

ABSTRACT

This project's main purpose was to design and install a standard solar air collector in the building facade. This is a fairly simple and cheap construction which converts solar energy into heat. The fresh air with the help of the fan is routed into the collector. Solar radiation penetrates the glass and is absorbed by the heated tube, then the heat is transferred into the air which flows through the tube by the phenomenon of convection, and finally the hot air exits the collector for various uses. Originally a literature review on other similar applications and a throwback to solar energy is done. It also becomes an introduction to the theory of solar energy, solar panels and solar air collectors. Afterwards, ideas are presented on how to integrate the solar thermal collector to the building frontage. After the selection of the appropriate concept, the collector and its appropriate features are analysed. The concept chosen is a flexible vertical hose device in the form of a coil. Based on this concept, the air enters the vertical hose and is heated by the flow of the tube and finally exits through it as a higher temperature. Next, is the design of the collector selected on the SolidWorks program. Then occurs the techno-economic study of the collector chosen and then the construction of the solar thermal collector. At the same time the steps for completing the structure are demonstrated. Following is the experimental procedure for the registration of temperatures and the incident radiation with the high and low fan speed. Based on these measurements the maximum system performance for high speed (86%) and low speed (66%) were measured. Moreover, an experiment for finding the time rate was conducted. At the end the conclusions arising from this work were recorded and also the prospects for the use of this concept regarding to future applications.