

SYNTHESIS OF DESIGN CRITERIA
FOR SOLAR HEATING SYSTEMS

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Project Report

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SUMMARY

The objective of this project was to investigate the performance of a solar space heating system when certain design parameters were varied and to find the optimum value of these parameters.

The upcoming steps were followed for the completion of this project :

- [1] First of all, a review study was done about solar energy and the methods and techniques employed for solar space heating.
- [2] Then, a house with known floor area and heat load requirements was found in order to be used as the basis for the performance simulations.
- [3] Furthermore, an inquiry was made throughout the market so that to obtain price values and some technical characteristics of the equipment required (collectors, storage tanks, boilers). These data were needed for the economic and thermal performance analysis of the system.
- [4] Next, a study of the f-Chart simulation program was made and the various weather data for the location under investigation (Nicosia), were entered in the program.
- [5] Then, the main design criteria of solar heating systems were identified and by varying one at a time and keeping the rest fixed, the performance of the system was observed. These criteria were the: (i)Collector area per floor area or per heat load of the building, (ii)Mass flow rate through the collection system per collector area, (iii)Storage tank capacity per collector area, (iv)Collector slope angle, and (v)Collector azimuth angle.
- [6] After the collection of the simulation results, the optimum value of the above criteria were obtained, based on the economic performance of the system.

[7] Finally, a case study was conducted, using the optimum design criteria, and the monthly and yearly performance of the system was investigated through simulation. At the end, conclusions were drawn based on the overall results obtained.

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