HIGHER TECHNICAL INSTITUTE

MECHANICAL ENGINEERING COURSE

DIPLOMA PROJECT

DESIGN OF A SOLAR HOT WATER SYPPLY FOR A MULTISTOREY BUILDING

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DESIGN OF A SOLAR HOT WATER SYPPLY FOR A MULTISTOREY BUILDING

BY

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SUMMARY

The objective of this Diploma Project is to design a Solar Hot Water System for a building located in Nicosia.

To achieve this and design it successfully, the following steps should be followed:

1. The requirements of the building in hot water.
2. Give detail description of all the parameters affecting the solar system. Also describe the methods and techniques currently used in order to collect and store solar energy for water heating.
3. Design the appropriate solar system to satisfy the building requirements in hot water.
4. Determine the optimum size of the solar collector, storage, auxiliary source of heat and other equipment and accessories involved, including all necessary controls.
5. Pipe sizing of the various systems in the design, such as collection and distribution systems.
6. Prepare drawings such as plan views and diagrammatic layouts showing clearly the system layout and components.
7. Conduct a cost-estimate and compare it with that of a non-solar system.

INTRODUCTION

An active solar heating system is basically a central heating system in which the heat can be supplied from the solar panels usually installed on the roof. Alternatively, heat can be supplied from the panels and some from an auxiliary power source.

The solar panels absorb the incoming radiation from the sun and transfer the heat gained to an insulated storage tank through a circulating fluid. The circulating fluid is usually water or air.

An active solar system can contribute towards both hot water and space heating needs.
In this project, as it is mentioned before in the summary that it will be investigated the active solar system contribution towards hot water needs for a building.

The establishment of a solar-based economy in the very near future seems to be the only alternative to a sudden, global economic seizure in the short term. It is clear that the rate of fossil-fuel consumption cannot be allowed to increase exponentially.
These reserves are needed for the production of plastics, oil, medicines and other products as well as for power generation. Nor can the rate of release of energy from any source of the earth be allowed to reach a situation,

which will result major changes such as, climatic conditions, pollution levels and ecological balances.

Cyprus has no conventional sources of energy such as oil or coal. Its geographical location is such that it classifies Cyprus as one of the countries where the potential of renewable energy sources, more specifically of solar radiation is very high.

In Cyprus the contribution of domestic resources to meet the energy need is only 4.5%. This 4.5% comes from solar energy (water heating) and wood. The rest 95.5% of the energy needed is imported oil and coal.

Cyprus imports half million tons of crude oil which is processed in the national refinery and equal amounts of oil products.

The first renewable energy source that was used in Cyprus was the windmills, around the year 1930.

The second mass extended utilization of renewable energy source was done in the early sixties.

The Cypriot manufactures created more than 30.000 m^2 of collectors per year and 9% of the total electricity consumption was replaced by solar energy.

So one can see that Cyprus and all the other countries must find a way to replace oil with other renewable energy sources such as solar energy.