to solar assisted HVAC interventions. This is especially relevant on retrofit systems.

Further  
Information?

Roger Shenton  
SolX Energy Ltd  
0844 33 00 321  
+44 7921 399409  
[www.solxenergy.com](http://www.solxenergy.com)