

**ANALYSIS AND COMPARAISON OF SOLAR ASSITED HEAT PUMP  
SYSTEMS FOR HEATING**

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**Abstract**

Heating systems and solar-heat pump are innovative technologies to support the production of ecological heat. They are becoming more important due to the acceleration of climate change and the rising cost of fossil resources.

The most promising source of energy for Algeria is solar energy because of its climate. Therefore the use of solar energy for space heating is an alternative future and very important for the Algerian economy. For the economical design of solar heating system, a theoretical study is required before installation. In this context a comparative study of performance of heating systems combining solar and heat pump as well as by conventional heating systems using solar or heat pump was undertaken. The building considered is located in Algiers.

Solar energy can be incorporated with the heat pump systems in a variety of configurations that can be classified into series and parallel arrangements.

In the parallel system of solar energy is used directly to supply the load when the solar gain is unable to satisfy the requirement often air to air heat pump type is used to provide the auxiliary energy necessary. In the series arrangement the solar energy is pumped through a heat transfer loop to be used on the evaporator side of the heat pump.

To study and optimize these heating systems, mathematical models have been developed and several simulations were performed, the influence of various parameters on system performance were identified, which collector efficiency, solar fraction and COP were determined, the collection area and the volume of heat storage were considered dominant parameters for the design of systems. The results show that the parallel system is the most convenient and these systems can save conventional energy and be competitive with traditional heating systems.

**Keywords:** COP, Heat Pump, Solar Heating, Solar Fraction.