

# Example name: Kingspan facade solar air heater



# **BISTS characteristics:**

The Kingspan Integrated Sol-Air Collector (ISAC) is a modified Kingspan insulated composite panel. On a typical panel, five crowns are left un-insulated, creating profiled voids beneath the crowns. Incident solar radiation on the panel's outer steel skin is absorbed leading to a rapid temperature rise inside the channel. Fresh air is drawn into the channels at low level, heated and supplied into a supply plenum at the top of the panel. Additional, auxiliary heating systems will provide top-up heating when necessary.



## Stage of Development:

#### **Responsible:**

- O Idea/Patent
- O Prototype
- Demonstration
- Operation
   Integral building element
- Commercially available
- Kingspan Renewables Kingspan Renewables Kingspan Renewables

## **BISTS** description and context

Due to its easy and rapid system installation and dual functionality, thereby reducing material and labour costs, the Kingspan Integrated Sol-Air Collector was an ideal choice to provide solar pre-heated air to an occupied area in the case study building; a large supermarket warehouse. The ergonomic building envelope solution suited directly with the architectural features required by the portal fame, panel clad structure, requiring minimal on-site fabrication of the system structure and ideal for this new build project.

The case study system has been installed to provide solar pre-heating for a space  $645.12m^2$  and  $11483.13m^3$ . The Solar-Air flow rate for the building was calculated at  $89m^3/hr/m^2$  which required an effective collector area 72.8m<sup>2</sup>. Each panel has an effective area of 0.583 m<sup>2</sup> therefore 124.8 m<sup>2</sup> of panels were required. To fit the building's south facing façade, above proposed light wells, the total Kingspan Integrated Sol-Air Collector system was 8.95m high and 14.4m long (128.8m<sup>2</sup>).

#### System viability

Based on the 128.8m<sup>2</sup> of Solar-Air system installed on the south elevation façade and the 14.4m of linear plenum and HVAC duct, an estimation of the solar derived energy delivered, CO<sub>2</sub> reduction, final material cost, annual financial savings and payback period have been determined

Solar-Air Savings		
Total energy demanded by the building	66.32	Mw/hr
Total predicted energy delivered by Solar-Air	13.14	Mw/hr
Estimated annual savings	653	£/annum
Total cost of Solar-air system	2661,6	£
Payback period	5	Years
CO <sub>2</sub> annual Reductions	2.36	tCO2/Annum

Where the cost of natural gas was  $\pm 0.036$ /kWhr, additional cost of Solar-Air panels over standard panel costs  $\pm 10/m^2$ , cost of plenum  $\pm 39/m$ , cost of duct system  $\pm 25/m$ , sensors & control equipment  $\pm 450$ 

# Modelling and simulation tools developed/used

Not available





