HIGHER TECHNICAL INSTITUTE

ELECTRICAL ENGINEERING COURSE

DIPLOMA PROJECT

ELECTRICAL INSTALLATION AND POWER SUPPLY OF A REMOTE AGRICULTURAL HOUSE

E. 1212

BY
HADJICOSTIS CHRISTOS

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ELECTRICAL INSTALLATION AND POWER SUPPLY OF A REMOTE AGRICULTURAL HOUSE

By Christos Hadjicostis

This project, in its first chapter deals with the installation of the house using supply from mains. This is the standard method used to provide power to a building.

Chapter two deals with the installation of the same house using solar modules to supply power to the house. Research is made to the total number of modules needed and to the type of components needed to supply throughout the day power.

Chapter three deals with the installation of the house using generator to supply power. The same components are used in this case as in chapter two with the difference that instead of solar module, a DC generator is used.

Chapter four deals with the installation using solar modules and generator. This configuration allows the supply of more loads. The drawback of this method is that it's very expensive.

The final chapter deals with the water pumping and the irrigation of the rows of the trees of the property. There is a description of its functions and options that the system provides.

CONTENTS

CHAPTER 2: PURELY SOLAR SUPPLY

CHAPTER 3: PURELY GENERATOR SUPPLY

CHAPTER 4: SOLAR & GENERATOR SUPPLY

ASSUMPTIONS

- Height of all the rooms is 3m.
- Height of the roof from the ground 3.25m
- Height of the distribution boards and EAC cabinet from the floor is 1.5m
- Height of all switches from the floor is 1.5m
- Height of sockets outlets from the floor is 0.5m
- External earth fault loop impedance is 1Ω
- Supply voltage for AC is 240V/50Hz and for DC 24V
- Ci, Cg, Ca factors are all equal to 1
- Wiring method is method 3 from IEE 16th edition regulations
- The prices are those of spring 2000.
- The currency analogy of US dollar to CY pound is taken to be $1.6 per £1

INTRODUCTION

In rural or undeveloped areas round the world, where the electricity supply does not have a fully developed network it is a necessity to provide an alternative source of power. This necessity lead in the discovery of new and renewable energy sources. These forms of energy are studied in this project.

These sources can be renewable or can be produced by more conventional means. The most usual renewable energy sources used worldwide are solar energy, aeolian energy and hydro energy. Hydro energy needs lots of equipment so it is not so commonly used in private properties. It is although an excellent way to produce electricity when dams or waterfalls are present.

Solar energy is a very common way to produce electricity. It is not very expensive but it requires large areas for the solar panels. Extra equipment such as batteries or inverters is also needed. D.C voltage that the panels produce must be converted to A.C, which are the typical home loads. A second reason the inverter is needed is to be able to connect to the power grid of the electricity authority. Batteries are for when the panels cannot produce electricity.

For our country, solar energy is a very good way to produce electricity since the sun shines all year long. During the summer in Cyprus the daily constant sunshine is more than eight hours. This amount of sun is enough to produce sufficient electricity for a summerhouse on a mountain, which has minimum load demand.

The solution of the problem of electricity supply in a small house located in a rural area will be dealt in this project. There is no easy access for the EAC to connect the house with the mains and for that purpose there is extra cost. So other options should be considered for the supply of electricity.

In this project hybrid systems of supply will also be shown. Combinations will be made between solar supply, mains and generators. This will be made to show whether it is for the best financial interest of the consumer not to use a single method of supply. There will also be special analysis about how long will take for each method to pay pack if the EAC supply was chosen.
In the choosing process there are other things to consider. Things like the noise of the diesel generators or the space needed to install the solar panels. So a special study should be made in order to determine whether there is middle point between those two methods. Between solar panels installation or generators installation.

It is hoped that the following report will offer an alternative way to supply power to homes. It is time to stop depend on the old type of fuels, the non-renewable ones. It is time to start using new form of energy, which is environment friendly and minimises the dependence of the entire country from liquid fuels.