

# CASE STUDY

## Kempsey Aged Care Solar Hot Water System



### Project Scope

The Kempsey age care facility is an existing 145 bed aged care facility with extensive hot water requirements for use in showering, meals preparation and sanitisation services. Urban energy have assisted by providing an efficient, low running cost and maintenance, high life expectancy solar hybrid hot water system as described below.

### System Design

Standalone solar / heat pump /gas boosted hot and warm water system

The basic principle of the hot water system is as follows:

- Heat from the sun is collected from the 20 solar collectors.
- This heat is stored in 4 x 580L solar stratified preheat storage tanks.
- A 16kW Heat pump also services the preheat tanks when the sun is not shining.
- Water then moves to the finishing tanks which are serviced by 4 high efficiency gas boilers keeping the outlet water temperature above 60 degrees. The Finished water then either enters the hot water ring main.

Carbon Dioxide and Cost savings of system  
The installed system has an estimated saving of 94 Tonnes CO2 per year compared with electric element heating.

Over a 15 year lifetime, each panel is equivalent to planting 353 trees. Total array equivalent to planting 7050 Trees

By installing this efficient alternative energy hybrid hot water system the Kempsey Aged Care Facility has saved significant quantities of carbon dioxide, the main contributor to global warming. The facility has also reduced the running costs of the hot water plant significantly.

Below is an estimation of the amount of hot water used by the hotel per day and the resultant Carbon Dioxide emissions from this system and alternative systems.

Expected Hot water consumption = 6,060L/day @ 65 degrees

Expected heat requirement = 352 kwh/day

The current system covers 68% of this demand by using solar thermal panels, please see the below graph to see the CO2 outputs and running costs of the various possible systems.

### SPECIFICATIONS

#### SOLAR COLLECTION PACKAGE

20 x Seido 1/16 Sunda Evacuated tube collector's with pitching frames

Expected daily (yearly average)output	240 kWh
Expected daily summer output	340 kWh/day
Expected daily winter output	140 kWh/day

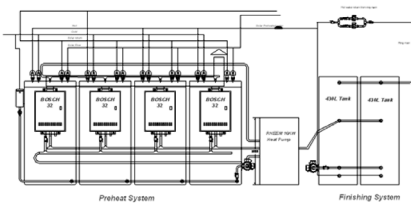
#### SOLAR STORAGE PLANT

4 x LATENTO BW 580 Litre storage tanks	
Heat storage capacity (15 - 90 degrees)	202 kWh
Peak flow rate	4 L/sec

#### GAS BOOSTING PLANT

4 x Bosch 32 250Mj High efficiency Boilers  
84% efficiency - 56kW each, 224kW combined power  
0.8kg of CO2 saving per kWh delivered compared with direct electric element heating

#### TANK LAYOUT - SOLAR FIELD 20 X COLLECTORS 2320 X 2000 EACH



#### SOLAR FIELD 20 X COLLECTORS - NOT TO SCALE WITH TANKS



#### ANNUAL CARBON OUTPUT AND RUNNING COSTS

